

## Navigation Problems

| ID # | Question   | Choice A  | Choice B                                      | Choice C                             | Choice D                    | Illustrations |
|------|--|---|---|--------------------------------------|-----------------------------|---------------|
| 1    | A great circle track would be most advantageous when compared to the rhumb line track on which route? (Use gnomonic tracking chart WOXZC5274)                    | Cayenne (LAT 4°40'N, LONG 52°15'W) to Sao Tome (LAT 0°00', LONG 6°45'E) | <b>Palm Beach, FL, to the English Channel</b> | Natal, Brazil, to Reykjavik, Iceland | Recife, Brazil, to Monrovia |               |
| 2    | A vessel at LAT 07°05'N, LONG 81°45'W is to proceed to LAT 08°40'N, LONG 88°00'W. What are the course and distance by mid-latitude sailing?                      | 283.1°T, 381.2 miles  | <b>284.3°T, 384.6 miles</b>                   | 285.6°T, 385.0 miles                 | 286.8°T, 387.4 miles        |               |
| 3    | A vessel at LAT 10°22.0'S, LONG 7°18.0'E, heads for a destination at LAT 6°52.0'N, LONG 57°23.0'W. Determine the true course and distance by Mercator sailing.   | 285°T, 3825.3 miles   | <b>285°T, 4025.7 miles</b>                    | 296°T, 3825.3 miles                  | 296°T, 4025.7 miles         |               |
| 4    | A vessel at LAT 11°22'S, LONG 009°18'E heads for a destination at LAT 06°52'N, LONG 57°23'W. Determine the true course and distance by Mercator sailing.         | 296°T, 3,825.3 miles  | 296°T, 4,154.2 miles                          | 285°T, 3,825.3 miles                 | <b>285°T, 4,154.2 miles</b> |               |
| 5    | A vessel at LAT 14°10'N, LONG 61°00'W is to proceed to LAT 10°00'N, LONG 53°23'W. What is the course and distance by mid-latitude sailing?                       | 117.3°T, 503.0 miles  | 117.9°T, 504.0 miles                          | 118.6°T, 508.0 miles                 | <b>119.2°T, 512.0 miles</b> |               |
| 6    | A vessel at LAT 18°54'N, LONG 73°00'E, heads for a destination at LAT 13°12'N, LONG 54°00'E. Determine the true course and distance by Mercator sailing.         | 247°T, 1161 miles   | 250°T, 1172 miles                             | <b>253°T, 1154 miles</b>             | 256°T, 1136 miles           |               |
| 7    | A vessel at LAT 20°00'N, LONG 107°30'W is to proceed to LAT 24°40'N, LONG 112°30'W. What is the course and distance by mid-latitude sailing?                     | 314.0°T, 389.0 miles  | <b>315.3°T, 394.0 miles</b>                   | 317.2°T, 397.0 miles                 | 318.3°T, 399.0 miles        |               |
| 8    | A vessel at LAT 20°10'N, LONG 122°00'E is to proceed to LAT 26°18'N, LONG 128°20'E. What are the course and distance by mid-latitude sailing?                    | 041.2°T, 501.0 miles  | 041.9°T, 503.6 miles                          | <b>043.5°T, 507.3 miles</b>          | 044.7°T, 509.7 miles        |               |
| 9    | A vessel at LAT 21°18.5'N, LONG 157°52.2'W, heads for a destination at LAT 8°53.0'N, LONG 79°31.0'W. Determine the true course and distance by Mercator sailing. | 081°T, 4617.5 miles   | 081°T, 4915.8 miles                           | <b>099°T, 4617.5 miles</b>           | 099°T, 4915.8 miles         |               |
| 10   | A vessel at LAT 21°32'N, LONG 160°30'W, heads for a destination at LAT 30°00'N, LONG 150°00'E. Determine the true course and distance by Mercator sailing.       | 273°T, 2645 miles   | 273°T, 2692 miles                             | <b>281°T, 2733 miles</b>             | 284°T, 2762 miles           |               |

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| 11   | A vessel at LAT 28°00'N, LONG 116°00'W is to proceed to LAT 34°00'N, LONG 123°40'W. What is the course and distance by mid-latitude sailing?                       | 323°T, 428 miles            | 324°T, 453 miles        | <b>312°T, 533 miles</b>       | 302°T, 539 miles           |               |
| 12   | A vessel at LAT 28°20'N, LONG 16°00'W is to proceed to LAT 21°00'N, LONG 18°00'W. What is the course and distance by mid-latitude sailing?                         | <b>194.0°T, 453.0 miles</b> | 195.2°T, 451.0 miles    | 196.8°T, 450.0 miles          | 197.3°T, 448.0 miles       |               |
| 13   | A vessel at LAT 29°38.0'N, LONG 93°49.0'W, heads for a destination at LAT 24°38.0'N, LONG 82°55.2'W. Determine the true course and distance by Mercator sailing.   | 115°T, 637 miles            | <b>117°T, 658 miles</b> | 122°T, 648 miles              | 126°T, 665 miles           |               |
| 14   | A vessel at LAT 32°05.0'N, LONG 81°06.0'W, heads for a destination at LAT 35°57.0'N, LONG 5°45.0'W. Determine the distance by Mercator sailing.                    | 3128.2 miles                | <b>3770.6 miles</b>     | 4126.1 miles                  | 4508.0 miles               |               |
| 15   | A vessel at LAT 32°14.7'N, LONG 66°28.9'W, heads for a destination at LAT 36°58.7'N, LONG 75°42.2'W. Determine the distance by Mercator sailing.                   | 241.2° miles                | 270.2° miles            | 300.2° miles                  | <b>538.2° miles</b>        |               |
| 16   | A vessel at LAT 32°14.7'N, LONG 66°28.9'W, heads for a destination at LAT 36°58.7'N, LONG 75°42.2'W. Determine the true course by Mercator sailing.                | 058.2°T                     | 235.2°T                 | <b>301.8°T</b>                | 348.3°T                    |               |
| 17   | A vessel at LAT 33°45'N, LONG 118°30'W, heads for a destination at LAT 21°15'N, LONG 157°36'W. Determine the true course and distance by Mercator sailing.         | 109.8°T, 2196 miles         | 236.3°T, 2259 miles     | <b>250.2°T, 2216 miles</b>    | 289.2°T, 2413 miles        |               |
| 18   | A vessel at LAT 37°24.0'N, LONG 178°15.0'W, heads for a destination at LAT 34°18.0'N, LONG 178°25.0'E. Determine the true course and distance by Mercator sailing. | 041°T, 273.9 miles          | 047°T, 273.9 miles      | <b>221°T, 247.2 miles</b>     | 227°T, 247.2 miles         |               |
| 19   | A vessel at LAT 38°03.0'S, LONG 49°38.0'W, heads for a destination at LAT 41°26.0'S, LONG 38°32.0'W. Determine the true course by Mercator sailing.                | <b>111.5°T</b>              | 113.5°T                 | 158.5°T                       | 160.5°T                    |               |
| 20   | A vessel at LAT 38°36'N, LONG 11°36'W, heads for a destination at LAT 24°16'N, LONG 71°52'W. Determine the true course and distance by Mercator sailing.           | 236.4°T, 2,916.9 miles      | 254.4°T, 2,916.9 miles  | <b>254.4°T, 3,203.6 miles</b> | 285.6°T, 3,203.6 miles     |               |
| 21   | A vessel at LAT 40°42.0'N, LONG 74°01.0'W, heads for a destination at LAT 14°41.0'N, LONG 17°26.0'W. Determine the true course and distance by Mercator sailing.   | 123°T, 3066.5 miles         | 123°T, 3065.6 miles     | 118°T, 3066.5 miles           | <b>118°T, 3365.0 miles</b> |               |

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| 22   | A vessel at LAT 45°36.0'N, LONG 11°36.0'W, heads for a destination at LAT 24°16.0'N, LONG 73°52.0'W. Determine the true course and distance by Mercator sailing. | <b>247°T, 3299.3 miles</b>     | 247°T, 3951.6 miles                   | 251°T, 3298.5 miles                  | 251°T, 3951.6 miles              |               |
| 23   | A vessel at LAT 49°45'N, LONG 6°35'W, heads for a destination at LAT 25°50'N, LONG 77°00'W. Determine the true course and distance by Mercator sailing.          | <b>246.5°T, 3597 miles</b>     | 253.0°T, 3648 miles                   | 268.6°T, 3483 miles                  | 066.4°T, 3602 miles              |               |
| 24   | A vessel steams 1082 miles on course 047°T from LAT 37°18.0'N, LONG 24°40.0'W. What is the latitude and longitude of the point of arrival by Mercator sailing?   | LAT 49°30.0'N, LONG 06°22.0'W  | LAT 49°33.0'N, LONG 06°25.0'W         | <b>LAT 49°36.0'N, LONG 06°28.0'W</b> | LAT 49°39.0'N, LONG 06°31.0'W    |               |
| 25   | A vessel steams 1106 miles on course 249°T from LAT 13°30.0'N, LONG 144°30.3'E. What is the latitude and longitude of the point of arrival by Mercator sailing?  | LAT 07°01.0'N, LONG 127°02.0'E | <b>LAT 06°54.0'N, LONG 127°08.0'E</b> | LAT 06°50.0'N, LONG 127°13.0'E       | LAT 06°46.0'N, LONG 127°17.0'E   |               |
| 26   | A vessel steams 1650 miles on course 077°T from LAT 12°47'N, LONG 45°10'E. What is the latitude and longitude of the point of arrival by Mercator sailing?       | LAT 18°54'N, LONG 72°58'E      | <b>LAT 18°58'N, LONG 72°52'E</b>      | LAT 19°02'N, LONG 72°44'E            | LAT 19°06'N, LONG 72°36'E        |               |
| 27   | A vessel steams 3312 miles on course 282°T from LAT 34°24'S, LONG 18°18'E. What is the latitude and longitude of the point of arrival by Mercator sailing?       | LAT 22°39'S, LONG 43°17'W      | LAT 22°42'S, LONG 43°14'W             | LAT 22°47'S, LONG 43°10'W            | <b>LAT 22°55'S, LONG 43°05'W</b> |               |
| 28   | A vessel steams 576 miles on course 260°T from LAT 40°36'N, LONG 50°24'W. What are the latitude and longitude of the point of arrival by mid-latitude sailing?   | LAT 39°12'N, LONG 62°28'W      | LAT 39°06'N, LONG 62°34'W             | LAT 39°02'N, LONG 62°37'W            | <b>LAT 38°56'N, LONG 62°42'W</b> |               |
| 29   | A vessel steams 580 miles on course 083°T from LAT 13°12'N, LONG 71°12'W. What are the latitude and longitude of the point of arrival by mid-latitude sailing?   | LAT 14°17'N, LONG 61°23'W      | LAT 14°20'N, LONG 61°21'W             | <b>LAT 14°23'N, LONG 61°19'W</b>     | LAT 14°25'N, LONG 61°17'W        |               |
| 30   | A vessel steams 640 miles on course 047°T from LAT 34°45'N, LONG 140°00'E. What are the latitude and longitude of the point of arrival by mid-latitude sailing?  | LAT 41°57'N, LONG 150°02'E     | <b>LAT 42°01'N, LONG 149°57'E</b>     | LAT 42°06'N, LONG 149°53'E           | LAT 42°09'N, LONG 149°50'E       |               |
| 31   | A vessel steams 666 miles on course 135°T from LAT 40°24.0'N, LONG 74°30.0'W. What is the latitude and longitude of the point of arrival by Mercator sailing?    | LAT 32°30.0'N, LONG 64°41.0'W  | <b>LAT 32°33.0'N, LONG 64°46.0'W</b>  | LAT 32°36.0'N, LONG 64°49.0'W        | LAT 32°39.0'N, LONG 64°53.0'W    |               |
| 32   | A vessel steams 666 miles on course 295°T from LAT 24°24'N, LONG 83°00'W. What are the latitude and longitude of the point of arrival by mid-latitude sailing?   | LAT 29°01'N, LONG 94°18'W      | <b>LAT 29°06'N, LONG 94°16'W</b>      | LAT 29°10'N, LONG 94°10'W            | LAT 29°13'N, LONG 94°06'W        |               |

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| 33   | A vessel steams 720 miles on course 058°T from LAT 30°06.0'S, LONG 31°42.0'E. What are the latitude and longitude of the point of arrival by mid-latitude sailing?   | LAT 23°48'S, LONG 43°11'E            | <b>LAT 23°44'S, LONG 43°07'E</b>      | LAT 23°38'S, LONG 43°03'E      | LAT 23°34'S, LONG 43°00'E      |               |
| 34   | At 1542 ZT on 23 October, in DR position LAT 37° 28.5'N, LONG 156° 17.3'E, you observe an amplitude of the Moon. The center of the Moon is on the visible horizon and bears 282.5°psc. The variation is 0.0°. What is the deviation?   | <b>2.2°E</b>                         | 2.2°W                                 | 1.2°E                          | 1.2°W                          |               |
| 35   | At 0100 zone time on 23 September your DR position is LAT 24°25.0'N, LONG 83°00.0'W. You are steering course 315°T. The speed over the ground is 10.0 knots. You observed 3 morning sun lines. Determine the latitude and longitude of your 1100 running fix?  | <b>LAT 25°35.3'N, LONG 84°17.0'W</b> | LAT 25°42.6'N, LONG 84°18.7'W         | LAT 25°30.4'N, LONG 84°28.6'W  | LAT 25°28.3'N, LONG 84°34.3'W  | NP-0002       |
| 36   | At 0327 ZT, on 29 May , your DR position is LAT 25°00'N, LONG 64°15'W. You are steering 270°T at a speed of 13.6 knots. What is the zone time of sunrise?  | 0521                                 | <b>0529</b>                           | 0536                           | 0548                           |               |
| 37   | At 0400 zone time, on 24 June , your DR position is LAT 23°10.0'N, LONG 085°33'W. You are steering 295°T at a speed of 10.0 knots. What is the zone time of sunrise?   | 0452                                 | <b>0458</b>                           | 0504                           | 0510                           |               |
| 38   | At 0450 zone time, on 25 June your DR position is LAT 21°26.0' N, LONG 160°24.5' W. You are steering course 100°T at a speed of 10 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0514 running fix.  | LAT 21°27.0'N, LONG 160°17.0'W       | <b>LAT 21°25.0'N, LONG 160°18.0'W</b> | LAT 21°22.0'N, LONG 160°17.0'W | LAT 21°20.0'N, LONG 160°15.5'W | NP-0020       |
| 39   | At 0500 zone time, on 21 August , your DR position is LAT 47°00'N, LONG 125°15'W. You are steering 000°T at a speed of 9.8 knots. What is the zone time of sunrise?  | <b>0525</b>                          | 0529                                  | 0531                           | 0535                           |               |
| 40   | At 0520 zone time, on 17 March while taking stars for a morning fix, you observe an unidentified star bearing 050°T, at an observed altitude (Ho) of 45°00.0'. Your DR position at the time of the sight is LAT 27°23.0'N, LONG 39°42.0° W. The chronometer time of the sight is 08h 22m 15s, and the chronometer error is 01m 45s fast. Your vessel is steaming on a course of 300°T at a speed of 18 knots. What star did you observe? | Altair                               | Alkaid                                | Arcturus                       | <b>Deneb</b>                   |               |

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| 41   | At 0530 zone time, on 20 December , you depart Cape Town (ZD -1). You are bound for New York (ZD +5), and you estimate your speed of advance at 25 knots. The distance is 6,762 miles. What is your estimated zone time of arrival at New York?   | 1200, 31 December             | 1100, 31 December             | 0700, 31 December                    | <b>0600, 31 December</b>      |               |
| 42   | At 0600 zone time, on 16 March your DR position is LAT 20°10.0'N, LONG 81°30.0'W. You are steering course 300°T. The speed over the ground is 10 knots. You observed 3 morning sun lines. Determine the latitude and longitude of your 1130 running fix?  | LAT 20°28.5'N, LONG 82°12.6'W | LAT 20°32.0'N, LONG 82°16.4'W | <b>LAT 20°39.0'N, LONG 82°22.9'W</b> | LAT 20°42.5'N, LONG 82°26.2'W | NP-0004       |
| 43   | At 0600 zone time, on 22 October , you depart Manila, LAT 14°35.0'N, LONG 120°58.0'E (ZD -8). You are bound for Los Angeles, LAT 33°46.0'N, LONG 118°11.0'W, and you estimate your speed of advance at 20.2 knots. The distance is 6,385.9 miles. What is your estimated zone time of arrival at Los Angeles? | <b>1808, 3 November</b>       | 0208, 4 November              | 1008, 4 November                     | 0208, 5 November              |               |
| 44   | At 0600 ZT on 24 July your DR position is LAT 22°37'N, LONG 32°45'W. You are steering 185°T at a speed of 20.0 knots. Determine the computed altitude (Hc) and azimuth (Zn) for an observation of the Sun's lower limb taken at 1030 ZT. At this time the chronometer reads 00h 30m 16s and is 0m 31s slow.   | Hc 64°27.5' Zn 092.3°         | Hc 64°30.8' Zn 090.1°         | <b>Hc 64°41.7' Zn 087.8°</b>         | Hc 64°44.2' Zn 094.7°         |               |
| 45   | At 0800 ZT on 29 June your DR position is LAT 26°00.0'N, LONG 75°29.5'W. Given a chronometer time of 01h 00m 00s, determine the computed altitude (Hc) of the Sun for the assumed position nearest to the above given latitude and longitude.   | Hc 34°38.6'                   | Hc 34°48.6'                   | <b>Hc 34°58.6'</b>                   | Hc 35°18.6'                   |               |
| 46   | At 0820 zone time, on 10 April , you depart Yokohama, LAT 35°27.0'N, LONG 139°39.0'E (ZD -9). You are bound for Honolulu, LAT 21°18.5'N, LONG 157°52.2'W (ZD +10) and you estimate your speed of advance at 17.5 knots. The distance is 3,397 miles. What is your estimated zone time of arrival at Honolulu? | 0127, 17 April                | <b>1527, 17 April</b>         | 0127, 18 April                       | 0927, 18 April                |               |
| 47   | At 0900 zone time, on 23 September your DR position is LAT 28°48.0'N, LONG 153°11.5'W. You are steering course 257°T at a speed of 18.0 knots. You observed 3 morning sun lines. Determine the latitude and longitude of your 1020 running fix?   | 28°43.3'N, 153°32.1'W         | 28°46.4'N, 153°34.6'W         | <b>28°49.1'N, 153°37.0'W</b>         | 28°52.8'N, 153°30.6'W         | NP-0001       |

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| 48   | At 0915 zone time, on 11 May , you depart Yokohama, LAT 35°27.0'N, LONG 139°39.0'E (ZD -9). You are bound for Seattle, LAT 47°36.0'N, LONG 122°22.0'W, and you estimate your speed of advance at 19.5 knots. The distance is 4,276 miles. What is your estimated zone time of arrival at Seattle? | 1932, 19 May      | 0332, 20 May      | 1032, 20 May      | 1232, 20 May      |               |
| 49   | At 0915 zone time, on 6 March , you depart Sydney, LAT 33°51.5'S, LONG 151°13.0'E (ZD -10). You are bound for Kodiak, LAT 57°47.0'N, LONG 152°25.0'W, and you estimate your speed of advance at 21 knots. The distance is 6,222 miles. What is your estimated zone time of arrival at Kodiak?     | 0732, 17 March    | 2132, 17 March    | 0732, 18 March    | 2132, 18 March    |               |
| 50   | At 0915 zone time, on 7 April , you depart San Francisco, LAT 37°48.5'N, LONG 122°24.0'W (ZD +8). You are bound for Kobe, LAT 34°40.0'N, LONG 135°12.0'E, and you estimate your speed of advance at 17 knots. The distance is 4,819 miles. What is your estimated zone time of arrival at Kobe?   | 0343, 18 April    | 1243, 19 April    | 2143, 19 April    | 0443, 20 April    |               |
| 51   | At 0915 zone time, on 7 November , you depart Seattle, LAT 47°36.0'N, LONG 122°22.0'W (ZD +8). You are bound for Kobe, LAT 34°40.0'N, LONG 135°12.0'E, and you estimate your speed of advance at 18.5 knots. The distance is 4,527 miles. What is your estimated zone time of arrival at Kobe?    | 1257, 17 November | 0657, 18 November | 1857, 18 November | 0657, 19 November |               |
| 52   | At 0915 ZT, on 26 July , you depart Yokohama, LAT 35°27.0'N, LONG 139°39.0'E (ZD -9). You are bound for Seattle, LAT 47°36.0'N, LONG 122°22.0'W, and you estimate your speed of advance at 14 knots. The distance is 4,245 miles. What is your estimated ZT of arrival at Seattle?                | 0728, 7 August    | 1528, 7 August    | 0028, 8 August    | 1528, 8 August    |               |
| 53   | At 1000 ZT on 21 October your DR position is LAT 29°00'N, LONG 134°40'E. Determine the computed altitude (Hc) of the Sun for the assumed position (AP) nearest to the above given latitude and longitude, given a chronometer time of 01h 00m 00s.  | Hc 42°30.6'       | Hc 42°32.1'       | Hc 42°34.2'       | Hc 42°35.7'       |               |

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| 54   | At 1200 zone time, on 10 October , you depart San Francisco, LAT 37°48.5'N, LONG 122°24.0'W (ZD +8). You are bound for Yokohama, LAT 35°27.0'N, LONG 139°39.0'E, and you estimate your speed of advance at 22 knots. The distance is 4,536 miles. What is your estimated zone time of arrival at Yokohama? | 0111, 19 October  | 0211, 19 October  | 1011, 19 October  | <b>1911, 19 October</b>  |               |
| 55   | At 1210 zone time, on 1 December , you depart Seattle, LAT 47°36.0'N, LONG 122°22.0'W (ZD +8). You are bound for Guam, LAT 13°27.0'N, LONG 144°37.0'E, and you estimate your speed of advance at 20 knots. The distance is 4,948 miles. What is your estimated zone time of arrival at Guam?               | 1734, 11 December | 1934, 11 December | 0334, 12 December | <b>1334, 12 December</b> |               |
| 56   | At 1300 ZT on 9 May your DR position is LAT 24°00'N, LONG 83°26'W. Determine the computed altitude (Hc) of the Sun for the assumed position (AP) nearest to the above given latitude and longitude, given a chronometer time of 07h 00m 00s.   | Hc 68°22.8'       | Hc 68°24.1'       | Hc 68°25.2'       | <b>Hc 68°26.6'</b>       |               |
| 57   | At 1318 ZT on 10 September, in DR position LAT 24° 05.8' N, LONG 058° 08.3' E, you observe an amplitude of the Moon. The upper limb of the Moon is on the visible horizon and bears 254° psc. Variation is 2° W. What is the deviation?  | 8.0°W             | 8.0°E             | <b>4.0°W</b>      | 4.0°E                    |               |
| 58   | At 1337 Z on July 17, in DR position LAT 30° 56.8' S, LONG 039° 36.5' W, you observe an amplitude of the Moon. The upper limb of the moon is on the visible horizon, bearing 263.0°psc. The variation is 20°W. What is the deviation?  | 2.6°E             | 2.6°W             | <b>3.6°E</b>      | 3.6°W                    |               |
| 59   | At 1400 zone time, on 11 April , your DR position is LAT 25°40'N, LONG 91°00'W. You are steering 180°T at a speed of 10.0 knots. What is your zone time of sunset?   | 1812              | 1816              | 1820              | <b>1825</b>              |               |
| 60   | At 1423 you are on course 072 T° at 12.2 knots, when you sight a rock awash bearing 070°T at a range of 3.6 miles. If you change course at 1427, what course would you steer to leave the rock 1.0 mile abeam to port?   | 049°              | 054°              | 086°              | <b>091°</b>              |               |



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| 61   | At 1430 ZT on 16 April, in DR position LAT 34° 03.8' N, LONG 061° 02.5'W, you observe an amplitude of the Moon. The center of the Moon is on the visible horizon and bears 095.2°psc. The variation is 12°W. What is the deviation?      | 1.7°W    | 1.7°E    | 1.9°W    | 1.9°E    |               |
| 62   | At 1435 ZT on 27 April, in DR position LAT 51° 56.8' N, LONG 150° 37.7' E, the Moon's upper limb is observed on the visible horizon, bearing 242.2° psc. Variation is 2° W. What is the deviation?                                       | 2.2°W    | 2.2°E    | 6.2°E    | 6.2°W    |               |
| 63   | At 1444 ZT on 28 July, in DR position LAT 40° 56.8' N, LONG 167° 12.4' E, you observe an amplitude of the Moon. The upper limb of the Moon is on the visible horizon and bears 299.3° psc. The variation is 1° E. What is the deviation? | 3.1°W    | 3.1°E    | 2.1°W    | 2.1°E    |               |
| 64   | At 1502 ZT on 4 August, in DR position LAT 11° 21.6' S, LONG 088° 14.3' E, you observe an amplitude of the Moon. The upper limb of the Moon is on the visible horizon and bears 289° psc. The variation is 15° W. What is the deviation? | 1.1°E    | 1.1°W    | 1.9°E    | 1.9°W    |               |
| 65   | At 1523 ZT on 14 June, in DR position LAT 31°58'S, LONG 48°42'W you observe an amplitude of the Moon. The center of the Moon is on the visible horizon and bears 118.0°psc. The variation is 10°W. What is the deviation?                | 2.5°W    | 2.1°W    | 1.7°W    | 1.7°E    |               |
| 66   | At 1524 ZT on 14 June, in DR position LAT 30°51'N, LONG 30° 02'W, you observe an amplitude of the Moon. The center of the Moon is on the visible horizon and bears 103.9°pgc. The variation is 10°W. What is the gyro error?             | 1.8°W    | 2.4°E    | 2.2°E    | 2.0°E    |               |
| 67   | At 1538 ZT on 15 October, in DR LAT position LAT 18° 12.8' S, LONG 160° 48.4' E, you observe an amplitude of the Moon. The center of the Moon is on the visible horizon and bears 276.2°psc. Variation is 10° E. What is the deviation?  | 2.6°E    | 2.6°W    | 3.6°E    | 3.6°W    |               |
| 68   | At 1544 zone time, on 5 October, your DR position is LAT 25°00'N, LONG 60°15'W. You are steering 270°T at a speed of 6.8 knots. What is the zone time of sunset?   | 1728     | 1737     | 1741     | 1745     |               |



| ID # | Question   | Choice A                      | Choice B                      | Choice C                      | Choice D                             | Illustrations |
|------|--|-------------------------------|-------------------------------|-------------------------------|--------------------------------------|---------------|
| 69   | At 1547 ZT on 22 May, in DR position LAT 45° 12.8' N, LONG 028° 15.4' W, the Moon's upper limb is observed on the visible horizon, bearing 120.0° psc. Variation is 2° W. What is the deviation?   | 1.4°W                         | <b>2.6°E</b>                  | 1.4°E                         | 2.6°W                                |               |
| 70   | At 1610 ZT on 14 August, in DR position LAT 33° 24.6' S, LONG 028°15.4'W, you observe an amplitude of the Moon. The center of the Moon is on the visible horizon and bears 111.0° psc. The variation is 2° E. What is the deviation?   | 1.1°E                         | <b>1.1°W</b>                  | 2.1°E                         | 2.1°W                                |               |
| 71   | At 1620 ZT on 10 September, in DR position LAT 34° 03.8' N, LONG 050° 28.4' W, you observe an amplitude of the Moon. The Moon's upper limb is observed on the visible horizon and bears 110.2° psc. The variation is 2° E. What is the deviation?  | 2.0°E                         | 2.0°W                         | <b>1.2°E</b>                  | 1.2°W                                |               |
| 72   | At 1622 ZT on 15 June, in DR position LAT 10° 15.2' N, LONG 135° 10' W, you observe an amplitude of the Moon. The center of the Moon is on the visible horizon, bearing 101.2°psc. The variation is 5° E. What is the deviation?   | <b>1.5°E</b>                  | 1.5°W                         | 0.5°E                         | 0.5°W                                |               |
| 73   | At 1730 zone time, on 3 March , your DR position is LAT 16°00'S, LONG 80°00'W. You are steering 000°T at a speed of 7.5 knots. What is the zone time of sunset?  | 1829                          | 1834                          | <b>1843</b>                   | 1852                                 |               |
| 74   | At 1800 zone time, on 7 December , your DR position is LAT 22°48'S, LONG 91°26'W. You are steering 320°T at a speed of 14.0 knots. What is the zone time of sunset?  | 1830                          | 1836                          | <b>1842</b>                   | 1852                                 |               |
| 75   | At 1820 zone time, on 21 March , you depart San Francisco, LAT 37°48.5'N, LONG 122°24.0'W (ZD +8). You are bound for Melbourne, LAT 37°49.2'S, LONG 144°56.0'E, and you estimate your speed of advance at 21 knots. The distance is 6,970 miles. What is your estimated zone time of arrival at Melbourne? | 1214, 4 April                 | 2214, 4 April                 | <b>0814, 5 April</b>          | 1314, 5 April                        |               |
| 76   | At 1830 zone time, on 6 April your DR position is LAT 26°33.0' N, LONG 64°31.0' W. You are steering course 082°T at a speed of 16.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1900 running fix.   | LAT 26°20.1'N, LONG 64°19.4'W | LAT 26°23.7'N, LONG 64°29.3'W | LAT 26°28.4'N, LONG 64°32.1'W | <b>LAT 26°32.5'N, LONG 64°27.1'W</b> | NP-0019       |

| ID # | Question  | Choice A         | Choice B         | Choice C         | Choice D         | Illustrations |
|------|---|------------------|------------------|------------------|------------------|---------------|
| 77   | At 1845 zone time on 17 March, while taking stars for an evening fix, you observe an unidentified star bearing 200°T at an observed altitude of 53°45.0'. Your DR position at the time of the sight is LAT 25°10.0'N, LONG 66°48.0'W. The chronometer time of the sight is 10h 47m 49s, and the chronometer error is 1m 54s fast. Your vessel is steaming on a course of 290°T at a speed of 18.0 knots. What star did you observe? | Altair           | Mirfak           | Pollux           | Rigel            |               |
| 78   | At 1845 zone time, on 24 October, you depart Bimini Island, LAT 25°50.0'N, LONG 77°00.0'W (ZD +5). You are bound for Bishop Rock, LAT 49°40.0'N, LONG 6°34.0'W, and you estimate your speed of advance at 13.6 knots. The distance is 3,491 miles. What is your estimated zone time of arrival at Bishop Rock?  | 0627, 3 November | 1642, 3 November | 0939, 4 November | 1627, 4 November |               |
| 79   | At 2043 ZT on 13 October you are in DR position LAT 43°57.3' S, LONG 147°16.0' E, when you observe an amplitude of Venus. The planet is about one Sun's diameter above the horizon and bears 236.2°pgc. The variation is 15°E. What is the gyro error?  | 0.0°             | 0.9°E            | 1.8°E            | 0.4°W            |               |
| 80   | At 2048 ZT on 13 October you are in DR position LAT 44°02.8' S, LONG 146°58.3' E when you observe an amplitude of Venus. The planet is about one Sun's diameter above the visible horizon and bears 222.2°psc. The variation is 15°E. What is the deviation?  | 0.0°             | 1.1°E            | 1.0°W            | 1.5°W            |               |
| 81   | At 2221 your course is 222°pgc at a speed of 11.2 knots, when radar detects a buoy bearing 355° relative, at a range of 5.8 miles. The gyro error is 2°E. If you change course at 2226, what course should you steer to leave the buoy 1.0 mile abeam to port?  | 206°pgc          | 210°pgc          | 228°pgc          | 231°pgc          |               |
| 82   | At 2231 ZT on 14 July you are in DR position LAT 34°06' S, LONG 149°47' W when you observe an amplitude of Jupiter. The planet is about one Sun's diameter above the visible horizon and bears 257.1°psc. The variation is 15°E. What is the deviation?   | 0.5°E            | 0.5°W            | 1.5°W            | 2.5°W            |               |

| ID # | Question  | Choice A | Choice B | Choice C | Choice D | Illustrations |
|------|---|----------|----------|----------|----------|---------------|
| 83   | At 2232 ZT on 14 July you are in DR position LAT 33°52' S, LONG 150°03' W when you observe an amplitude of Jupiter. The planet is about one Sun's diameter above the visible horizon and bears 268.5°pgc. The variation is 15°E. What is the gyro error?  | 1.0°E    | 0.5°E    | 0.0°     | 0.5°W    |               |
| 84   | At 2234 ZT on 14 July you are in DR position LAT 34°03' N, LONG 150°16' W when you observe an amplitude of Saturn. The planet is about one Sun's diameter above the visible horizon and bears 272.1°pgc. The variation is 14°E. What is the gyro error?   | 0.5°W    | 0.5°E    | 1.5°W    | 2.5°E    |               |
| 85   | At 2237 ZT on 14 July you are in DR position LAT 33°57' N, LONG 150°32' W when you observe an amplitude of Saturn. The planet is about one Sun's diameter above the visible horizon and bears 258.6°psc. The variation is 14°E. What is the deviation?  | 2.0°W    | 1.0°W    | 0.0°     | 1.0°E    |               |
| 86   | At 2326 ZT on 22 June your vessel's position is LAT 28°30'N, LONG 150°04'W. An azimuth of the planet Jupiter is observed, and the standard compass bearing is 250.4°. The chronometer reads 09h 24m 36s and is 01m 12s slow. The variation of this area is 13.5°E. What is the deviation of the standard compass? | 3.0°W    | 3.5°W    | 1.5°E    | 2.3°E    |               |
| 87   | At your current speed of 17 knots you only have enough fuel remaining to travel 316 miles. You must travel 622 miles to reach your destination. What should you reduce your speed (knots) to in order to reach your destination?  | 12.1     | 13.3     | 14.5     | 15.7     |               |
| 88   | At your current speed of 18 knots you only have enough fuel remaining to travel 316 miles. You must travel 731 miles to reach your destination. What should you reduce your speed (knots) to in order to reach your destination?  | 10.4     | 11.8     | 13.2     | 14.6     |               |
| 89   | At your current speed of 19 knots you only have enough fuel remaining to travel 265 miles. You must travel 731 miles to reach your destination. What should you reduce your speed (knots) to in order to reach your destination?  | 13.8     | 12.6     | 11.4     | 10.2     |               |
| 90   | At your current speed of 20 knots you only have enough fuel remaining to travel 218 miles. You must travel 395 miles to reach your destination. What should you reduce your speed (knots) to in order to reach your destination?  | 17.4     | 16.2     | 14.9     | 13.7     |               |

| ID # | Question   | Choice A     | Choice B     | Choice C     | Choice D     | Illustrations |
|------|--|--------------|--------------|--------------|--------------|---------------|
| 91   | At your current speed of 20 knots you only have enough fuel remaining to travel 360 miles. You must travel 440 miles to reach your destination. What should you reduce your speed (knots) to in order to reach your destination? | 18.1         | 17.5         | 16.9         | 16.3         |               |
| 92   | At your current speed of 21 knots you only have enough fuel remaining to travel 404 miles. You must travel 731 miles to reach your destination. What should you reduce your speed (knots) to in order to reach your destination? | 18.9         | 17.8         | 16.7         | 15.6         |               |
| 93   | At your current speed of 21 knots you only have enough fuel remaining to travel 435 miles. You must travel 755 miles to reach your destination. What should you reduce your speed (knots) to in order to reach your destination? | 15.9         | 17.1         | 18.3         | 19.5         |               |
| 94   | At your current speed of 22 knots you only have enough fuel remaining to travel 422 miles. You must travel 844 miles to reach your destination. What should you reduce your speed (knots) to in order to reach your destination? | 19.8         | 18.4         | 17.0         | 15.6         |               |
| 95   | At your current speed of 22 knots you only have enough fuel remaining to travel 440 miles. You must travel 618 miles to reach your destination. What should you reduce your speed (knots) to in order to reach your destination? | 17.8         | 18.6         | 19.4         | 20.2         |               |
| 96   | At your current speed of 23 knots you only have enough fuel remaining to travel 386 miles. You must travel 785 miles to reach your destination. What should you reduce your speed (knots) to in order to reach your destination? | 19.3         | 17.7         | 16.1         | 14.5         |               |
| 97   | Determine the distance from LAT 19°54.0'N, LONG 166°36.0'E to LAT 19°54.0'N, LONG 157°54.0'W. by parallel sailing.   | 2204.6 miles | 2006.9 miles | 2002.8 miles | 1990.6 miles |               |
| 98   | Determine the distance from LAT 23°24'S, LONG 13°54'E to LAT 23°24'S, LONG 42°48'W. by parallel sailing.   | 3119.3 miles | 3122.2 miles | 3124.5 miles | 3126.6 miles |               |
| 99   | Determine the distance from LAT 34°18'S, LONG 172°40'E to LAT 34°18'S, LONG 152°38'E, by parallel sailing.   | 993.0 miles  | 995.2 miles  | 996.4 miles  | 998.6 miles  |               |
| 100  | Determine the distance from LAT 59°12'N, LONG 14°00'W to LAT 59°12'N, LONG 03°20'W by parallel sailing.  | 324.2 miles  | 325.4 miles  | 327.7 miles  | 328.9 miles  |               |
| 101  | Determine the distance from LAT 63°54.0'N, LONG 04°52.0'E to LAT 63°54.0'N, LONG 18°24.0'W by parallel sailing.  | 608.6 miles  | 610.9 miles  | 612.3 miles  | 614.2 miles  |               |

| ID # | Question  | Choice A                     | Choice B                   | Choice C                   | Choice D                     | Illustrations |
|------|---|------------------------------|----------------------------|----------------------------|------------------------------|---------------|
| 102  | Determine the great circle distance and initial course from LAT 08°36.0'N, LONG 126°17.0'E to LAT 02°12.0'S, LONG 81°53.0'W.  | 9015 miles, 067°T            | 9076 miles, 067°T          | 9105 miles, 079°T          | <b>9076 miles, 079°T</b>     |               |
| 103  | Determine the great circle distance and initial course from LAT 08°53.0'N, LONG 79°31.0'W to LAT 33°51.5'S, LONG 151°13.0'E.  | 7809 miles, 247.0°T          | 7763 miles, 247.0°T        | <b>7635 miles, 233.9°T</b> | 7618 miles, 230.3°T          |               |
| 104  | Determine the great circle distance and initial course from LAT 12°45.2'N, LONG 124°20.1'E to LAT 33°48.8'N, LONG 120°07.0'W. | <b>6185.9 miles, 050.3°T</b> | 6231.3 miles, 309.7°T      | 6248.0 miles, 048.3°T      | 6382.0 miles, 311.7°T        |               |
| 105  | Determine the great circle distance and initial course from LAT 24°52.0'N, LONG 78°27.0'W to LAT 47°19.0'N, LONG 06°42.0'W.   | <b>3593 miles, 048.1°T</b>   | 3457 miles, 053.3°T        | 3389 miles, 042.4°T        | 3367 miles, 045.0°T          |               |
| 106  | Determine the great circle distance and initial course from LAT 25°47.0'N, LONG 79°59.5'W to LAT 38°42.0'N, LONG 09°10.5'W.   | 3341.0 miles, 063°T          | 3347.0 miles, 063°T        | 3427.8 miles, 061°T        | <b>3588.6 miles, 059°T</b>   |               |
| 107  | Determine the great circle distance and initial course from LAT 25°50.0'N, LONG 77°00.0'W to LAT 35°56.0'N, LONG 06°15.0'W.   | 3470 miles, 298°T            | 3518 miles, 028°T          | <b>3616 miles, 062°T</b>   | 3718 miles, 118°T            |               |
| 108  | Determine the great circle distance and initial course from LAT 26°00.0'S, LONG 56°00.0'W to LAT 34°00.0'S, LONG 18°15.0'E.   | 3705 miles, 153°T            | 3841 miles, 068°T          | 3849 miles, 248°T          | <b>3805 miles, 117°T</b>     |               |
| 109  | Determine the great circle distance and initial course from LAT 27°51.0'N, LONG 71°41.0'W to LAT 49°45.0'N, LONG 06°14.0'W.   | 3196 miles, 313.1°T          | <b>3214 miles, 046.9°T</b> | 3219 miles, 042.5°T        | 3231 miles, 041.4°T          |               |
| 110  | Determine the great circle distance and initial course from LAT 31°57.0'S, LONG 115°52.0'E to LAT 24°47.0'N, LONG 66°59.0'E.  | 4516 miles, 134.5°T          | <b>4407 miles, 314.5°T</b> | 4402 miles, 319.5°T        | 4378 miles, 336.8°T          |               |
| 111  | Determine the great circle distance and initial course from LAT 33°53.3'S, LONG 18°23.1'E to LAT 40°27.0'N, LONG 73°49.4'W.   | 6648.0 miles, 298.7°T        | 6743.5 miles, 302.7°T      | 6750.8 miles, 235.5°T      | <b>6763.0 miles, 304.5°T</b> |               |
| 112  | Determine the great circle distance and initial course from LAT 34°51.0'N, LONG 115°01.2'E to LAT 10°16.0'S, LONG 51°42.6'E.  | 4436 miles, 245.3°T          | 4598 miles, 245.6°T        | <b>4493 miles, 245.6°T</b> | 4582 miles, 245.6°T          |               |
| 113  | Determine the great circle distance and initial course from LAT 35°08.0'S, LONG 19°26.0'E to LAT 33°16.0'S, LONG 115°36.0'E.  | 4457 miles, 126°T            | <b>4559 miles, 121°T</b>   | 4682 miles, 059°T          | 4688 miles, 126°T            |               |
| 114  | Determine the great circle distance and initial course from LAT 35°17.6'N, LONG 144°23.0'E to LAT 47°36.0'N, LONG 124°22.0'W. | 3946 miles, 312°T            | <b>3931 miles, 048°T</b>   | 3881 miles, 042°T          | 3718 miles, 318°T            |               |
| 115  | Determine the great circle distance and initial course from LAT 35°27.0'N, LONG 140°20.5'E to LAT 47°51.0'N, LONG 122°51.0'W. | 4087 miles, 036°T            | <b>4115 miles, 045°T</b>   | 4122 miles, 076°T          | 4136 miles, 076°T            |               |
| 116  | Determine the great circle distance and initial course from LAT 37°47.5'N, LONG 122°27.8'W to LAT 33°51.7'S, LONG 151°12.7'E. | 6324.2 miles, 310.3°T        | 6345.3 miles, 301.7°T      | 6398.0 miles, 298.3°T      | <b>6445.2 miles, 240.3°T</b> |               |

| ID # | Question   | Choice A              | Choice B              | Choice C              | Choice D                     | Illustrations |
|------|--|-----------------------|-----------------------|-----------------------|------------------------------|---------------|
| 117  | Determine the great circle distance and initial course from LAT 38°42.0'N, LONG 09°10.5'W to LAT 32°05.0'N, LONG 81°05.0'W.  | 3402.0 miles, 072.5°T | 3412.6 miles, 085.8°T | 3432.0 miles, 278.3°T | <b>3449.4 miles, 287.2°T</b> |               |
| 118  | Determine the great circle initial course from LAT 07°05.0'N, LONG 81°45.0'W to LAT 21°15.0'N, LONG 157°40.0'W.  | 128°T                 | 217°T                 | <b>290°T</b>          | 326°T                        |               |
| 119  | Determine the great circle initial course from LAT 29°46.0'S, LONG 30°26.0'E to LAT 31°52.0'S, LONG 115°22.0'E.  | 074°T                 | 113°T                 | <b>117°T</b>          | 121°T                        |               |
| 120  | Determine the great circle initial course from LAT 37°12.6'S, LONG 73°58.0'W to LAT 10°33.0'S, LONG 142°08.0'E.  | <b>223°T</b>          | 253°T                 | 287°T                 | 317°T                        |               |
| 121  | During evening twilight on 28 December a sextant altitude (hs) of the planet Venus was 29°43.2'. The height of eye was 40 feet, and the index error was 2.0' on the arc. What was the observed altitude (Ho)?  | <b>29°34.1'</b>       | 29°36.0'              | 29°36.3'              | 29°38.2'                     |               |
| 122  | During twilight on 28 December around 1800 GMT, in DR position LAT 4°00'N, LONG 0°06'W, the sextant altitude (hs) of Venus was 30°46.8'. The height of eye was 36 feet, and the index error was 2.0' on the arc. The temperature was 68°F. The barometer read 1030 mb. Calculate the observed altitude (Ho). | Ho 30°35.2'           | Ho 30°37.1'           | <b>Ho 30°38.1'</b>    | Ho 30°40.3'                  |               |
| 123  | Enroute from Rio to Montevideo, the true course is 215°; the gyro error is 2° west. A north wind causes 3° leeway. What course would you steer per gyrocompass to make good the true course?   | <b>220°pgc</b>        | 214°pgc               | 216°pgc               | 210°pgc                      |               |
| 124  | Entering a harbor, you take a bearing on a range and get 338° per gyrocompass (pgc). The true bearing from the chart is 340°T. Variation for the area is 14°E. Your course is 329° per standard magnetic compass (psc) and 338°pgc. The deviation on this heading is _____.                                  | 3°E                   | <b>3°W</b>            | 5°E                   | 5°W                          |               |
| 125  | From 1020, 3 March, to 1845, 5 March, your vessel steamed an observed distance of 845.6 miles. The average RPM was 78, and the pitch of the propeller was 20'03". What was the slip?   | -4%                   | <b>+4%</b>            | -8%                   | +8%                          |               |
| 126  | If the pitch of the propeller is 19.4 feet, and the revolutions per day are 96,713, calculate the day's run allowing 6% positive slip.   | 266.4 miles           | <b>290.1 miles</b>    | 308.6 miles           | 327.1 miles                  |               |
| 127  | If the pitch of the propeller is 19.7 feet, and the revolutions per day are 86,178, calculate the day's run allowing 3% negative slip.   | 279.2 miles           | <b>287.6 miles</b>    | 311.4 miles           | 326.2 miles                  |               |

| ID # | Question   | Choice A           | Choice B           | Choice C           | Choice D           | Illustrations |
|------|--|--------------------|--------------------|--------------------|--------------------|---------------|
| 128  | If the pitch of the propeller is 20.1 feet, and the revolutions per day are 118,178, calculate the day's run allowing 6% negative slip.  | 367.2 miles        | 381.6 miles        | 398.4 miles        | <b>414.1 miles</b> |               |
| 129  | If the pitch of the propeller is 20.6 feet, and the revolutions per day are 107,341, calculate the day's run allowing 3% positive slip.  | <b>352.7 miles</b> | 363.6 miles        | 374.5 miles        | 389.1 miles        |               |
| 130  | If the pitch of the propeller is 21.2 feet, and the revolutions per day are 93,660, calculate the day's run allowing 5% positive slip.   | 163.3 miles        | 217.8 miles        | <b>310.3 miles</b> | 342.9 miles        |               |
| 131  | If the pitch of the propeller is 21.3 feet, and the revolutions per day are 126,214, calculate the day's run allowing 4% positive slip.  | <b>424.5 miles</b> | 442.1 miles        | 459.9 miles        | 477.3 miles        |               |
| 132  | If the pitch of the propeller is 21.5 feet, and the revolutions per day are 96,666, calculate the day's run allowing 9% negative slip.   | 311.1 miles        | 341.8 miles        | 357.9 miles        | <b>372.6 miles</b> |               |
| 133  | If the pitch of the propeller is 22.4 feet, and the revolutions per day are 103,690, calculate the day's run allowing 9% positive slip.  | 321.7 miles        | <b>347.6 miles</b> | 382.0 miles        | 416.4 miles        |               |
| 134  | If the pitch of the propeller is 23.2 feet, and the revolutions per day are 94,910, calculate the day's run allowing 11% negative slip.  | 322.3 miles        | 362.3 miles        | 382.0 miles        | <b>402.0 miles</b> |               |
| 135  | If the pitch of the propeller is 24.8 feet, and the revolutions per day are 93,373, calculate the day's run allowing 11% positive slip.  | 307.3 miles        | <b>339.0 miles</b> | 380.9 miles        | 422.8 miles        |               |
| 136  | If the pitch of the propeller is 25.1 feet, and the revolutions per day are 91,591, calculate the day's run allowing 7% positive slip.   | <b>351.6 miles</b> | 378.1 miles        | 390.0 miles        | 404.6 miles        |               |
| 137  | If the pitch of the propeller is 26.3 feet, and the revolutions per day are 87,421, calculate the day's run allowing 7% negative slip.   | 351.7 miles        | 378.1 miles        | <b>404.6 miles</b> | 419.3 miles        |               |
| 138  | If the pitch of the propeller is 26.7 feet, and the revolutions per day are 131,717, calculate the day's run allowing 4% negative slip.  | 555.2 miles        | 578.4 miles        | <b>601.6 miles</b> | 649.4 miles        |               |
| 139  | If the speed necessary for reaching port at a designated time is 12.6 knots and the pitch of the propeller is 13.6 feet, how many revolutions per minute will the shaft have to turn, assuming no slip?            | 81                 | 85                 | 90                 | <b>94</b>          |               |
| 140  | If the speed necessary for reaching port at a designated time is 15.7 knots and the pitch of the propeller is 23.4 feet, how many revolutions per minute will the shaft have to turn, assuming a 6% negative slip? | <b>64</b>          | 68                 | 72                 | 76                 |               |



| ID # | Question  | Choice A | Choice B | Choice C | Choice D | Illustrations |
|------|---|----------|----------|----------|----------|---------------|
| 141  | If the speed necessary for reaching port at a designated time is 16.4 knots and the pitch of the propeller is 23.8 feet, how many revolutions per minute will the shaft have to turn, assuming a 6% positive slip?  | 66       | 74       | 82       | 90       |               |
| 142  | If the speed necessary for reaching port at a designated time is 16.8 knots and the pitch of the propeller is 22.3 feet, how many revolutions per minute will the shaft have to turn, assuming a 4% negative slip?  | 61       | 66       | 73       | 80       |               |
| 143  | If the speed necessary for reaching port at a designated time is 17.4 knots and the pitch of the propeller is 25.6 feet, how many revolutions per minute will the shaft have to turn, assuming a 3% positive slip?  | 63       | 67       | 71       | 75       |               |
| 144  | If the speed necessary for reaching port at a designated time is 17.8 knots and the pitch of the propeller is 24.7 feet, how many revolutions per minute will the shaft have to turn, assuming a 7% positive slip?  | 67       | 71       | 75       | 79       |               |
| 145  | If the speed necessary for reaching port at a designated time is 18.2 knots and the pitch of the propeller is 23.9 feet, how many revolutions per minute will the shaft have to turn, assuming a 2% negative slip?  | 70       | 73       | 76       | 79       |               |
| 146  | If the speed necessary for reaching port at a designated time is 18.5 knots and the pitch of the propeller is 21.7 feet, how many revolutions per minute will the shaft have to turn, assuming a 4% negative slip?  | 83       | 90       | 97       | 114      |               |
| 147  | If the speed necessary for reaching port at a designated time is 18.6 knots, and the pitch of the propeller is 26.2 feet, how many revolutions per minute will the shaft have to turn, assuming a 4% negative slip? | 69       | 72       | 75       | 78       |               |
| 148  | If the speed necessary for reaching port at a designated time is 19.2 knots and the pitch of the propeller is 22.7 feet, how many revolutions per minute will the shaft have to turn, assuming a 4% positive slip?  | 82       | 89       | 96       | 103      |               |
| 149  | If the speed necessary for reaching port at a designated time is 19.6 knots and the pitch of the propeller is 24.6 feet, how many revolutions per minute will the shaft have to turn, assuming a 5% positive slip?  | 76       | 85       | 97       | 106      |               |

| ID # | Question   | Choice A   | Choice B   | Choice C  | Choice D   | Illustrations |
|------|--|--|--|---|--|---------------|
| 150  | If the speed necessary for reaching port at a designated time is 20.7 knots and the pitch of the propeller is 23.8 feet, how many revolutions per minute will the shaft have to turn, assuming a 3% negative slip?   | 74   | 79   | 86  | 98   |               |
| 151  | If the speed necessary for reaching port at a designated time is 21.6 knots and the pitch of the propeller is 22.5 feet, how many revolutions per minute will the shaft have to turn, assuming a 2% positive slip?   | 81   | 87   | 95  | 99   |               |
| 152  | If the speed necessary for reaching port at a designated time is 23.7 knots and the pitch of the propeller is 20.8 feet, how many revolutions per minute will the shaft have to turn, assuming a 7% negative slip?   | 108  | 112  | 116   | 124  |               |
| 153  | In planning a North Pacific voyage, you wish to steam the minimum distance from LAT 48°30'N, LONG 124°45'W to LAT 44°00'N, LONG 150°00'E, while remaining south of 51°N latitude. Which track meets these requirements? (Use gnomonic tracking chart WOXZC 5270)   | A Mercator sailing from departure to the mid-longitude at 51°N, thence great circle to arrival | A great circle between departure and arrival with parallel sailing between the longitudes where the great circle intersects 51°N | A great circle tangent to 51°N from departure to the mid-longitude then a great circle to arrival | <b>A great circle from departure to LAT 51°N, LONG 148°W, parallel sailing to LAT 51°N, LONG 171°W, then a great circle to arrival</b> |               |
| 154  | On 1 April at 0515 zone time, morning stars were observed, and the vessel's position was determined to be LAT 27°05.0'N, LONG 16°30.0'W. Your vessel is steaming at 19.0 knots on a course of 022°T. A sextant observation of the Sun's lower limb is made at 0930 zone time. The chronometer reads 10h 28m 25s, and the sextant altitude is 46°20.3'. The index error is 4.5' off the arc, and the chronometer error is 02m 15s slow. Your height of eye on the bridge is 57.0 feet. What is the azimuth (Zn) of this sight using the assumed position? | 121.6°T  | 117.9°T  | 115.0°T   | 112.2°T  |               |
| 155  | On 1 December, your 1600 ZT DR position is LAT 22°48.0'S, LONG 91°26.0'E. You are on course 327°T at a speed of 16 knots. What will be the zone time of sunset at your vessel?   | 1823   | 1827   | 1831  | 1847   |               |

| ID # | Question   | Choice A                 | Choice B                       | Choice C              | Choice D                          | Illustrations |
|------|--|--------------------------|--------------------------------|-----------------------|-----------------------------------|---------------|
| 156  | On 1 July your 0515 zone time fix gives you a position of LAT 23°24.0'S, LONG 151°42.0'W. Your vessel is on course 240°T, and your speed is 10.0 knots. Local apparent noon (LAN) occurs at 1215 zone time, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 42°55.0'. What is the latitude at 1200 ZT? | 24°02.5'S                | 24°01.0'S                      | <b>23°59.7'S</b>      | 23°58.6'S                         |               |
| 157  | On 1 July your 0515 ZT fix gives you a position of LAT 24°36.0'S, LONG 151°42.0'W. Your vessel is on course 300°T, and your speed is 10.0 knots. Local apparent noon (LAN) occurs at 1215 ZT, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 42°55.0'. What is the calculated latitude at LAN?        | 24°03.6'S                | 24°02.5'S                      | <b>24°01.0'S</b>      | 24°00.0'S                         |               |
| 158  | On 1 March your 2135 zone time DR position is LAT 23°54.0' N, LONG 63°22.0' W. At that time, you observe Schedar bearing 328°psc. The chronometer reads 01h 35m 16s, and the chronometer error is 00m 07s slow. The variation is 3.5°E. What is the deviation of the standard compass?   | 2.3°E                    | 2.5°W                          | <b>3.2°W</b>          | 4.2°E                             |               |
| 159  | On 1 November your 1600 zone time DR position is LAT 27°48'S, LONG 91°26'E. Your vessel is on a course of 327°T at a speed of 16 knots. What will be the zone time of sunset at your vessel?   | <b>1815</b>              | 1821                           | 1829                  | 1836                              |               |
| 160  | On 1 October you determine the zone time of evening twilight will be 1835. Your DR position at this time is LAT 27°18.0' N, LONG 48°52.0' W. Considering their magnitude and location, which group of three stars are best suited to be used in obtaining a fix at star time?  | Altair, Rasalhague, Vega | <b>Alphecca, Kochab, Deneb</b> | Diphda, Hamal, Mirfak | Antares, Rigil Kentaurus, Peacock |               |
| 161  | On 1 September your 1115 zone time DR position is LAT 25°20.0'N, LONG 28°24.0'W. At that time, you observe the Sun bearing 160.5°psc. The chronometer reads 01h 14m 58s, and the chronometer error is 01m 17s fast. The variation is 13.5°W. What is the deviation of the standard compass?  | <b>2.1°E</b>             | 4.1°E                          | 11.0°W                | 11.0°E                            |               |

| ID # | Question   | Choice A                       | Choice B                              | Choice C                       | Choice D                       | Illustrations |
|------|--|--------------------------------|---------------------------------------|--------------------------------|--------------------------------|---------------|
| 162  | On 10 April , your 1630 ZT DR position is LAT 21°03.0'N, LONG 63°11.0'W. You are on course 324°T at a speed of 22 knots. What will be the zone time of sunset at your vessel?  | 1805                           | 1814                                  | 1818                           | <b>1833</b>                    |               |
| 163  | On 10 August your 0430 ZT position is LAT 29°56.7' S, LONG 139°11.0' E. Your course is 321°T, speed 18.2 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0500 running fix.  | LAT 29°46.0'S, LONG 138°54.0'E | <b>LAT 29°49.2'S, LONG 138°57.0'E</b> | LAT 29°56.0'S, LONG 139°03.8'E | LAT 30°07.5'S, LONG 138°55.2'E | NP-0021       |
| 164  | On 10 August your vessel's 0426 zone time DR position is LAT 52°07'N, LONG 142°16'E, when an amplitude of the Sun is observed. The Sun's lower limb is about 20 minutes of arc above the visible horizon and bears 074.5° per standard compass. Variation in the area is 12°W. The chronometer reads 07h 24m 19s and is 02m 34s fast. Which of the following is the deviation of the standard compass?   | 0.0°                           | 1.3°W                                 | <b>1.3°E</b>                   | 2.3°W                          |               |
| 165  | On 10 December , your 1300 zone time (ZT) DR position is LAT 26°27.0'S, LONG 79°04.0'E. You are on course 068°T at a speed of 14 knots. What will be the zone time of sunset at your vessel?   | <b>1824</b>                    | 1846                                  | 1854                           | 1908                           |               |
| 166  | On 10 February in DR position LAT 25°32.0'N, LONG 135°15.0'E, you observe an amplitude of the Sun. The Sun's center is on the celestial horizon and bears 109°psc. The chronometer reads 09h 43m 25s and is 03m 20s fast. Variation in the area is 4.5°W. What is the deviation of the standard magnetic compass?  | <b>1.6°E</b>                   | 2.9°W                                 | 10.5°E                         | 30.5°W                         |               |
| 167  | On 10 January at 0550 ZT, morning stars were observed, and the vessel's position was determined to be LAT 25°16.0'N, LONG 123°18.0'W. Your vessel is steaming at 22.0 knots on a course of 295°T. A sextant observation of the Sun's lower limb is made at 0915 ZT. The chronometer reads 05h 14m 02s, and the sextant altitude is 24°00.7'. The index error is 2.6' off the arc, and the chronometer error is 01m 34s slow. Your height of eye on the bridge is 55.0 feet. What is the azimuth (Zn) of this sight using the assumed position? | 127.8°T                        | 129.8°T                               | <b>131.9°T</b>                 | 133.6°T                        |               |

| ID # | Question   | Choice A                 | Choice B                 | Choice C                | Choice D                 | Illustrations |
|------|--|--------------------------|--------------------------|-------------------------|--------------------------|---------------|
| 168  | On 10 July your 0930 zone time DR position is LAT 26°31.0'S, LONG 4°41.0'E. Your vessel is on course 308°T at a speed of 22.0 knots. What is the zone time of local apparent noon (LAN)?   | 1144                     | 1149                     | 1153                    | 1159                     |               |
| 169  | On 10 June your 1712 zone time DR position is LAT 25°10.0' S, LONG 06°58.0' E. You are on course 213°T at a speed of 9.0 knots. Considering their magnitude, azimuth, and altitude, which group includes the three stars best suited for a fix at star time?   | Procyon, Antares, Sirius | Sirius, Procyon, Regulus | Acrux, Canopus, Regulus | Acrux, Procyon, Arcturus |               |
| 170  | On 10 June your 2010 zone time DR position is LAT 41°10.0' N, LONG 61°15.0' W. At that time, you observe Polaris with a sextant altitude (hs) of 40°35.8'. The chronometer time of the sight is 00h 08m 18s, and the chronometer error is 01m 54s slow. The index error is 2.0' on the arc, and the height of eye is 40 feet. What is your latitude by Polaris?          | 41°10.6'N                | 41°15.0'N                | 41°18.3'N               | 41°21.2'N                |               |
| 171  | On 10 June your vessel's 0519 zone time DR position is LAT 27°07.0'N, LONG 92°10.0'W, when an amplitude of the Sun is observed. The Sun's center is on the visible horizon and bears 063.6° per standard magnetic compass. The variation in the area is 4.8°E. The chronometer reads 11h 17m 32s and is 01m 18s slow. What is the deviation of the compass?              | 5.6°E                    | 4.8°E                    | 4.2°W                   | 4.8°W                    |               |
| 172  | On 10 March in DR position LAT 21°42.0'S, LONG 57°28.0'E, you take an ex-meridian observation of the Sun's lower limb. The chronometer time of the sight is 08h 28m 17s, and the chronometer error is 00m 00s. The sextant altitude (hs) is 72°08.0'. The index error is 3.4' on the arc, and your height of eye is 52.7 feet. What is the latitude at meridian transit? | LAT 21°32.5'S            | LAT 21°40.6'S            | LAT 21°45.5'S           | LAT 21°50.2'S            |               |
| 173  | On 10 November , your 1630 zone time DR position is LAT 25°10.0'N, LONG 71°12.0'W. You are on course 335°T at a speed of 24 knots. What will be the zone time of sunset at your vessel?  | 1650                     | 1700                     | 1715                    | 1730                     |               |
| 174  | On 10 October your 0930 zone time position is LAT 25°00.0'S, LONG 164°38.6'W. Your vessel is on course 180°T at a speed to 10.0 knots. What is the zone time of local apparent noon (LAN)?   | 1145                     | 1151                     | 1203                    | 1206                     |               |

| ID # | Question   | Choice A               | Choice B               | Choice C                               | Choice D             | Illustrations |
|------|--|------------------------|------------------------|--|----------------------|---------------|
| 175  | On 10 October your 1500 zone time DR position is LAT 27°35.6' S, LONG 44°49.0' W. You are on course 342°T at a speed of 24 knots. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?  | Venus, Moon, Fomalhaut | Venus, Arcturus, Hamal | <b>Moon, Al Na'ir, Rigil Kentaurus</b> | Deneb, Spica, Markab |               |
| 176  | On 11 December your 1816 ZT DR position is LAT 26°30.0'N, LONG 140°35.0'E. At that time, you observe Venus bearing 230°pgc. The chronometer reads 09h 14m 52s and the chronometer error is 01m 02s slow. The variation is 3.5°E. What is the gyro error?   | 2.2°E                  | <b>3.3°E</b>           | 3.2°W                                  | 4.2°W                |               |
| 177  | On 11 February your 1832 zone time DR position is LONG 110°52.6' W. At that time you observe Polaris with a sextant altitude (hs) of 26°19.8'. The chronometer time of the sight is 01h 34m 56s, and the chronometer error is 02m 16s fast. The index error is 2.7' off the arc, and the height of eye is 60.2 feet. What is your latitude by Polaris?     | <b>25°27.2'N</b>       | 25°34.2'N              | 26°27.2'N                              | 26°34.2'N            |               |
| 178  | On 11 January , your 0450 ZT position is LAT 38°42'N, LONG 14°16'W. You observe Polaris bearing 358.5°pgc. At the time of the observation the helmsman noted that he was heading 160°pgc and 173°psc. The variation is 9°W. What is the deviation for that heading?  | 1°E                    | 1°W                    | <b>3°W</b>                             | 13°W                 |               |
| 179  | On 11 January your vessel's 0655 zone time DR position is LAT 24°30'N, LONG 122°02'W, when an amplitude of the Sun is observed. The Sun's center is on the celestial horizon and bears 101.0° per standard compass. Variation in the area is 11.6°E. The chronometer reads 02h 52m 48s and is 02m 12s slow. What is the deviation of the standard compass? | <b>1.4°E</b>           | 1.4°W                  | 4.6°E                                  | 4.6°W                |               |
| 180  | On 11 July , your 0240 ZT position is LAT 14°52'N, LONG 34°23'W. You observe Polaris bearing 359.8°pgc. At the time of the observation the helmsman noted that he was heading 279°pgc and 299°psc. The variation is 19°W. What is the deviation for that heading?  | <b>0°</b>              | 1°E                    | 1°W                                    | 3°W                  |               |

| ID # | Question  | Choice A                | Choice B                | Choice C               | Choice D                      | Illustrations |
|------|---|-------------------------|-------------------------|------------------------|-------------------------------|---------------|
| 181  | On 11 March your 1846 zone time DR position is LAT 25°05.7' N, LONG 124°29.0' W. At that time you observe Polaris with a sextant altitude (hs) of 25°59.1'. The chronometer time of the sight is 02h 44m 01s, and the chronometer error is 02m 15s slow. The index error is 3.9' on the arc, and the height of eye is 42.7 feet (13.0 meters). What is your latitude by Polaris?  | 25°14.2'N               | 25°17.9'N               | 25°28.1'N              | 26°15.2'N                     |               |
| 182  | On 11 May in DR position LAT 28°13.7'N, LONG 168°36.3'E, you observe an amplitude of the Sun. The Sun's center is on the celestial horizon and bears 283°psc. The chronometer reads 07h 13m 19s and is 02m 56s slow. Variation in the area is 13°E. What is the deviation of the standard magnetic compass?   | 5.2°W                   | 5.6°W                   | 7.4°E                  | 7.8°E                         |               |
| 183  | On 11 May in DR position LAT 37°06.0'N, LONG 45°45.0'W you observe an amplitude of the Sun. The Sun's center is on the visible horizon and bears 089.0°psc. The chronometer reads 07h 57m 06s and is 01m 48s slow. Variation in the area is 20.0°W. What is the deviation?  | 3.6°W                   | 2.2°W                   | 1.4°W                  | 3.6°E                         |               |
| 184  | On 11 May your vessel's 1839 ZT position is LAT 17°30'N, LONG 63°55'W, when an amplitude of the Sun's center is observed on the celestial horizon bearing 301° per standard magnetic compass. Variation for this area is 10.5°W. The chronometer reads 10h 37m 10s and is 02m 08s slow. What is the deviation of the compass?   | 2.5°W                   | 2.0°W                   | 1.5°W                  | 2.0°E                         |               |
| 185  | On 11 November your 0200 zone time DR position is LAT 26°32' S, LONG 154°16' E. You are on course 058°T at a speed of 21 knots. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?   | Polaris, Regulus, Rigel | Jupiter, Spica, Canopus | Saturn, Peacock, Rigel | Mars, Betelgeuse, Miaplacidus |               |
| 186  | On 11 November your 0730 zone time position was LAT 19°58.0'N, LONG 143°54.0'W. Your vessel was steaming on course 084°T at a speed of 15.0 knots. An observation of the Sun's lower limb was made at 0931 ZT. The chronometer read 07h 29m 22s and was slow 02m 22s. The observed altitude (Ho) was 44°17.6'. LAN occurred at 1125 zone time (ZD +10). The observed altitude (Ho) was 52°17.4'. What was the longitude of your 1200 zone time running fix? | 142°34.7'W              | 142°37.1'W              | 142°40.2'W             | 142°44.2'W                    |               |



| ID # | Question  | Choice A                      | Choice B                      | Choice C                      | Choice D                      | Illustrations |
|------|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|---------------|
| 187  | On 11 October at 0516 ZT, morning stars were observed, and the vessel's position was determined to be LAT 23°21.0'N, LONG 139°27.0'W. Your vessel is steaming at 14.0 knots on a course of 293°T. A sextant observation of the Sun's lower limb is made at 0927 ZT. The chronometer reads 06h 30m 21s, and the sextant altitude (hs) is 39°48.7'. The index error is 2.0' on the arc, and the chronometer error is 02m 56s fast. Your height of eye on the bridge is 63.0 feet. What is the azimuth (Zn) of this sight using the assumed position?        | 116.2°T                       | 123.4°T                       | 126.2°T                       | 128.4°T                       |               |
| 188  | On 12 April at 0515 ZT, morning stars were observed, and the vessel's position was determined to be LAT 21°05'S, LONG 16°30'W. Your vessel is steaming at 19 knots on a course of 278°T. A sextant observation of the Sun's lower limb is made at 0930 ZT. The chronometer reads 10h 28m 25s, and the sextant altitude (hs) is 40°15.9'. The index error is 2.5' off the arc, and the chronometer error is 2m 15s slow. Your height of eye on the bridge is 57 feet. What are the intercept (a) and azimuth (Zn) from the assumed position of this sight? | Zn 057.7°, a 15.4' T          | Zn 057.0°, a 17.7' A          | Zn 122.3°, a 17.7' A          | Zn 123.0°, a 22.7' A          |               |
| 189  | On 12 December your 1830 ZT DR position is LAT 24°16.0' S, LONG 41°18.0' W. You are on course 235°T at a speed of 16.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1930 running fix.   | LAT 24°12.5'S, LONG 41°10.9'W | LAT 24°16.9'S, LONG 41°18.2'W | LAT 24°25.2'S, LONG 41°39.9'W | LAT 27°46.9'S, LONG 41°31.2'W | NP-0009       |
| 190  | On 12 February your 0542 zone time (ZT) fix gives you a position of LAT 26°42.0'N, LONG 60°18.0'W. Your vessel is on course 300°T, and your speed is 9.8 knots. Local apparent noon (LAN) occurs at 1220 ZT at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 49°10.0'. What is the calculated latitude at LAN?   | 27°13.5'N                     | 27°16.3'N                     | 27°17.6'N                     | 27°19.2'N                     |               |
| 191  | On 12 February your 0900 zone time DR position is LAT 16°43.0'N, LONG 51°42.0'W. Your vessel is on course 093°T at a speed of 18.5 knots. What is the zone time of local apparent noon (LAN)?   | 1237                          | 1233                          | 1230                          | 1226                          |               |

| ID # | Question   | Choice A | Choice B | Choice C            | Choice D   | Illustrations |
|------|--|----------|----------|---------------------|------------|---------------|
| 192  | On 12 February your 0930 zone time DR position is LAT 25°20.0'N, LONG 30°40.0'W. Your vessel is on course 135°T at a speed of 11.2 knots. What is the zone time of local apparent noon (LAN)?  | 1210     | 1215     | 1220                | 1224       |               |
| 193  | On 12 July your 0800 ZT DR position is LAT 24°15.0'N, LONG 132°30.0'W. Your vessel is on course 045°T at a speed of 15.0 knots. What is the ZT of local apparent noon (LAN)?   | 1146     | 1148     | 1152                | 1159       |               |
| 194  | On 12 June , at 0919 zone time, your position is LAT 26°52'N, LONG 84°34'W. The chronometer reads 03h 17m 00s. Chronometer error is 01m 40s slow. At that time, an azimuth of the Sun is obtained. The bearing is 089.5° per standard magnetic compass. Variation for this area is 4.5°E. What is the deviation of the standard magnetic compass?  | 9.5°E    | 9.5°W    | 5.2°E               | 5.2°W      |               |
| 195  | On 12 June , your 0400 ZT DR position is LAT 22°31.0'N, LONG 31°45.0'W. You are on course 240°T at a speed of 16.5 knots. What will be the zone time of sunrise at your vessel?  | 0507     | 0515     | 0523                | 0645       |               |
| 196  | On 12 June , your 1845 DR position is LAT 21°47'N, LONG 46°52'W when you observe a faint unidentifiable star through a break in the clouds. The star bears 019.0°T at a sextant altitude (hs) of 53°56.2'. The index error is 0.5' on the arc, and the height of eye is 45 feet. The chronometer reads 09h 43m 27s, and the chronometer error is 1m 46s slow. What star did you observe? | Phecda   | Mimosa   | Gamma Ursae Minoris | Mizar      |               |
| 197  | On 12 June , your 1845 DR position is LAT 21°47'N, LONG 46°52'W when you observe a faint unidentifiable star through a break in the clouds. The star bears 031°T at a sextant altitude (hs) of 70°10.3'. The index error is 0.5' on the arc, and the height of eye is 45 feet. The chronometer reads 09h 43m 27s, and the chronometer error is 1m 46s slow. What star did you observe?   | Sheratan | Ruchbah  | Mimosa              | Cor Caroli |               |

| ID # | Question   | Choice A          | Choice B             | Choice C      | Choice D       | Illustrations |
|------|--|-------------------|----------------------|---------------|----------------|---------------|
| 198  | On 12 June , your 1845 DR position is LAT 21°47'N, LONG 46°52'W when you observe a faint unidentifiable star through a break in the clouds. The star bears 162°T at a sextant altitude (hs) of 28°36.5'. The index error is 0.5' on the arc, and the height of eye is 45 feet. The chronometer reads 09h 43m 27s, and the chronometer error is 1m 46s slow. What star did you observe?   | Gamma Virginis    | <b>Iota Centauri</b> | Spica         | Mimosa         |               |
| 199  | On 12 June , your 1845 DR position is LAT 21°47'N, LONG 46°52'W when you observe a faint unidentifiable star through a break in the clouds. The star bears 270°T at a sextant altitude (hs) of 65°41.7'. The index error is 0.5' on the arc, and the height of eye is 45 feet. The chronometer reads 09h 43m 27s, and the chronometer error is 1m 46s slow. What star did you observe?   | Epsilon Leonis    | Scheat               | Merak         | <b>Algeiba</b> |               |
| 200  | On 12 June , your 1845 DR position is LAT 21°47'N, LONG 46°52'W when you observe a faint unidentifiable star through a break in the clouds. The star bears 282.5°T at a sextant altitude (hs) of 14°22.3'. The index error is 0.5' on the arc, and the height of eye is 45 feet. The chronometer reads 09h 43m 27s, and the chronometer error is 1m 46s slow. What star did you observe? | Wezen             | <b>Alhena</b>        | Mirzam        | Menkalinan     |               |
| 201  | On 12 June , your 1845 DR position is LAT 21°47'N, LONG 46°52'W when you observe a faint unidentifiable star through a break in the clouds. The star bears 313°T at a sextant altitude (hs) of 14°56.3'. The index error is 0.5' on the arc, and the height of eye is 45 feet. The chronometer reads 09h 43m 27s, and the chronometer error is 1m 46s slow. What star did you observe?   | <b>Menkalinan</b> | Mirzam               | Theta Aurigae | Alnitak        |               |

| ID # | Question   | Choice A                      | Choice B                      | Choice C                      | Choice D                      | Illustrations |
|------|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|---------------|
| 202  | On 12 June , your 1845 DR position is LAT 21°47'N, LONG 46°52'W when you observe a faint unidentifiable star through a break in the clouds. The star bears 174.0°T at a sextant altitude (hs) of 18°58.6'. The index error is 0.5° on the arc, and the height of eye is 45 feet. The chronometer reads 09h 43m 27s, and the chronometer error is 1m 46s slow. What star did you observe?   | Muhlifain                     | Alpha Hydri                   | Almak                         | Alpha Muscae                  |               |
| 203  | On 12 June , your 1945 DR position is LAT 21°47.0'N, LONG 46°52.0'W when you observe a faint unidentifiable star through a break in the clouds. The star bears 130°T at a sextant altitude (hs) of 45°21.2'. The index error is 0.5' on the arc, and the height of eye is 45 feet. The chronometer reads 10h 43m 27s, and the chronometer error is 1m 46s slow. What star did you observe? | Theta Carinae                 | Epsilon Leonis                | Beta Librae                   | Zeta Puppis                   |               |
| 204  | On 12 March your 1846 zone time DR position is LONG 129°16.5' W. At that time you observe Polaris with a sextant altitude (hs) of 28°01.5'. The chronometer time of the sight is 03h 44m 10s, and the chronometer error is 01m 55s slow. The index error is 2.2' off the arc, and the height of eye is 59.8 feet (18.2 m). What is your latitude by Polaris?                               | 27°33.7'N                     | 27°40.9'N                     | 27°54.4'N                     | 28°06.9'N                     |               |
| 205  | On 12 November, you are taking a time tick using the 1600 GMT BBC Broadcast. You hear five pulses followed by a longer pulse. At the start of the longer pulse you start a stopwatch. You stop the stopwatch at the same time reading the chronometer with the following results: stopwatch 03m 19s, chronometer 15h 59m 46s. What is the chronometer error?                               | 01m 14s slow                  | 03m 19s fast                  | 03m 33s slow                  | 06m 54s slow                  |               |
| 206  | On 12 October your vessel is on course 081°T, speed 20 knots. Your 1800 zone time DR position is LAT 26°11.0' S, LONG 77°18.0' E. You observed 3 celestial bodies. Determine the latitude and longitude of your 1835 running fix.  | LAT 26°05.5'S, LONG 77°14.5'E | LAT 26°07.5'S, LONG 77°34.0'E | LAT 26°09.0'S, LONG 77°27.5'E | LAT 26°12.0'S, LONG 77°31.0'E | NP0024        |

| ID # | Question  | Choice A  | Choice B  | Choice C  | Choice D  | Illustrations |
|------|---|-----------|-----------|-----------|-----------|---------------|
| 207  | On 12 September your 0600 zone time (ZT) fix gives you a position of LAT 22°51.9'N, LONG 133°40.1'W. Your vessel is on course 062°T, and your speed is 12.3 knots. Local apparent noon (LAN) occurs at 1142 ZT, at which time a meridian altitude of the Sun's upper limb is observed. The observed altitude (Ho) for this sight is 70°33.2'. What is the calculated latitude at LAN?   | 23°23.0'N | 23°24.8'N | 23°26.5'N | 23°27.9'N |               |
| 208  | On 12 September, your 0736 zone time DR position is LAT 28°34.0'S, LONG 174°49.0'E. At that time, you observe the Sun bearing 084° per standard magnetic compass (psc). The chronometer reads 07h 38m 11s, and the chronometer error is 01m 46s fast. The variation is 11°W. What is the deviation of the standard magnetic compass?  | 2.9°W     | 3.2°E     | 3.9°E     | 4.7°W     |               |
| 209  | On 13 August , your 0345 ZT DR position is LAT 21°35.0' N, LONG 135°26.0'W. You are on course 052°T at a speed of 14 knots. What will be the zone time of sunrise at your vessel?   | 0443      | 0449      | 0536      | 0540      |               |
| 210  | On 13 February , at 0325 zone time, your DR position is LAT 23°20'N, LONG 155°15'W. You are steering 240°T at a speed of 13.6 knots. What is the zone time of sunrise?  | 0652      | 0657      | 0706      | 0711      |               |
| 211  | On 13 June your 0445 DR position is LAT 20°12.0' N, LONG 44°45.0' W. You observe an unidentified star bearing 168°T at an observed altitude (Ho) of 38°56.0'. The chronometer reads 07h 43m 20s, and is 01m 39s slow. Which star did you observe?   | Peacock   | Ankaa     | Al Na'ir  | Fomalhaut |               |
| 212  | On 13 November at 0438 ZT, morning stars were observed and the vessel's position was determined to be LAT 22°14.0'S, LONG 79°23.0'E. Your vessel is steaming at 13.0 knots on a course of 242°T. A sextant observation of the Sun's lower limb is made at 0822 ZT. The chronometer reads 03h 20m 16s, and the sextant altitude (hs) is 45°49.7'. The index error is 1.0' on the arc, and the chronometer error is 01m 47s slow. Your height of eye on the bridge is 61.0 feet (18.6 meters). What is the azimuth (Zn) of this sight using the assumed position? | 092.6°T   | 096.2°T   | 098.7°T   | 099.7°T   |               |

| ID #      | Question   | Choice A         | Choice B     | Choice C    | Choice D  | Illustrations |           |            |          |      |           |            |          |                                     |                              |                              |                              |  |
|-----------|--|------------------|--------------|-------------|-----------|---------------|-----------|------------|----------|------|-----------|------------|----------|-------------------------------------|------------------------------|------------------------------|------------------------------|--|
| 213       | <p>On 13 November your 1030 ZT DR position is LAT 19°03'S, LONG 6°34'E. You are on course 164°T, speed 12 knots. Determine your 1200 position using the following observations of the Sun.</p> <table border="1"> <thead> <tr> <th>ZONE TIME</th> <th>GHA</th> <th>DECLINATION</th> <th>Ho</th> </tr> </thead> <tbody> <tr> <td>1112</td> <td>351°55.4'</td> <td>S 18°00.4'</td> <td>88°08.0'</td> </tr> <tr> <td>1121</td> <td>354°10.4'</td> <td>S 18°00.5'</td> <td>88°33.9'</td> </tr> </tbody> </table> | ZONE TIME        | GHA          | DECLINATION | Ho        | 1112          | 351°55.4' | S 18°00.4' | 88°08.0' | 1121 | 354°10.4' | S 18°00.5' | 88°33.9' | <b>LAT 19°22.3'S, LONG 6°37.8'E</b> | LAT 19°20.1'S, LONG 6°41.4'E | LAT 19°17.6'S, LONG 6°39.2'E | LAT 19°15.8'S, LONG 6°36.8'E |  |
| ZONE TIME | GHA  | DECLINATION      | Ho           |             |           |               |           |            |          |      |           |            |          |                                     |                              |                              |                              |  |
| 1112      | 351°55.4'  | S 18°00.4'       | 88°08.0'     |             |           |               |           |            |          |      |           |            |          |                                     |                              |                              |                              |  |
| 1121      | 354°10.4'  | S 18°00.5'       | 88°33.9'     |             |           |               |           |            |          |      |           |            |          |                                     |                              |                              |                              |  |
| 214       | <p>On 13 October at 1847 ZT, your vessel's DR position is LAT 42°17.4' N, LONG 138°46.2' W. At approximately this time, you obtain a sextant altitude (hs) of Polaris reading 42°16.8', with an index error of 3.2' on the arc. Your chronometer reads 03h 45m 20s and is 1m 32s slow. What is your latitude by Polaris, given a height of eye of 44 feet?</p>   | <b>42°09.1'N</b> | 42°12.5'N    | 42°16.0'N   | 42°19.5'N |               |           |            |          |      |           |            |          |                                     |                              |                              |                              |  |
| 215       | <p>On 13 October your 0515 zone time (ZT) fix gives you a position of LAT 26°53.0'N, LONG 90°05.0'W. Your vessel is on course 068°T, and your speed is 7.8 knots. Local apparent noon (LAN) occurs at 1145 zone time, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 54°51.5'. What is the calculated latitude at LAN?</p>  | <b>27°12.6'N</b> | 27°14.1'N    | 27°15.7'N   | 27°16.2'N |               |           |            |          |      |           |            |          |                                     |                              |                              |                              |  |
| 216       | <p>On 13 October your 0515 zone time fix gives you a position of LAT 26°53.0'N, LONG 90°05.0'W. Your vessel is on course 068°T, and your speed is 7.8 knots. Local apparent noon (LAN) occurs at 1145 zone time, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 54°51.5'. What is the latitude at 1200 ZT?</p>  | <b>27°13.3'N</b> | 27°14.6'N    | 27°15.7'N   | 27°16.8'N |               |           |            |          |      |           |            |          |                                     |                              |                              |                              |  |
| 217       | <p>On 13 October your vessel's 1722 zone time DR position is LAT 27°36'S, LONG 136°16'E, when an amplitude of the Sun is observed. The Sun's center is on the celestial horizon and bears 266° per standard magnetic compass. Variation in the area is 2°W. The chronometer reads 08h 24m 19s and is 01m 43s fast. What is the deviation of the standard magnetic compass?</p>   | 2.3°E            | <b>2.8°W</b> | 4.8°E       | 6.8°W     |               |           |            |          |      |           |            |          |                                     |                              |                              |                              |  |

| ID # | Question   | Choice A          | Choice B             | Choice C        | Choice D             | Illustrations |
|------|--|-------------------|----------------------|-----------------|----------------------|---------------|
| 218  | On 13 September , your 1830 ZT DR position was LAT 23°03'S, LONG 105°16'E when you observe a faint unidentifiable star through a hole in the clouds. The star bore 132.3°T at a sextant altitude (hs) of 29°34.6'. The chronometer read 11h 24m 39s and is 5m 08s slow. The index error is 1.0' off the arc, and the height of eye is 52 feet. What star did you observe?    | <b>Beta Gruis</b> | Sigma Capricorni     | Scheat          | Alpha Indi           |               |
| 219  | On 13 September , your 1830 ZT DR position was LAT 23°03'S, LONG 105°16'E when you observed a faint unidentifiable star through a hole in the clouds. The star bore 265.0°T at a sextant altitude (hs) of 62°25.4'. The chronometer read 11h 24m 39s and is 5m 08s slow. The index error is 1.0' off the arc, and the height of eye is 52 feet. What star did you observe?   | Sigma Ophiuchi    | Alcyone              | <b>Dschubba</b> | Gamma Lupi           |               |
| 220  | On 13 September , your 1830 ZT DR position was LAT 23°03'S, LONG 105°16'E when you observed a faint unidentifiable star through a hole in the clouds. The star bore 351.5°T at a sextant altitude (hs) of 62°05.6'. The chronometer read 11h 24m 39s and is 5m 08s slow. The index error is 1.0' off the arc, and the height of eye is 52 feet. What star did you observe?   | Alpha Herculis    | Kappa Scorpii        | Alpha Arae      | <b>Beta Ophiuchi</b> |               |
| 221  | On 13 September , your 1830 ZT DR position was LAT 23°03'S, LONG 105°16'E, when you observed a faint unidentifiable star through a hole in the clouds. The star bore 148.0°T at a sextant altitude (hs) of 32°24.3'. The chronometer read 11h 24m 39s and is 05m 08s slow. The index error is 1.0' off the arc, and the height of eye is 52 feet. What star did you observe? | Beta Gruis        | <b>Alpha Tucanae</b> | Beta Aquarii    | Alpha Indi           |               |
| 222  | On 14 January , your 0746 zone time DR position is LAT 26°37.0'N, LONG 153°19.0'W. At that time, you observe the Sun bearing 123°psc. The chronometer reads 05h 49m 16s, and the chronometer error is 02m 29s fast. The variation is 3°W. What is the deviation of the standard magnetic compass?  | <b>1.4°W</b>      | 1.6°E                | 3.4°E           | 4.4°W                |               |



| ID # | Question   | Choice A | Choice B  | Choice C | Choice D | Illustrations |
|------|--|----------|-----------|----------|----------|---------------|
| 223  | On 14 January your 0550 DR position is LAT 25°26.0'N, LONG 38°16.0'W. You observe an unidentified star bearing 043°T at an observed altitude (Ho) of 37°12.1'. The chronometer reads 08h 48m 51s, and is 01m 22s slow. What star did you observe?        | Gienah   | Kochab    | Gacrux   | Eltanin  |               |
| 224  | On 14 January your 0550 DR position is LAT 25°26.0'N, LONG 38°16.0'W. You observe an unidentified star bearing 212°T at an observed altitude (Ho) of 41°42.3'. The chronometer reads 08h 48m 51s, and is 01m 22s slow. What star did you observe?        | Gienah   | Kochab    | Gacrux   | Eltanin  |               |
| 225  | On 14 January your 0550 DR position is LAT 25°26.0'N, LONG 38°16.0'W. You observe an unidentified star bearing 192°T at an observed altitude (Ho) of 06°15.2'. The chronometer reads 08h 48m 51s, and is 01m 22s slow. What star did you observe?        | Gienah   | Kochab    | Gacrux   | Eltanin  |               |
| 226  | On 14 January your 0550 ZT DR position is LAT 25°26.0' N, LONG 38°16.0' W. You observe an unidentified star bearing 004.5°T, at an observed altitude (Ho) of 40°10.0'. The chronometer reads 08h 48m 51s and is 01m 22s slow. What star did you observe? | Gienah   | Kochab    | Gacrux   | Eltanin  |               |
| 227  | On 14 January your 1922 DR position is LAT 27°18.5'S, LONG 67°18.0'E. You observe an unidentified star bearing 250°T at an observed altitude (Ho) of 31°01.2'. The chronometer reads 03h 25m 43s, and is 03m 15s fast. Which star did you observe?       | Elnath   | Fomalhaut | Pollux   | Markab   |               |
| 228  | On 14 January your 1922 DR position is LAT 27°18.5'S, LONG 67°18.0'E. You observe an unidentified star bearing 295°T at an observed altitude (Ho) of 13°50.7'. The chronometer reads 03h 25m 43s, and is 03m 15s fast. What star did you observe?        | Elnath   | Fomalhaut | Pollux   | Markab   |               |
| 229  | On 14 January your 1922 DR position is LAT 27°18.5'S, LONG 67°18.0'E. You observe an unidentified star bearing 054°T at an observed altitude (Ho) of 07°52.1'. The chronometer reads 03h 25m 43s, and is 03m 15s fast. What star did you observe?        | Elnath   | Fomalhaut | Pollux   | Markab   |               |

| ID # | Question   | Choice A                      | Choice B                      | Choice C                      | Choice D                             | Illustrations |
|------|--|-------------------------------|-------------------------------|-------------------------------|--------------------------------------|---------------|
| 230  | On 14 January your 1922 ZT DR position is LAT 27°18.5' S, LONG 67°18.0' E. You observe an unidentified star bearing 029°T, at an observed altitude (Ho) of 29°35.0'. The chronometer reads 03h 25m 43s and is 03m 15s fast. What star did you observe?   | <b>Elmath</b>                 | Fomalhaut                     | Pollux                        | Markab                               |               |
| 231  | On 14 March at 1845 ZT, you take a sextant observation of Polaris. Your DR position is LAT 29°10' N, LONG 154°30' W, and your sextant reads 29°53.5'. Your chronometer reads 04h 42m 36s, and the chronometer error is 02m 24s slow. Your height of eye is 24 feet, and the index error is 1.3' off the arc. Determine the latitude by Polaris.              | 29°11.7'N                     | 29°15.5'N                     | 29°18.0'N                     | <b>29°21.3'N</b>                     |               |
| 232  | On 14 March your 1846 ZT DR position is LAT 21°57.6' N, LONG 132°16.2' W. At that time you observe Polaris with a sextant altitude (hs) of 22°16.8'. The chronometer time of the sight is 03h 45m 10s, and the chronometer error is 01m 32s slow. The index error is 3.2' off the arc, and the height of eye is 44.9 feet. What is your latitude by Polaris? | 21°32.4'N                     | <b>21°49.8'N</b>              | 21°51.0'N                     | 21°53.1'N                            |               |
| 233  | On 14 October your 0800 zone time (ZT) dead reckoning position is LAT 28°22.0'N, LONG 161°17.0'E. Your vessel is on course 116°T at a speed of 17.5 knots. What is the ZT of local apparent noon (LAN)?  | 1148                          | 1151                          | <b>1156</b>                   | 1202                                 |               |
| 234  | On 14 October your 0800 ZT DR position is LAT 28°22.0'N, LONG 161°17.0'E. Your vessel is on course 116°T at a speed of 17.5 knots. What is the ZT of local apparent noon (LAN)?  | 1142                          | 1148                          | 1152                          | <b>1156</b>                          |               |
| 235  | On 14 September your 1810 ZT DR position is LAT 27°12.0' S, LONG 71°10.0' E. You are on course 060°T at a speed of 15.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1822 running fix.   | LAT 27°04.5'S, LONG 71°22.4'E | LAT 27°07.5'S, LONG 71°18.6'E | LAT 27°09.2'S, LONG 71°11.3'E | <b>LAT 27°11.0'S, LONG 71°14.5'E</b> | NP-0011       |

| ID # | Question   | Choice A                       | Choice B                       | Choice C                       | Choice D                              | Illustrations |
|------|--|--------------------------------|--------------------------------|--------------------------------|---------------------------------------|---------------|
| 236  | On 15 August an ex-meridian altitude of the Sun's lower limb at upper transit was observed at 1130 ZT. Your DR position is LAT 26°24.0'S, LONG 155°02.0'E, and your sextant altitude (hs) is 48°45.9'. The index error is 2.6' on the arc, and your height of eye is 51.5 feet. The chronometer time of the observation is 01h 27m 38s, and the chronometer error is 02m 14s slow. Find the latitude at meridian transit from the ex-meridian observation. | LAT 26°32.6'S                  | <b>LAT 26°51.6'S</b>           | LAT 26°57.0'S                  | LAT 27°09.9'S                         |               |
| 237  | On 15 August your 0512 zone time position was LAT 29°18.0'N, LONG 57°24.0'W. Your vessel was steaming on course 262°T at a speed of 20.0 knots. An observation of the Sun's lower limb was made at 0824 ZT. The chronometer read 00h 22m 24s and was slow 01m 34s. The observed altitude (Ho) was 38°16.7'. LAN occurred at 1204 zone time. The observed altitude (Ho) was 74°58.0'. What was the longitude of your 1204 zone time running fix?            | LONG 59°52.0'W                 | LONG 59°54.0'W                 | <b>LONG 59°58.5'W</b>          | LONG 60°02.0'W                        |               |
| 238  | On 15 August your vessel is enroute from Bombay, India, to San Francisco, CA. You are steering course 020°T and making a speed of 20.0 knots. Your 1830 zone time DR is LAT 26°13.0' N, LONG 135°18.0' W. You observed 3 celestial bodies. Determine the latitude and longitude of your 1935 running fix.  | LAT 26°15.9'N, LONG 135°03.6'W | LAT 26°35.3'N, LONG 135°24.8'W | LAT 26°40.5'N, LONG 135°21.6'W | <b>LAT 26°48.1'N, LONG 135°20.7'W</b> | NP-0017       |
| 239  | On 15 December in DR position LAT 23°24.0'N, LONG 55°36.0'W, you take an ex-meridian observation of the Sun's lower limb. The chronometer time of the sight is 03h 45m 19s, and the chronometer error is 00m 00s. The sextant altitude (hs) is 43°02.3'. The index error is 2.6' on the arc, and your height of eye is 65.0 feet. What is the latitude at meridian transit?  | <b>LAT 23°33.5'N</b>           | LAT 23°35.8'N                  | LAT 23°38.1'N                  | LAT 23°40.6'N                         |               |
| 240  | On 15 February at 0610 ZT, in DR position LAT 56°53.0' N, LONG 157°02.9' E, you observe Polaris at a sextant altitude (hs) of 56°10.4'. The index error is 2.5' on the arc, and the height of eye is 18 meters. What is the latitude?  | <b>56°41.8'N</b>               | 56°47.9'N                      | 56°48.1'N                      | 57°10.6'N                             |               |

| ID # | Question   | Choice A                              | Choice B                       | Choice C                       | Choice D                       | Illustrations |
|------|--|---------------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------|
| 241  | On 15 July at 0447 ZT, your vessel's DR position is LAT 22°42' N, LONG 126°36' E. At approximately this time, you obtain a sextant altitude (hs) of Polaris reading 23°46.2' with an index error of 1.6' off the arc. Your chronometer reads 08h 48m 28s, and is 1m 16s fast. What is your latitude by Polaris, given a height of eye of 33 feet?                            | 22°44.1'N                             | 22°46.2'N                      | 22°50.2'N                      | <b>22°54.1'N</b>               |               |
| 242  | On 15 July in DR position LAT 22°19.0'N, LONG 154°37.0'W, you observe an amplitude of the Sun. The Sun's center is on the visible horizon and bears 298°psc. The chronometer reads 04h 45m 19s and is 01m 56s slow. Variation in the area is 7.5°W. What is the deviation of the standard magnetic compass?  | 2.7°W                                 | <b>3.0°E</b>                   | 3.6°W                          | 3.9°E                          |               |
| 243  | On 15 July your vessel is enroute from Portland, OR, to Singapore, Malaysia. You are steering course 243°T and making a speed of 16 knots. Your 1845 zone time DR is LAT 27°42.0' N, LONG 167°02.0' E. You observed 3 celestial bodies. Determine the latitude and longitude of your 1945 running fix.   | <b>LAT 27°31.1'N, LONG 166°43.0'E</b> | LAT 27°38.5'N, LONG 166°45.1'E | LAT 27°45.3'N, LONG 166°32.2'E | LAT 28°18.1'N, LONG 166°39.8'E | NP-0016       |
| 244  | On 15 March in DR position LAT 21°42.0'N, LONG 55°26.0'W, you take an ex-meridian observation of the Sun's lower limb. The chronometer time of the sight is 04h 02m 40s, and the chronometer error is 02m 24s fast. The sextant altitude (hs) is 66°15.6'. The index error is 2.8' on the arc, and your height of eye is 56 feet. What is the latitude at meridian transit?  | 21°12.0'N                             | 21°18.0'N                      | 21°24.4'N                      | <b>21°32.0'N</b>               |               |
| 245  | On 15 November your 0813 zone time (ZT) fix gives you a position of LAT 22°30.0'N, LONG 67°28.0'W. Your vessel is on course 164°T, and your speed is 13.5 knots. Local apparent noon (LAN) occurs at 1215 ZT, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 49°46.0'. What is the latitude at 1200 ZT? | <b>21°42.5'N</b>                      | 21°39.3'N                      | 21°36.0'N                      | 21°32.8'N                      |               |

| ID # | Question  | Choice A                             | Choice B                      | Choice C                             | Choice D                      | Illustrations |
|------|---|--------------------------------------|-------------------------------|--------------------------------------|-------------------------------|---------------|
| 246  | On 15 November your 0913 zone time fix gives you a position of LAT 22°30.0'N, LONG 68°28.0'W. Your vessel is on course 164°T, and your speed is 13.5 knots. Local apparent noon (LAN) occurs at 1118 zone time at which time meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 49°46.0'. What is the calculated latitude at LAN?  | 21°36.1'N                            | 21°37.7'N                     | <b>21°39.3'N</b>                     | 21°40.9'N                     |               |
| 247  | On 15 November your 1030 ZT DR position is LAT 17°25'S, LONG 42°12'W. You are on course 059°T, speed 22 knots. Determine your 1200 position using the following observations of the Sun.<br><br>ZONE TIME    GHA    DECLINATION    Ho<br>1128            40°50.4'    S 18°33.6'    88°18.4'<br>1133            42°05.4'    S 18°33.6'    88°37.7'   | LAT 17°00.0'S, LONG 41°45.8'W        | LAT 17°02.1'S, LONG 41°48.4'W | <b>LAT 17°06.8'S, LONG 41°44.3'W</b> | LAT 17°08.9'S, LONG 41°40.4'W |               |
| 248  | On 15 November your 1030 ZT DR position is LAT 19°41'S, LONG 41°37'W. You are on course 239°T, speed 22 knots. Determine your 1200 position using the following observations of the Sun.<br><br>ZONE TIME    GHA    DECLINATION    Ho<br>1128            40°50.4'    S 18°33.6'    88°18.4'<br>1133            42°05.4'    S 18°33.6'    88°37.7'   | <b>LAT 20°01.0'S, LONG 42°05.9'W</b> | LAT 20°04.3'S, LONG 42°09.8'W | LAT 20°06.7'S, LONG 42°06.1'W        | LAT 20°08.1'S, LONG 42°00.7'W |               |
| 249  | On 15 October an ex-meridian altitude of the Sun's lower limb at upper transit was observed at 1146 ZT. Your DR position is LAT 22°42.0'N, LONG 139°52.0'E, and your sextant altitude (hs) is 58°30.4'. The index error is 3.4' on the arc, and your height of eye is 56.7 feet. The chronometer time of the observation is 02h 45m 06s, and the chronometer error is 01m 06s slow. Find the latitude at meridian transit from the ex-meridian observation. | LAT 22°29.1'N                        | <b>LAT 22°35.2'N</b>          | LAT 22°58.1'N                        | LAT 23°20.6'N                 |               |

| ID # | Question   | Choice A                       | Choice B                       | Choice C                       | Choice D                              | Illustrations |
|------|--|--------------------------------|--------------------------------|--------------------------------|---------------------------------------|---------------|
| 250  | On 15 October your 0300 zone time DR position is LAT 27°14' S, LONG 99°46' E. You are on course 128°T at a speed of 19 knots. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?  | Jupiter, Alphard, Betelgeuse   | Mars, Regulus, Canopus         | Achernar, Suhail, Alphard      | <b>Achernar, Procyon, Aldebaran</b>   |               |
| 251  | On 15 October your 0325 zone time DR position is LAT 26°51.0' N, LONG 138°17.0' W. At that time, you observe Canopus bearing 167°pgc. The chronometer reads 00h 25m 36s, and the chronometer error is 00m 20s slow. The variation is 2°E. What is the gyro error?  | <b>1.3°W</b>                   | 3.2°W                          | 3.2°E                          | 4.1°W                                 |               |
| 252  | On 16 April in DR position LAT 28°07.0'N, LONG 81°47.0'W, you observe an amplitude of the Sun. The Sun's center is on the visible horizon and bears 073.5°psc. The chronometer reads 10h 53m 41s and is 02m 23s slow. Variation in the area is 11°E. What is the deviation of the magnetic compass?  | 4.5°E                          | 4.9°W                          | 6.1°E                          | <b>6.5°W</b>                          |               |
| 253  | On 16 April your 0200 zone time DR position is LAT 17°18' S, LONG 168°46' E. You are on course 236°T at a speed of 16 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix.   | LAT 17°54.9'S, LONG 167°48.7'E | LAT 17°55.6'S, LONG 167°45.1'E | LAT 17°56.8'S, LONG 167°52.4'E | <b>LAT 18°00.4'S, LONG 167°49.2'E</b> | NP-0036       |
| 254  | On 16 August , your 1600 ZT DR position is LAT 26°17.0'N, LONG 165°17.0'E. You are on course 301°T at a speed of 15 knots. What will be the zone time of sunset at your vessel?  | 1827                           | 1832                           | <b>1838</b>                    | 1845                                  |               |
| 255  | On 16 December your 1810 zone time DR position is LONG 129°46.5' W. At that time you observe Polaris with a sextant altitude (hs) of 23°56.8'. The chronometer time of the sight is 03h 12m 31s, and the chronometer error is 02m 16s fast. The index error is 2.5' off the arc, and the height of eye is 52.6 feet. What is your latitude by Polaris? | <b>23°07.8'N</b>               | 23°12.3'N                      | 24°11.9'N                      | 24°18.6'N                             |               |
| 256  | On 16 February , your 0300 ZT DR position is LAT 28°32.0'S, LONG 176°49.0'E. You are on course 082°T at a speed of 21 knots. What will be the zone time of sunrise at your vessel?   | 0534                           | <b>0552</b>                    | 0631                           | 0645                                  |               |

| ID # | Question   | Choice A                 | Choice B                   | Choice C            | Choice D           | Illustrations |
|------|--|--------------------------|----------------------------|---------------------|--------------------|---------------|
| 257  | On 16 February your 0640 zone time (ZT) position was LAT 23°46.0'N, LONG 156°24.0'W. Your vessel was steaming on course 222°T at a speed of 18.0 knots. An observation of the Sun's lower limb was made at 0910 ZT. The chronometer read 07h 08m 06s and was slow 01m 56s. The observed altitude (Ho) was 27°15.8'. LAN occurred at 1245 ZT (ZD +10). The observed altitude (Ho) was 55°25.3'. What was the longitude of your 1245 ZT running fix? | 157°37.2'W               | 157°42.0'W                 | 157°45.7'W          | 157°47.2'W         |               |
| 258  | On 16 February your 1845 ZT DR position is LAT 25°50.5' N, LONG 46°24.0' W. At that time you observe Polaris with a sextant altitude (hs) of 26°25.5'. The chronometer time of the sight is 09h 47m 30s and the chronometer error is 02m 16s fast. The index error is 2.5' off the arc, and the height of eye is 55.0 feet. What is your latitude by Polaris?  | 25°38.0'N                | 25°44.2'N                  | 26°00.1'N           | 26°37.5'N          |               |
| 259  | On 16 January at 1804 zone time, you take a sextant observation of Polaris. Your vessel's DR position is LAT 36°12' N, LONG 124°36' W, and your sextant reads (hs) 37°16.4'. Your chronometer reads 02h 02m 12s, and is 01m 36s slow. Your height of eye is 60 feet, and the index error is 1.5' on the arc. From your observation of Polaris, what is the latitude of your vessel?  | 36°12.6'N                | 36°14.4'N                  | 36°17.9'N           | 36°20.2'N          |               |
| 260  | On 16 January your 0930 ZT DR position is LAT 26°07.0'S, LONG 51°43.0'E. Your vessel is on course 238°T at a speed of 17.0 knots. What is the ZT of local apparent noon (LAN)?   | 1145                     | 1148                       | 1152                | 1156               |               |
| 261  | On 16 July at 2000 zone time, you take a sextant observation of Polaris. Your vessel's DR position is LAT 27°22.0' N, LONG 148°35.0' W, and your sextant reads 26°57.5'. Your chronometer reads 05h 59m 16s, and your chronometer error is 01m 28s slow. Your height of eye is 48 feet, and the index error for your sextant is 1.3' off the arc. What is the latitude of your vessel from your observation of Polaris?                            | 26°52.1'N                | 26°58.8'N                  | 27°36.1'N           | 27°43.4'N          |               |
| 262  | On 16 July your 1810 zone time DR position is LAT 24°16.5' S, LONG 162°52.0' E. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?  | Arcturus, Spica, Antares | Jupiter, Alphard, Alphecca | Pollux, Mars, Deneb | Vega, Hadar, Venus |               |

| ID # | Question  | Choice A                    | Choice B             | Choice C            | Choice D             | Illustrations |
|------|---|-----------------------------|----------------------|---------------------|----------------------|---------------|
| 263  | On 16 July your 1920 ZT DR position is LAT 25°36.0' N, LONG 172°18.9' W. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?  | Rasalhague, Spica, Arcturus | Venus, Antares, Vega | Vega, Mars, Antares | Saturn, Acrux, Spica |               |
| 264  | On 16 June , in DR position LAT 50°57.0'S, LONG 53°03.9'W (ZD+4), you take an ex-meridian observation of Acrux at lower transit. The chronometer time of the sight is 10h 08m 18s, and the chronometer error is 02m 12s fast. The sextant altitude (hs) is 23°49.0'. The index error is 1.1' off the arc, and your height of eye is 26 feet. What is the latitude at meridian transit?  | 50°41.2'S                   | 51°02.2'S            | 51°33.0'S           | 51°41.2'S            |               |
| 265  | On 16 June 0612 zone time, morning stars were observed. The vessel's position was LAT 27°23.0'S, LONG 56°22.0'W. The vessel is steaming at 16.0 knots on a course of 212°T. A sextant observation of the Sun's lower limb is made at 0850 zone time. The chronometer reads 00h 53m 19s, and the sextant altitude is 22°58.6'. The index error is 2.0' off the arc, and the chronometer error is 02m 43s fast. Your height of eye is 61.0 feet. What is the azimuth (Zn) of this sight using the assumed position? | 044.3°                      | 052.6°               | 136.1°              | 148.4°               |               |
| 266  | On 16 June your 0430 zone time DR position is LAT 29°24.0' S, LONG 36°16.0' E. At that time, you observe Vega bearing 341.0°psc. The chronometer reads 02h 32m 06s, and the chronometer error is 01m 54s fast. The variation is 20.5°W. What is the deviation?  | 3.2°E                       | 3.2°W                | 2.4°W               | 2.8°E                |               |
| 267  | On 16 March , your 0330 ZT DR position is LAT 22°36.0'S, LONG 76°16.0'E. You are on course 098°T at a speed of 16 knots. What will be the ZT of sunrise at your vessel?   | 0545                        | 0553                 | 0600                | 0608                 |               |
| 268  | On 16 November your 0800 zone time DR position is LAT 25°11.0'N, LONG 117°41.0'W. Your vessel is on course 252°T at a speed of 14.5 knots. What is the zone time of local apparent noon (LAN)?  | 1131                        | 1135                 | 1139                | 1144                 |               |
| 269  | On 16 November your 0800 ZT DR position is LAT 25°11.0'N, LONG 117°41.0'W. Your vessel is on a course of 252°T at a speed of 14.5 knots. What is the ZT of local apparent noon (LAN)?   | 1135                        | 1139                 | 1143                | 1146                 |               |



| ID # | Question  | Choice A                   | Choice B             | Choice C             | Choice D            | Illustrations |
|------|---|----------------------------|----------------------|----------------------|---------------------|---------------|
| 270  | On 16 November your 1200 ZT DR position is LAT 26°48.0'S, LONG 124°32.0'W. Your vessel is on course 078°T, speed 17.0 knots. You observe an ex-meridian of the Sun's lower limb. The sextant (hs) reads 81°41.3'. The index error is 1.5' off the arc, and your height of eye is 56 feet. The chronometer time of the observation is 08h 15m 32s, and the chronometer is 03m 06s fast. What is your latitude at meridian transit?   | 26°42.6'S                  | 26°47.1'S            | 26°49.5'S            | 26°52.3'S           |               |
| 271  | On 16 October evening twilight will occur at 1746 ZT, and your DR position will be LAT 28°43.2' N, LONG 60°29.8' W. Considering their magnitude and location, which of the following are the three best stars to select for a fix at star time?   | Antares, Arcturus, Polaris | Deneb, Polaris, Vega | Antares, Deneb, Vega | Vega, Polaris, Enif |               |
| 272  | On 16 September , your vessel's 0736 zone time DR position is LAT 27°34'S, LONG 174°49'E, when an azimuth of the Sun is observed. The chronometer time of the sight is 07h 38m 11s, and the Sun is bearing 079.8° per gyrocompass. The chronometer error is 01m 46s fast, and the variation in the area is 11.0°W. At the time of the sight, the helmsman reports that he was heading 252°pgc and 258° per magnetic compass. What is the deviation of the magnetic compass? | 2°W                        | 3°W                  | 3°E                  | 8°W                 |               |
| 273  | On 16 September your 0600 ZT fix gives you a position of LAT 29°47.2'N, LONG 65°28.4'W. Your vessel is on course 242°T and your speed is 13.5 knots. Local apparent noon (LAN) occurs at 1227 ZT, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 63°25.3'. What is the calculated latitude at LAN?   | 29°07.9'N                  | 29°06.1'N            | 29°04.7'N            | 29°01.6'N           |               |
| 274  | On 17 April , your 1516 zone time DR position is LAT 27°24.0'N, LONG 115°24.0'E. At that time, you observe the Sun bearing 247°psc. The chronometer reads 07h 16m 26s, and the chronometer error is 00m 32s slow. The variation is 4.5°E. What is the deviation of the standard compass?  | 4.5°W                      | 5.4°E                | 6.2°E                | 6.2°W               |               |

| ID # | Question  | Choice A          | Choice B          | Choice C                 | Choice D          | Illustrations |
|------|---|-------------------|-------------------|--------------------------|-------------------|---------------|
| 275  | On 17 April , your vessel is enroute from the Panama Canal to Kobe, Japan. Your 0400 zone time DR position is LAT 26°12.0'N, LONG 126°12.0'W. Your vessel is on course 285°T at a speed of 18 knots. What will be the zone time of sunrise at your vessel?  | 0535              | 0541              | 0552                     | <b>0602</b>       |               |
| 276  | On 17 April your 1610 ZT DR position is LAT 22°07.0'N, LONG 158°16.0'W. At that time, you observe the Sun bearing 271°psc. The chronometer reads 03h 08m 52s, and the chronometer error is 01m 16s slow. The variation is 4°E. What is the deviation of the standard magnetic compass?  | 1.1°W             | 1.7°E             | <b>2.3°W</b>             | 2.9°E             |               |
| 277  | On 17 April your vessel's 1856 zone time DR position is LAT 22°35.0'N, LONG 63°15.0'W. At that time, a sextant observation of the star Sirius is made. The sextant altitude is 42°45.0' and the chronometer reads 10h 59m 27s. The index error is 2.6' off the arc, and the chronometer error is 03m 01s fast. Your height of eye is determined to be 45 feet. What is the computed altitude (hc) and azimuth (Zn) for this sight using the assumed position? | 42°40.0', 214.9°T | 42°40.0', 325.1°T | <b>42°51.6', 214.9°T</b> | 42°51.6', 325.1°T |               |
| 278  | On 17 April your vessel's position is LAT 21°00'S, LONG 78°30'W, when an amplitude of the Sun is observed. The Sun's center is on the celestial horizon and bears 082.7° per standard magnetic compass. Variation in the area is 2.0°W. The chronometer reads 10h 59m 24s and is 01m 24s fast. What is the deviation of the compass?  | <b>2.0°W</b>      | 3.0°W             | 2.5°E                    | 3.0°E             |               |
| 279  | On 17 December your 0600 ZT fix gives you a position of LAT 27°16.7'N, LONG 138°39.2'W. Your vessel is on course 137°T, and your speed is 14.8 knots. Local apparent noon (LAN) occurs at 1207 ZT, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 40°22.1'. What is the calculated latitude at LAN?  | 26°09.9'N         | 26°11.6'N         | 26°13.0'N                | <b>26°15.4'N</b>  |               |

| ID # | Question   | Choice A                              | Choice B                       | Choice C                       | Choice D                           | Illustrations |
|------|--|---------------------------------------|--------------------------------|--------------------------------|------------------------------------|---------------|
| 280  | On 17 January your 0730 zone time fix gives you a position of LAT 22°26.0'S, LONG 152°17.0'E. Your vessel is steaming on a course of 116°T at a speed of 17 knots. An observation of the Sun's lower limb is made at 1015 zone time. The chronometer reads 00h 13m 23s, and the chronometer error is 01m 49s slow. The observed altitude (Ho) is 66°02.1'. LAN occurs at 1152 zone time and a meridian altitude of the Sun's lower limb is made. The observed altitude (Ho) is 87°54.2'. Determine the vessel's 1200 zone time position. | <b>LAT 22°53.8'S, LONG 153°25.6'E</b> | LAT 22°53.8'S, LONG 153°28.8'E | LAT 22°56.3'S, LONG 153°25.6'E | LAT 22°56.3'S, LONG 153°28.8'E     |               |
| 281  | On 17 January your 0730 zone time position was LAT 22°26.0'N, LONG 152°17.0'E. Your vessel was steaming on course 136°T at a speed of 17.0 knots. An observation of the Sun's lower limb was made at 1015 ZT. The chronometer read 00h 13m 23s and was slow 01m 49s. The observed altitude (Ho) was 40°25.7'. LAN occurred at 1222 zone time. The observed altitude (Ho) was 47°48.1'. What was the longitude of your 1200 zone time running fix?  | LONG 153°04.2'E                       | LONG 153°08.3'E                | <b>LONG 153°13.1'E</b>         | LONG 153°18.6'E                    |               |
| 282  | On 17 July your 1951 zone time DR position is LAT 24°26.0' N, LONG 51°16.0' W. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?   | Hadar, Deneb, Alphard                 | Regulus, Venus, Antares        | Mars, Vega, Dubhe              | <b>Kochab, Jupiter, Rasalhague</b> |               |
| 283  | On 17 June , your 0815 zone time DR position is LAT 25°27.0'N, LONG 47°16.0'W. At that time, you observe the Sun bearing 079.5°psc. The chronometer reads 11h 15m 03s, and the chronometer error is 01m 15s fast. The variation is 3°E. What is the deviation of the standard magnetic compass?  | 0.7°W                                 | <b>3.5°W</b>                   | 3.7°E                          | 2.3°E                              |               |
| 284  | On 17 March your 0520 DR position is LAT 27°23.0'N, LONG 39°42.0'W. At this time you observe an unidentified star bearing 270°T with an observed altitude of 46°30.2'. The chronometer reads 08h 22m 15s, and is 01m 45s fast. What star did you observe?  | Altair                                | Alkaid                         | <b>Arcturus</b>                | Deneb                              |               |

| ID # | Question  | Choice A | Choice B | Choice C | Choice D | Illustrations |
|------|---|----------|----------|----------|----------|---------------|
| 285  | On 17 March your 0520 DR position is LAT 27°23.0'N, LONG 39°42.0'W. You observe an unidentified star bearing 110°T at an observed altitude (Ho) of 50°47.2'. The chronometer reads 08h 22m 15s, and is 01m 45s fast. What star did you observe? | Altair   | Alkaid   | Arcturus | Deneb    |               |
| 286  | On 17 March your 0520 Dr position is LAT 27°23.0'N, LONG 39°42.0'W. You observe an unidentified star bearing 313°T at an observed altitude (Ho) of 43°03.8'. The chronometer reads 08h 22m 15s and is 01m 45s fast. What star did you observe?  | Altair   | Alkaid   | Arcturus | Deneb    |               |
| 287  | On 17 March your 0800 zone time DR position is LAT 21°27.0'N, LONG 65°25.0'W. Your vessel is on course 105°T at a speed of 17.5 knots. What is the zone time of local apparent noon (LAN)?  | 1210     | 1218     | 1225     | 1231     |               |
| 288  | On 17 March your 1845 DR position is LAT 25°10.0'N, LONG 66°48.0'W. You observe an unidentified star bearing 077°T at an observed altitude (Ho) of 67°04.4'. The chronometer reads 10h 47m 49s, and is 1m 54s fast. What star did you observe?  | Capella  | Mirfak   | Pollux   | Rigel    |               |
| 289  | On 17 March your 1845 DR position is LAT 25°10.0'N, LONG 66°48.0'W. You observe an unidentified star bearing 320°T at an observed altitude (Ho) of 50°02.9'. The chronometer reads 10h 47m 49s, and is 1m 54s fast. What star did you observe?  | Capella  | Mirfak   | Pollux   | Rigel    |               |
| 290  | On 17 March your 1845 DR position is LAT 25°10.0'N, LONG 66°48.0'W. You observe an unidentified star bearing 340°T at an observed altitude (Ho) of 66°25.1'. The chronometer reads 10h 47m 49s, and is 1m 54s fast. What star did you observe?  | Capella  | Mirfak   | Pollux   | Rigel    |               |
| 291  | On 17 May , your 0300 ZT DR position is LAT 27°21.0'N, LONG 146°14.0'E. You are on course 107°T at a speed of 18 knots. What will be the zone time of sunrise at your vessel?   | 0457     | 0511     | 0519     | 0522     |               |

| ID # | Question   | Choice A               | Choice B               | Choice C               | Choice D               | Illustrations |
|------|--|------------------------|------------------------|------------------------|------------------------|---------------|
| 292  | On 17 May , your 1554 zone time DR position is LAT 26°33.0'N, LONG 65°46.0'W. At that time, you observe the Sun bearing 269°psc. The chronometer reads 07h 55m 47s, and the chronometer error is 01m 14s fast. The variation is 3°W. What is the deviation of the standard magnetic compass?   | 0.6°E                  | 1.6°W                  | 4.6°W                  | 7.6°E                  |               |
| 293  | On 17 May at 0501 zone time, morning stars were observed, and the vessel's position was determined to be LAT 22°16.0'S, LONG 103°46.0'W. Your vessel is steaming at 24.0 knots on a course of 301°T. A sextant observation of the Sun's lower limb is made at 0845 zone time. The chronometer reads 03h 43m 32s, and the sextant altitude is 28°24.7'. The index error is 1.5' off the arc, and the chronometer error is 02m 02s slow. Your height of eye on the bridge is 85.5 feet. What is the azimuth (Zn) of this sight using the assumed position? | 051.0°T                | 052.5°T                | 054.2°T                | 055.7°T                |               |
| 294  | On 17 November , your 1530 ZT DR position is LAT 27°13.0'S, LONG 153°21.0'W. You are on course 261°T at a speed of 14 knots. What will be the ZT of sunset at your vessel?   | 1813                   | 1828                   | 1834                   | 1845                   |               |
| 295  | On 17 November in DR position LAT 01°14.4'S, LONG 148°45.5'E, you take an ex-meridian observation of the planet Venus at upper transit. The chronometer time of the sight is 05h 31m 42s, and the chronometer error is 01m 50s fast. The sextant altitude (hs) is 64°41.1'. The index error is 1.8' off the arc, and your height of eye is 50 feet. What is the latitude at meridian transit?  | LAT 01°14.4'S          | LAT 01°16.3'S          | LAT 01°18.0'S          | LAT 01°20.2'S          |               |
| 296  | On 18 August at 0600 ZT, morning stars were observed, and the vessel's position was determined to be LAT 19°48'N, LONG 108° 34'W. Your vessel is steaming on course 166°T at a speed of 16 knots. An observation of the Sun's lower limb is made at 1036 ZT. The chronometer reads 05h 34m 48s and is slow 01m 24s. What is the computed altitude (Hc) and azimuth (Zn) for this 1036 ZT observation using the assumed position method?  | Hc 65°18.5', Zn 102.1° | Hc 65°14.8', Zn 100.4° | Hc 65°11.3', Zn 099.4° | Hc 65°07.2', Zn 101.2° |               |

| ID #      | Question   | Choice A    | Choice B  | Choice C    | Choice D  | Illustrations |          |            |          |      |          |            |          |                               |                               |                               |                               |  |
|-----------|--|-------------|-----------|-------------|-----------|---------------|----------|------------|----------|------|----------|------------|----------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--|
| 297       | <p>On 18 May your 1030 ZT DR position is LAT 18°30'N, LONG 62°31'W. You are on course 286°T, speed 24 knots. Determine your 1200 position using the following observations of the Sun.</p> <table border="1"> <thead> <tr> <th>ZONE TIME</th> <th>GHA</th> <th>DECLINATION</th> <th>Ho</th> </tr> </thead> <tbody> <tr> <td>1204</td> <td>61°54.6'</td> <td>N 19°37.6'</td> <td>88°39.7'</td> </tr> <tr> <td>1210</td> <td>63°24.6'</td> <td>N 19°37.7'</td> <td>88°59.2'</td> </tr> </tbody> </table> | ZONE TIME   | GHA       | DECLINATION | Ho        | 1204          | 61°54.6' | N 19°37.6' | 88°39.7' | 1210 | 63°24.6' | N 19°37.7' | 88°59.2' | LAT 18°33.6'N, LONG 62°54.3'W | LAT 18°35.2'N, LONG 62°49.7'W | LAT 18°38.7'N, LONG 62°59.2'W | LAT 18°41.1'N, LONG 62°53.9'W |  |
| ZONE TIME | GHA  | DECLINATION | Ho        |             |           |               |          |            |          |      |          |            |          |                               |                               |                               |                               |  |
| 1204      | 61°54.6'   | N 19°37.6'  | 88°39.7'  |             |           |               |          |            |          |      |          |            |          |                               |                               |                               |                               |  |
| 1210      | 63°24.6'   | N 19°37.7'  | 88°59.2'  |             |           |               |          |            |          |      |          |            |          |                               |                               |                               |                               |  |
| 298       | <p>On 18 May your 1030 ZT DR position is LAT 20°41'N, LONG 63°32'W. You are on course 106°T, speed 24 knots. Determine your 1200 position using the following observations of the Sun.</p> <table border="1"> <thead> <tr> <th>ZONE TIME</th> <th>GHA</th> <th>DECLINATION</th> <th>Ho</th> </tr> </thead> <tbody> <tr> <td>1204</td> <td>61°54.6'</td> <td>N 19°37.6'</td> <td>88°39.7'</td> </tr> <tr> <td>1210</td> <td>63°24.6'</td> <td>N 19°37.7'</td> <td>88°59.2'</td> </tr> </tbody> </table> | ZONE TIME   | GHA       | DECLINATION | Ho        | 1204          | 61°54.6' | N 19°37.6' | 88°39.7' | 1210 | 63°24.6' | N 19°37.7' | 88°59.2' | LAT 20°32.6'N, LONG 62°57.5'W | LAT 20°30.1'N, LONG 63°01.9'W | LAT 20°27.6'N, LONG 62°52.4'W | LAT 20°25.2'N, LONG 62°56.9'W |  |
| ZONE TIME | GHA  | DECLINATION | Ho        |             |           |               |          |            |          |      |          |            |          |                               |                               |                               |                               |  |
| 1204      | 61°54.6'   | N 19°37.6'  | 88°39.7'  |             |           |               |          |            |          |      |          |            |          |                               |                               |                               |                               |  |
| 1210      | 63°24.6'   | N 19°37.7'  | 88°59.2'  |             |           |               |          |            |          |      |          |            |          |                               |                               |                               |                               |  |
| 299       | <p>On 18 November your 1750 zone time DR position is LONG 110°16.0' W. At that time you observe Polaris with a sextant altitude (hs) of 21°29.8'. The chronometer time of the sight is 00h 52m 43s, and the chronometer error is 02m 18s fast. The index error is 3.2' on the arc, and the height of eye is 49.5 feet. What is your latitude by Polaris?</p>   | 21°03.4'N   | 21°13.4'N | 21°28.1'N   | 21°35.1'N |               |          |            |          |      |          |            |          |                               |                               |                               |                               |  |
| 300       | <p>On 18 October , your 1330 ZT DR position is LAT 27°32.0'N, LONG 154°47.0'W. You are on course 115°T at a speed of 20 knots. What will be the zone time of sunset at your vessel?</p>  | 1715        | 1729      | 1742        | 1751      |               |          |            |          |      |          |            |          |                               |                               |                               |                               |  |

| ID # | Question   | Choice A                             | Choice B                      | Choice C                      | Choice D                      | Illustrations |
|------|--|--------------------------------------|-------------------------------|-------------------------------|-------------------------------|---------------|
| 301  | On 18 October at 0518 ZT, morning stars were observed and the vessel's position was determined to be LAT 25°31.0'N, LONG 146°29.2'E. Your vessel is steaming at 19.0 knots on a course of 308°T. A sextant observation of the Sun's lower limb is made at 0915 ZT. The chronometer reads 11h 17m 11s, and the sextant altitude (hs) is 34°51.4'. The index error is 2.0' off the arc, and the chronometer error is 01m 57s fast. Your height of eye on the bridge is 54.0 feet. What is the azimuth (Zn) of this sight using the assumed position? | 120.6°T                              | 121.9°T                       | <b>125.5°T</b>                | 127.3°T                       |               |
| 302  | On 19 January your 0300 zone time DR position is LAT 22°13' N, LONG 40°19' W. You are on course 297°T at a speed of 17 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0545 running fix?  | <b>LAT 22°29.0'N, LONG 41°06.5'W</b> | LAT 22°30.3'N, LONG 41°00.2'W | LAT 22°31.1'N, LONG 42°58.6'W | LAT 22°33.0'N, LONG 42°55.9'W |               |
| 303  | On 19 July your 1500 ZT DR position is LAT 28°25.0'N, LONG 120°28.0'W. You are on course 233°T at a speed of 10 knots. What will be the zone time of sunset at your vessel?  | 1842                                 | 1853                          | <b>1901</b>                   | 1909                          |               |
| 304  | On 19 June your vessel's 0523 ZT DR position is LAT 25°12.0'N, LONG 123°14.0'W, when an amplitude of the Sun is observed. The Sun's center is on the visible horizon and bears 052.0° per standard compass. Variation in the area is 15°E. The chronometer reads 01h 21m 58s and is 01m 18s slow. What is the deviation of the standard compass?   | 1.4°E                                | 1.4°W                         | 1.7°W                         | <b>3.3°W</b>                  |               |
| 305  | On 19 November in DR position LAT 20°03.5'N, LONG 129°48.0'W, you take an ex-meridian observation of the planet Venus at upper transit. The chronometer time of the sight is 11h 29m 44s, and the chronometer error is 01m 23s slow. The sextant altitude (hs) is 43°54.3'. The index error is 2.0' off the arc, and your height of eye is 48 feet. What is the latitude at meridian transit?  | 20°08.2'N                            | <b>19°58.0'N</b>              | 19°53.2'N                     | 19°50.6'N                     |               |
| 306  | On 19 November your 0146 ZT position is LAT 33°48'N, LONG 25°22'E. You observe Polaris bearing 359.8°pgc. At the time of the observation the helmsman noted that he was heading 224°pgc and 222.5°psc. The variation is 2°E. What is the deviation for that heading?   | 2.0°E                                | 0.5°E                         | <b>1.0°W</b>                  | 1.5°W                         |               |

| ID # | Question   | Choice A                              | Choice B                              | Choice C                              | Choice D                       | Illustrations |
|------|--|---------------------------------------|---------------------------------------|---------------------------------------|--------------------------------|---------------|
| 307  | On 19 November your 0200 zone time DR position is LAT 18°41' N, LONG 150°37' E. You are on course 014°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix.  | <b>LAT 19°45.4'N, LONG 150°52.6'E</b> | LAT 19°42.8'N, LONG 150°56.9'E        | LAT 19°41.2'N, LONG 150°46.3'E        | LAT 19°39.3'N, LONG 150°51.8'E | NP-0031       |
| 308  | On 19 November your 0200 zone time DR position is LAT 20°29.0' N, LONG 150°21.3' E. You are on course 136°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix.  | LAT 19°30.1'N, LONG 151°06.0'E        | LAT 19°31.7'N, LONG 151°04.9'E        | <b>LAT 19°33.0'N, LONG 151°10.0'E</b> | LAT 19°35.8'N, LONG 151°13.6'E | NP-0033       |
| 309  | On 19 November your 0300 zone time DR position is LAT 19°23' N, LONG 151°37' E. You are on course 293°T at a speed of 17 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix.  | LAT 19°38.5'N, LONG 150°41.6'E        | <b>LAT 19°34.8'N, LONG 150°48.0'E</b> | LAT 19°32.9'N, LONG 150°52.3'E        | LAT 19°30.5'N, LONG 150°48.5'E | NP-0039       |
| 310  | On 19 September your 0300 zone time DR position is LAT 24°35' N, LONG 88°40' W. You are on course 288°T at a speed of 14 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix.  | LAT 24°47.4'N, LONG 89°15.0'W         | <b>LAT 24°52.5'N, LONG 89°22.4'W</b>  | LAT 24°59.5'N, LONG 89°28.6'W         | LAT 25°06.0'N, LONG 90°37.0'W  | NP-0028       |
| 311  | On 2 April your 0830 zone time fix gives you a position of LAT 20°16.0'S, LONG 004°12.0'E. Your vessel is steaming a course of 143°T at a speed of 18.0 knots. An observation of the Sun's upper limb is made at 0903 zone time, and the observed altitude (Ho) is 42°39.6'. The chronometer reads 09h 05m 40s, and the chronometer error is 02m 15s fast. Local apparent noon occurs at 1145 zone time, and a meridian altitude of the Sun's lower limb is made. The observed altitude (Ho) for this sight is 63°46.2'. Determine the vessel's 1200 zone time position. | LAT 21°10.1'S, LONG 004°53.9'E        | LAT 21°14.0'S, LONG 004°55.0'E        | <b>LAT 21°18.0'S, LONG 005°00.5'E</b> | LAT 22°42.0'S, LONG 004°57.0'E |               |
| 312  | On 2 April your 0900 zone time DR position is LAT 28°04.0'S, LONG 94°14.0'E. Your vessel is on course 316°T at a speed of 18.5 knots. What is the zone time of local apparent noon (LAN)?  | 1138                                  | 1143                                  | 1146                                  | <b>1149</b>                    |               |
| 313  | On 2 February your 0400 zone time DR position is LAT 24°14.0' N, LONG 163°28.0' W. You are on course 322°T at a speed of 22 knots. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?   | <b>Saturn, Antares, Rasalhague</b>    | Jupiter, Saturn, Polaris              | Saturn, Polaris, Zubenelgenubi        | Jupiter, Spica, Denebola       |               |



| ID # | Question  | Choice A  | Choice B  | Choice C  | Choice D  | Illustrations |
|------|---|-----------|-----------|-----------|-----------|---------------|
| 314  | On 2 January , you are on a course of 094°T at a speed of 20 knots. At 0430 ZT, your DR position is LAT 24°12'N, LONG 71°24'W. Determine the zone time of sunrise.  | 0627      | 0636      | 0644      | 0701      |               |
| 315  | On 2 January you observe the lower limb of the Sun at a sextant altitude (hs) of 35°50.4'. The index error is 0.8' on the arc. The height of eye is 24 feet (7.3 meters). What is the observed altitude (Ho)?   | 35°50.3'  | 35°54.7'  | 35°59.7'  | 36°05.6'  |               |
| 316  | On 2 January your 1759 zone time DR position is LONG 45°17.6' W. At that time you observe Polaris with a sextant altitude (hs) of 24°16.5'. The chronometer time of the sight is 08h 57m 10s, and the chronometer error is 02m 16s slow. The index error is 3.5' on the arc, and the height of eye is 42.5 feet. What is your latitude by Polaris?                  | 22°50.2'N | 23°18.8N  | 23°30.2N  | 24°07.3'N |               |
| 317  | On 2 January your 1759 zone time DR position is LONG 45°17.6' W. At that time you observe Polaris with a sextant altitude (hs) of 24°16.5'. The chronometer time of the sight is 08h 57m 10s, and the chronometer error is 02m 16s slow. The index error is 3.5' on the arc, and the height of eye is 42.5 feet. What is your latitude by Polaris?                  | 22°50.2'N | 23°18.8'N | 23°30.8'N | 23°48.8'N |               |
| 318  | On 2 January your vessel's 1948 zone time position is LAT 21°42'S, LONG 39°12'W, when an amplitude of the Sun is observed. The Sun's center is on the celestial horizon and bears 260° per standard magnetic compass. Variation in the area is 19°W. The chronometer reads 10h 44m 36s and is 03m 24s slow. What is the deviation of the standard magnetic compass? | 4.3°E     | 4.3°W     | 5.1°E     | 5.1°W     |               |
| 319  | On 2 March your 2216 ZT DR position is LAT 21°20.0'S, LONG 17°10.0'W. At that time, you observe Saturn bearing 078°psc. The chronometer reads 11h 14m 04s, and the chronometer error is 02m 20s slow. The variation is 4.5°W. What is the deviation of the standard compass?  | 1.5°W     | 1.6°E     | 2.9°W     | 3.6°E     |               |

| ID # | Question   | Choice A                       | Choice B                       | Choice C                              | Choice D                       | Illustrations |
|------|--|--------------------------------|--------------------------------|---------------------------------------|--------------------------------|---------------|
| 320  | On 2 October , your 1845 DR position is LAT 28°09.2'S, LONG 167°48.1'E. You observe a faint star through a hole in the clouds at a sextant altitude (hs) of 11°37.6' bearing 066°T. The index error is 1.3' off the arc, and the height of eye is 42 feet. The chronometer reads 07h 46m 19s and is 0m 51s fast. What star did you observe?        | Scheat                         | Ruckbah                        | Caph                                  | <b>Algenib</b>                 |               |
| 321  | On 2 October , your 1845 DR position is LAT 28°09.2'S, LONG 167°48.1'E. You observe a faint star through a hole in the clouds at a sextant altitude (hs) of 25°19.4' bearing 273°T. The index error is 1.3' off the arc, and the height of eye is 42 feet. The chronometer reads 07h 46m 19s and is 0m 51s fast. What star did you observe?        | Alpha Serpentis                | <b>Beta Librae</b>             | Beta Lupi                             | Epsilon Bootis                 |               |
| 322  | On 2 October , your 1845 DR position is LAT 28°09.2'S, LONG 167°48.1'E. You observe a faint star through a hole in the clouds at a sextant altitude (hs) of 63°29.1' bearing 237.5°T. The index error is 1.3' off the arc, and the height of eye is 42 feet. The chronometer reads 07h 46m 19s and is 0m 51s fast. What star did you observe?      | <b>Kappa Scorpii</b>           | Beta Ophiuchi                  | Alpha Arae                            | Beta Draconis                  |               |
| 323  | On 2 October , your 1845 DR position is LAT 28°09.2'S, LONG 167°48.1'E. You observe a faint star through a hole in the clouds at a sextant altitude (hs) of 68°03.6' bearing 154°T. The index error is 1.3' off the arc, and the height of eye is 42 feet. The chronometer reads 07h 46m 19s and is 0m 51s fast. What star did you observe?        | <b>Alpha Indi</b>              | Epsilon Cygni                  | Gamma Aquilae                         | Albireo                        |               |
| 324  | On 2 October , your 1845 DR position was LAT 28°09.2'S, LONG 167°48.1'E. You observe a faint star through a hole in the clouds at a sextant altitude (hs) of 20°45.6' T, bearing 201.5°T. The index error is 1.3' off the arc, and the height of eye is 42 feet. The chronometer reads 07h 46m 19s and is 00m 51s fast. What star did you observe? | Cor Caroli                     | Muhlifain                      | <b>Alpha Muscae</b>                   | Beta Corvi                     |               |
| 325  | On 20 February your 0530 ZT DR position is LAT 24°15.0'N, LONG 137°33.0'W. You are on course 033°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix.   | LAT 24°23.3'N, LONG 137°35.5'W | LAT 24°26.0'N, LONG 137°25.8'W | <b>LAT 24°27.5'N, LONG 137°31.8'W</b> | LAT 24°30.1'N, LONG 137°24.5'W | NP-0010       |

| ID # | Question  | Choice A                       | Choice B                       | Choice C                       | Choice D                       | Illustrations |
|------|---|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------|
| 326  | On 20 July , your vessel's 1626 zone time DR position is LAT 27°13.0'N, LONG 63°42.0'W, when you take an azimuth of the Sun. Determine the gyro error using the azimuth information.<br>Chronometer time: 08h 24m 18s Chronometer error: slow 02m 12s Gyro bearing: 279.3°<br>Variation: 15°W   | 1.9°W                          | 2.6°W                          | 1.4°E                          | 2.6°E                          |               |
| 327  | On 20 June your 0800 zone time DR position is LAT 21°02.0'N, LONG 152°50.0'E. Your vessel is on course 265°T at a speed of 15.0 knots. What is the zone time of local apparent noon (LAN)?  | 1149                           | 1154                           | 1159                           | 1203                           |               |
| 328  | On 20 June your 1742 zone time DR position is LAT 24°55.0' S, LONG 8°19.6' E. Considering their magnitude, azimuth, and altitude, which three stars are best suited for a fix at star time?   | Regulus, Canopus, Antares      | Spica, Arcturus, Alioth        | Arcturus, Achernar, Pollux     | Avior, Sabik, Fomalhaut        |               |
| 329  | On 20 June your vessel's 1955 ZT DR position is LAT 52°38.9'N, LONG 03°42.7'E, when an amplitude of the Sun is observed. The Sun's center is on the visible horizon and bears 311° per gyrocompass. Variation in the area is 6°W. At the time of the observation, the helmsman noted that he was heading 352° per gyrocompass and 358° per steering compass. What is the gyro error and deviation for that heading?                       | 1.3°W GE, 1.3°E DEV            | 0.0° GE, 0.0° DEV              | 1.3°W GE, 1.3°W DEV            | 1.3°E GE, 1.3°E DEV            |               |
| 330  | On 20 November your 0612 zone time (ZT) position was LAT 25°38.0'N, LONG 166°54.0'W. Your vessel was steaming on course 126°T at a speed of 20.0 knots. An observation of the Sun's lower limb was made at 0854 ZT. The chronometer read 07h 51m 14s and was slow 02m 52s. The observed altitude (Ho) was 27°58.3'. LAN occurred at 1147 ZT. The observed altitude (Ho) was 45°35.0'. What was the longitude of your 1147 ZT running fix? | 165°20.2'W                     | 165°18.4'W                     | 165°15.8'W                     | 165°12.5'W                     |               |
| 331  | On 20 November your 1030 ZT DR position is LAT 27°16.0' N, LONG 157°18.6' E. You are on course 060°T at a speed of 20 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1200 running fix.  | LAT 27°16.8'N, LONG 157°30.5'E | LAT 27°22.6'N, LONG 157°37.8'E | LAT 27°29.7'N, LONG 157°43.0'E | LAT 27°33.4'N, LONG 157°48.2'E | NP-0012       |

| ID # | Question   | Choice A            | Choice B            | Choice C               | Choice D                   | Illustrations |
|------|--|---------------------|---------------------|------------------------|----------------------------|---------------|
| 332  | On 20 September your 0730 zone time position was LAT 28°58.0'N, LONG 152°26.0'W. Your vessel was steaming on course 225°T at a speed of 19.0 knots. An observation of the Sun's lower limb was made at 0931 ZT. The chronometer read 07h 29m 20s and was slow 02m 22s. The observed altitude (Ho) was 44°14.4'. LAN occurred at 1206 zone time. The observed altitude (Ho) was 62°49.5'. What was the longitude of your 1200 zone time running fix?  | LONG 153°32.5'W     | LONG 153°27.2'W     | <b>LONG 153°23.5'W</b> | LONG 153°20.0'W            |               |
| 333  | On 21 April , your 1542 zone time DR position is LAT 28°54.0'S, LONG 19°07.0'W. At that time, you observe the Sun bearing 299°psc. The chronometer reads 04h 44m 11s, and the chronometer error is 01m 54s fast. The variation is 3°E. What is the deviation of the standard compass?  | <b>0.3°W</b>        | 0.4°E               | 2.7°W                  | 2.7°E                      |               |
| 334  | On 21 February , your 0823 zone time DR position is LAT 21°44.0'S, LONG 80°14.0'E. At that time, you observe the Sun bearing 096°psc. The chronometer reads 03h 25m 19s, and the chronometer error is 01m 52s fast. The variation is 5°W. What is the deviation of the standard magnetic compass?  | 2.2°E               | <b>4.7°W</b>        | 5.7°E                  | 6.3°W                      |               |
| 335  | On 21 May , at 0630 PDT (ZD +7), your vessel takes departure at the San Francisco Sea Buoy, LAT 37°45.0'N, LONG 122°41.5'W, enroute to Kobe, LAT 33°52.0'N, LONG 135°00.0'E via great circle. The distance is 4,245 miles, and you estimate that you will average 14.0 knots. What will be your estimated zone time of arrival?  | 0442, 2 June        | 1342, 2 June        | 0442, 3 June           | <b>1342, 3 June</b>        |               |
| 336  | On 21 November at 0430 ZT, morning stars were observed, and the vessel's position was LAT 22°14.0'S, LONG 79°23.0'E. Your vessel is steaming at 14.5 knots on a course of 246°T. A sextant observation of the Sun's lower limb is made at 0816 ZT. The chronometer reads 03h 14m 16s, and the sextant altitude (hs) is 44°29.2'. The index error is 1.0' on the arc, and the chronometer error is 01m 47s slow. Your height of eye is 61.0 feet (18.6 meters). What is the azimuth (Zn) and intercept (a) of this sight using the assumed position method? | Zn 084.2°, a 6.6' A | Zn 084.2°, a 6.6' T | Zn 095.6°, a 6.6' A    | <b>Zn 095.6°, a 6.6' T</b> |               |

| ID # | Question  | Choice A         | Choice B          | Choice C                | Choice D         | Illustrations |
|------|---|------------------|-------------------|-------------------------|------------------|---------------|
| 337  | On 21 November, at 2100 zone time, you depart LAT 32°12.0'N, LONG 69°26.0'W enroute to LAT 12°05.0'N, LONG 7°32.0'W. The distance is 3,519 miles, and the average speed will be 12.5 knots. What is the zone time of arrival?   | 1330, 3 December | 1530, 3 December  | <b>1830, 3 December</b> | 1530, 4 December |               |
| 338  | On 22 April your 0344 zone time DR position is LAT 21°16.0' N, LONG 107°32.0' W. At that time, you observe Spica bearing 236°psc. The chronometer reads 10h 45m 16s, and the chronometer error is 00m 25s fast. The variation is 7.5°E. What is the deviation of the standard compass?  | 1.1°W            | <b>5.2°E</b>      | 5.2°W                   | 6.1°W            |               |
| 339  | On 22 April your 1852 DR position is LAT 23°54.5'N, LONG 117°36.8'W. You observe an unidentified star bearing 077°T at an observed altitude (Ho) of 18°58.7'. The chronometer reads 02h 54m 53s, and is 02m 51s fast. What star did you observe?  | Diphda           | Betelgeuse        | Gienah                  | <b>Arcturus</b>  |               |
| 340  | On 22 April your 1852 DR position is LAT 23°54.5'N, LONG 117°36.8'W. You observe an unidentified star bearing 248°T at an observed altitude (Ho) of 25°00.9'. The chronometer reads 02h 54m 53s, and is 02m 51s fast. What star did you observe?  | <b>Rigel</b>     | Betelgeuse        | Gienah                  | Arcturus         |               |
| 341  | On 22 April your 1852 DR position is LAT 23°54.5'N, LONG 117°36.8'W. You observe an unidentified star bearing 259°T at an observed altitude (Ho) of 41°15.2'. The chronometer reads 02h 54m 53s, and is 02m 51s fast. What star did you observe?  | Diphda           | <b>Betelgeuse</b> | Gienah                  | Arcturus         |               |
| 342  | On 22 April your 1852 ZT DR position is LAT 23°54.5' N, LONG 117°36.8' W. You observe an unidentified star bearing 129°T at an observed altitude (Ho) of 27°10.0'. The chronometer reads 02h 54m 53s and is 02m 51s fast. What star did you observe?  | Diphda           | Betelgeuse        | <b>Gienah</b>           | Arcturus         |               |
| 343  | On 22 August in DR position LAT 29°41.8'N, LONG 33°15.5'W, you take an ex-meridian observation of the Moon's upper limb at upper transit. The chronometer time of the sight is 08h 00m 02s, and the chronometer error is 02m 20s slow. The sextant altitude (hs) is 74°32.4'. The index error is 1.5' off the arc, and your height of eye is 48 feet. What is the latitude at meridian transit? | LAT 29°39.3'N    | LAT 29°41.3'N     | <b>LAT 29°47.8'N</b>    | LAT 29°49.7'N    |               |

| ID # | Question   | Choice A                      | Choice B                      | Choice C                             | Choice D                      | Illustrations |
|------|--|-------------------------------|-------------------------------|--------------------------------------|-------------------------------|---------------|
| 344  | On 22 August your 1852 zone time DR position is LONG 155°54.0' E. At that time you observe Polaris with a sextant altitude (hs) of 27°36.9'. The chronometer time of the sight is 08h 54m 06s, and the chronometer error is 02m 20s fast. The index error is 3.6' off the arc, and the height of eye is 61.5 feet. What is your latitude by Polaris?   | 27°05.5'N                     | 27°31.0'N                     | <b>28°05.9'N</b>                     | 28°09.5'N                     |               |
| 345  | On 22 February , your 2045 ZT position is LAT 33°19'N, LONG 52°06'W. You observe Polaris bearing 358.1°pgc. At the time of the observation the helmsman noted that he was heading 048°pgc and 065°psc. The variation is 19°W. What is the deviation for that heading?  | 1°E                           | <b>3°E</b>                    | 1°W                                  | 3°W                           |               |
| 346  | On 22 February your 0612 zone time fix gives you a position of LAT 27°16.2'S, LONG 37°41.6'W. Your vessel is on course 298°T, and your speed is 14.2 knots. Local apparent noon (LAN) occurs at 1147 zone time, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 73°33.3'. What is the calculated latitude at LAN?  | <b>26°31.4'S</b>              | 26°29.5'S                     | 26°27.1'S                            | 26°24.8'S                     |               |
| 347  | On 22 February your 0800 zone time position is LAT 24°16'S, LONG 95°37'E. Your vessel is on course 126°T at a speed of 14 knots. An observation of the Sun's lower limb is made at 0945 zone time. The chronometer reads 03h 47m 22s, and the chronometer error is 02m 37s fast. The observed altitude (Ho) is 57°02.1'. LAN occurs at 1148 zone time, and a meridian altitude of the Sun's lower limb is made. The observed meridian altitude (Ho) is 75°22.3'. Determine the vessel's 1200 zone time position. | LAT 24°49.3'S, LONG 96°24.0'E | LAT 24°49.3'S, LONG 96°27.2'E | <b>LAT 24°52.2'S, LONG 96°24.0'E</b> | LAT 24°52.2'S, LONG 96°27.2'E |               |
| 348  | On 22 February your 1857 DR position is LAT 23°46.0'S, LONG 93°16.5'E. You observe an unidentified star bearing 108°T at an observed altitude (Ho) of 67°53.9'. The chronometer reads 01h 00m 35s, and is 03m 25s fast. What star did you observe?   | <b>Adhara</b>                 | Miaplacidus                   | Avior                                | Suhail                        |               |

| ID # | Question  | Choice A            | Choice B            | Choice C                   | Choice D            | Illustrations |
|------|---|---------------------|---------------------|----------------------------|---------------------|---------------|
| 349  | On 22 February your 1857 DR position is LAT 23°46.0'S, LONG 93°16.5'E. You observe an unidentified star bearing 126°T at an observed altitude (Ho) of 40°21.5'. The chronometer reads 01h 00m 35s and is 03m 25s fast. What star did you observe?   | Adhara              | Miaplacidus         | Avior                      | <b>Suhail</b>       |               |
| 350  | On 22 February your 1857 DR position is LAT 23°46.0'S, LONG 93°16.5'E. You observe an unidentified star bearing 150°T at an observed altitude (Ho) of 42°15.0'. The chronometer reads 01h 00m 35s, and is 03m 25s fast. What star did you observe?  | Adhara              | Miaplacidus         | <b>Avior</b>               | Suhail              |               |
| 351  | On 22 February your 1857 ZT DR position is LAT 23°46.0' S, LONG 93°16.5' E. You observe an unidentified star bearing 159°T, at an observed altitude (Ho) of 34°30.0'. The chronometer reads 01h 00m 35s and is 03m 25s fast. What star did you observe?   | Adhara              | <b>Miaplacidus</b>  | Avior                      | Suhail              |               |
| 352  | On 22 July at 0448 ZT, morning stars were observed, and the vessel's position was determined to be LAT 21°43.0'N, LONG 158°39.0'E. Your vessel is steaming at 21.0 knots on a course of 028°T. A sextant observation of the Sun's lower limb is made at 0956 ZT. The chronometer reads 10h 54m 27s, and the sextant altitude is 54°28.2'. The index error is 1.5' off the arc, and the chronometer error is 01m 38s slow. Your height of eye on the bridge is 56 feet. What is the azimuth (Zn) of this sight using the assumed position? | 080.9°T             | 082.2°T             | 084.2°T                    | <b>086.9°T</b>      |               |
| 353  | On 22 July at 0720 ZT, in DR position LAT 20°38.2'N, LONG 87°16.0'W, you observe the Moon's lower limb. The sextant altitude (hs) is 38°32.6, and the chronometer reads 01h 18m 14s. The chronometer is 01m 28s slow. The index error is 3.1' off the arc, and the height of eye is 68 feet. What is the azimuth (Zn) and intercept (a) of this sight from the assumed position?  | Zn 291.4°, a 5.2' A | Zn 111.4°, a 8.7' A | <b>Zn 248.6°, a 5.0' T</b> | Zn 068.6°, a 6.5' T |               |
| 354  | On 22 July your 0442 DR position is LAT 26°35.6' N, LONG 22°16.7' W. You observe an unidentified star bearing 091°T at an observed altitude (Ho) of 64°35.2'. The chronometer reads 05h 39m 03s, and is 03m 14s slow. What star did you observe?  | <b>Hamal</b>        | Rigel               | Menkar                     | Acamar              |               |

| ID # | Question  | Choice A | Choice B | Choice C    | Choice D | Illustrations |
|------|---|----------|----------|-------------|----------|---------------|
| 355  | On 22 July your 0442 DR position is LAT 26°35.6' N, LONG 22°16.7' W. You observe an unidentified star bearing 104°T at an observed altitude (Ho) of 9°55.7'. The chronometer reads 05h 39m 03s, and is 03m 14s slow. What star did you observe?     | Hamal    | Rigel    | Menkar      | Acamar   |               |
| 356  | On 22 July your 0442 DR position is LAT 26°35.6' N, LONG 22°16.7' W. You observe an unidentified star bearing 149°T at an observed altitude (Ho) of 12°55.0'. The chronometer reads 05h 39m 03s, and is 03m 14s slow. What star did you observe?    | Hamal    | Rigel    | Menkar      | Acamar   |               |
| 357  | On 22 July your 0442 ZT DR position is LAT 26°35.6' N, LONG 22°16.7' W. You observe an unidentified star bearing 112°T, at an observed altitude (Ho) of 44°16.0'. The chronometer reads 05h 39m 03s and is 03m 14s slow. What star did you observe? | Hamal    | Rigel    | Menkar      | Acamar   |               |
| 358  | On 22 July your 1759 DR position is LAT 24°50.2' S, LONG 005°16.0' E. You observe an unidentified star bearing 203°T at an observed altitude (Ho) of 28°12.2'. The chronometer reads 06h 01m 31s, and is 02m 15s fast. What star did you observe?   | Regulus  | Antares  | Miaplacidus | Suhail   |               |
| 359  | On 22 July your 1759 DR position is LAT 24°50.2' S, LONG 05°16.0' E. You observe an unidentified star bearing 100°T at an observed altitude (Ho) of 61°48.2'. The chronometer reads 06h 01m 31s, and is 02m 15s fast. What star did you observe?    | Regulus  | Antares  | Miaplacidus | Suhail   |               |
| 360  | On 22 July your 1759 DR position is LAT 24°50.2' S, LONG 05°16.0' E. You observe an unidentified star bearing 293°T at an observed altitude (Ho) of 17°52.8'. The chronometer reads 06h 01m 31s, and is 02m 15s fast. What star did you observe?    | Regulus  | Antares  | Miaplacidus | Suhail   |               |
| 361  | On 22 July your 1759 ZT DR position is LAT 24°50.2' S, LONG 05°16.0' E. You observe an unidentified star bearing 231°T, at an observed altitude (Ho) of 26°10.0'. The chronometer reads 06h 01m 31s and is 02m 15s fast. What star did you observe? | Acamar   | Capella  | Miaplacidus | Suhail   |               |



| ID # | Question  | Choice A         | Choice B       | Choice C     | Choice D      | Illustrations |
|------|---|------------------|----------------|--------------|---------------|---------------|
| 362  | On 22 June , your 0400 zone time DR position is LAT 23°00'N, LONG 81°45'W. You are steaming on course 110°T at a speed of 8.6 knots. What will be the zone time of sunrise at your vessel?  | 0537             | <b>0541</b>    | 0545         | 0547          |               |
| 363  | On 22 June at 0906 EDT (ZD +4), your position is LAT 24°36'N, LONG 69°30'W. You are on course 165°pgc at a speed of 14.8 knots. A sextant observation of the Sun's lower limb is made, and the sextant altitude (hs) is 42°44.0' with an index error of 0.8' off the arc. At this time the chronometer reads 01h 10m 12s, and is 2m 42s slow. If your height of eye is 70 feet, what is the azimuth (Zn) of the sight using the assumed position? | <b>Zn 080.4°</b> | Zn 081.6°      | Zn 129.0°    | Zn 130.5°     |               |
| 364  | On 22 June your 0424 DR position is LAT 26°18.5' N, LONG 124°18.2' W. You observe an unidentified star bearing 154°T at an observed altitude (Ho) of 15°01.2'. The chronometer reads 12h 23m 24s, and is 01m 32s slow. What star did you observe?   | Peacock          | Schedar        | <b>Ankaa</b> | Alioth        |               |
| 365  | On 22 June your 0424 DR position is LAT 26°18.5' N, LONG 124°18.2' W. You observe an unidentified star bearing 249°T at an observed altitude (Ho) of 52°50.7'. The chronometer reads 00h 23m 24s, and is 01m 32s slow. What star did you observe?   | Peacock          | Schedar        | Ankaa        | <b>Altair</b> |               |
| 366  | On 22 June your 0424 DR position is LAT 26°18.5'N, LONG 124°18.2'W. You observe an unidentified star bearing 195°T at an observed altitude (Ho) of 03°30.7'. The chronometer reads 00h 23m 24s, and is 01m 32s slow. What star did you observe?   | <b>Peacock</b>   | Schedar        | Ankaa        | Alioth        |               |
| 367  | On 22 June your 0424 ZT DR position is LAT 26°18.5' N, LONG 124°18.2' W. You observe an unidentified star bearing 031°T at an observed altitude (Ho) of 49°26.0'. The chronometer reads 00h 23m 24s and is 01m 32s slow. What star did you observe?   | Peacock          | <b>Schedar</b> | Ankaa        | Alioth        |               |

| ID # | Question   | Choice A | Choice B | Choice C | Choice D | Illustrations |
|------|--|----------|----------|----------|----------|---------------|
| 368  | On 22 March your 0519 DR position is LAT 27°20.6'N, LONG 69°25.6'W. You observe an unidentified star bearing 115°T at an observed altitude (Ho) of 54°52.8'. The chronometer reads 10h 16m 47s, and is 02m 15s slow. What star did you observe?      | Altair   | Enif     | Menkar   | Rigel    |               |
| 369  | On 22 March your 0519 DR position is LAT 27°20.6'N, LONG 69°25.6'W. You observe an unidentified star bearing 200°T at an observed altitude (Ho) of 33°05.5'. The chronometer reads 10h 16m 47s, and is 02m 15s slow. What star did you observe?      | Acamar   | Enif     | Antares  | Rigel    |               |
| 370  | On 22 March your 0519 DR position is LAT 27°20.6'N, LONG 69°25.6'W. You observe an unidentified star bearing 051°T at an observed altitude (Ho) of 50°03.7'. The chronometer reads 10h 16m 47s, and is 02m 15s slow. What star did you observe?      | Acamar   | Enif     | Menkar   | Deneb    |               |
| 371  | On 22 March your 0519 ZT DR position is LAT 27°20.6' N, LONG 69°25.6' W. You observe an unidentified star bearing 094°T, at an observed altitude (Ho) of 30°15.0'. The chronometer reads 10h 16m 47s and is 02m 15s slow. What star did you observe? | Acamar   | Enif     | Menkar   | Rigel    |               |
| 372  | On 22 March your 1834 DR position is LAT 26°13.5'S, LONG 108°36.5'W. You observe an unidentified star bearing 062°T at an observed altitude (Ho) of 23°22.0'. The chronometer reads 01h 32m 37s, and is 01m 50s slow. Which star did you observe?    | Regulus  | Menkar   | Rigel    | Alphard  |               |
| 373  | On 22 March your 1834 DR position is LAT 26°13.5'S, LONG 108°36.5'W. You observe an unidentified star bearing 294°T at an observed altitude (Ho) of 33°02.7'. The chronometer reads 01h 32m 37s, and is 01m 50s slow. What star did you observe?     | Regulus  | Menkar   | Rigel    | Alphard  |               |
| 374  | On 22 March your 1834 DR position is LAT 26°13.5'S, LONG 108°36.5'W. You observe an unidentified star bearing 315°T at an observed altitude (Ho) of 66°01.2'. The chronometer reads 01h 32m 37s, and is 01m 50s slow. What star did you observe?     | Regulus  | Menkar   | Rigel    | Alphard  |               |

| ID # | Question  | Choice A      | Choice B      | Choice C         | Choice D         | Illustrations |
|------|---|---------------|---------------|------------------|------------------|---------------|
| 375  | On 22 March your 1834 ZT DR position is LAT 26°13.5' S, LONG 108°36.5' W. You observe an unidentified star bearing 077°T, at an observed altitude (Ho) of 43°10.5'. The chronometer reads 01h 32m 37s and is 01m 50s slow. What star did you observe?   | Regulus       | Menkar        | Rigel            | <b>Alphard</b>   |               |
| 376  | On 22 May at 0440 ZT, your vessel's DR position is LAT 23°24' N, LONG 110°24' W. At approximately this time, you obtain a sextant altitude (hs) of Polaris reading 23°40.9' with an index error of 1.6' on the arc. Your chronometer reads 11h 42m 14s, and is 2m 36s fast. What is your latitude by Polaris, given a height of eye of 24 feet? | 23°28.6'N     | 23°30.0'N     | <b>23°31.2'N</b> | 23°32.8'N        |               |
| 377  | On 22 May your 0437 DR position is LAT 25°18.5' N, LONG 51°18.0' W. You observe an unidentified star bearing 142°T at an observed altitude (Ho) of 23°10.2'. The chronometer reads 07h 40m 40s, and is 03m 24s fast. What star did you observe?   | Markab        | Diphda        | Sabik            | <b>Fomalhaut</b> |               |
| 378  | On 22 May your 0437 DR position is LAT 25°18.5'N, LONG 51°18.0'W. You observe an unidentified star bearing 116°T at an observed altitude (Ho) of 11°27.8'. The chronometer reads 07h 40m 40s, and is 03m 24s fast. What star did you observe?   | Markab        | <b>Diphda</b> | Sabik            | Hamal            |               |
| 379  | On 22 May your 0437 DR position is LAT 25°18.5'N, LONG 51°18.0'W. You observed an unidentified star bearing 233°T at an observed altitude (Ho) of 29°42.3'. The chronometer reads 07h 40m 40s, and is 03m 24s fast. What star did you observe?  | Markab        | Diphda        | <b>Sabik</b>     | Hamal            |               |
| 380  | On 22 May your 0437 ZT DR position is LAT 25°18.5' N, LONG 51°18.0' W. You observe an unidentified star bearing 097°T at an observed altitude (Ho) of 48°20.0'. The chronometer reads 07h 40m 40s and is 03m 24s fast. What star did you observe?   | <b>Markab</b> | Diphda        | Sabik            | Hamal            |               |
| 381  | On 22 November your 1400 ZT DR position is LAT 22°16.0'N, LONG 136°37.0'E. You are on course 038°T at a speed of 22 knots. What will be the zone time of sunset at your vessel?   | <b>1705</b>   | 1710          | 1714             | 1718             |               |

| ID # | Question   | Choice A                             | Choice B                      | Choice C                      | Choice D                      | Illustrations |
|------|--|--------------------------------------|-------------------------------|-------------------------------|-------------------------------|---------------|
| 382  | On 22 November your vessel is enroute from Accra, Ghana to Montevideo, Uruguay. You are on course 240°T and making a speed of 15.0 knots. Your 1129 DR position is LAT 28°25.0' S, LONG 42°40.0' W. You observed 3 celestial bodies. Determine the latitude and longitude of your 1137 running fix.  | <b>LAT 28°27.0'S, LONG 42°38.0'W</b> | LAT 28°25.2'S, LONG 42°40.0'W | LAT 28°25.0'S, LONG 42°36.0'W | LAT 28°23.4'S, LONG 42°42.0'W | NP-0023       |
| 383  | On 22 October in DR position LAT 21°51.0'S, LONG 76°24.0'E, you observe an amplitude of the Sun. The Sun's center is on the visible horizon and bears 256°psc. The chronometer reads 01h 01m 25s and is 01m 15s fast. Variation for the area is 2°E. What is the deviation of the standard magnetic compass?   | 0.3°E                                | <b>0.3°W</b>                  | 2.0°E                         | 2.0°W                         |               |
| 384  | On 23 August at 0604 ZT, in DR position LAT 16°42.3'S, LONG 28°19.3'W, you observed an amplitude of the Sun. The lower limb was a little above the horizon, and the Sun bore 076.0°pgc. At the time of the observation, the helmsman reported that he was heading 143°pgc and 167° per standard magnetic compass. The variation in the area was 23°W. What were the gyro error and deviation for that heading? | 1°W GE, 2°W DEV                      | 1°E GE, 1°E DEV               | 2°W GE, 1°E DEV               | <b>2°E GE, 1°E DEV</b>        |               |
| 385  | On 23 August in DR position LAT 24°07.0'N, LONG 136°16.0'E, you observe an amplitude of the Sun. The Sun's center is on the visible horizon and bears 074.5°psc. The chronometer reads 08h 56m 19s and is 02m 34s fast. Variation in the area is 2°W. What is the deviation of the magnetic compass?   | 2.5°E                                | 2.8°W                         | <b>4.5°E</b>                  | 4.8°W                         |               |
| 386  | On 23 August in DR position LAT 24°22.0'S, LONG 64°55.3'E, you take an ex-meridian observation of the Moon's upper limb at upper transit. The chronometer time of the sight is 02h 15m 04s, and the chronometer error is 01m 06s fast. The sextant altitude (hs) is 48°03.6'. The index error is 2.0' on the arc, and your height of eye is 60 feet (21.0 meters). What is the latitude at meridian transit?   | <b>24°20.5'S</b>                     | 24°22.8'S                     | 24°24.8'S                     | 24°49.5'S                     |               |

| ID # | Question  | Choice A                    | Choice B                  | Choice C                       | Choice D                    | Illustrations |
|------|---|-----------------------------|---------------------------|--------------------------------|-----------------------------|---------------|
| 387  | On 23 July , your 2100 ZT position is LAT 36°43.0'N, LONG 16°09.8'W, when you observed an azimuth of Polaris to determine the compass error. Polaris bears 359.0° per gyrocompass. At the time of the observation, the helmsman noted that he was heading 319.0° per gyrocompass and 331.0° per standard compass. Variation is 12.0°W. Which of the following statements is TRUE? | The gyro error is 0.7°E.    | The gyro error is 1.7°W.  | <b>The deviation is 1.7°E.</b> | The compass error is 13.7°W |               |
| 388  | On 23 July your 1700 zone time DR position is LAT 27°29' N, LONG 129°26' W. You are on course 079°T at a speed of 20 knots. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?   | Arcturus, Jupiter, Denebola | <b>Spica, Sabik, Vega</b> | Antares, Polaris, Altair       | Jupiter, Saturn, Polaris    |               |
| 389  | On 23 July, you take a time tick using the 0900 GMT Cape Town broadcast. You hear a repeating series of 59 dots followed by a dash. At the beginning of the fifth dash you start your stopwatch. The chronometer reads 08h 39m 16s at the time the stopwatch reads 01m 42s. The chronometer error at 0900 GMT, 22 July, was 22m 24s slow. What is the chronometer rate?           | <b>00m 02s losing</b>       | 01m 02s gaining           | 22m 24s losing                 | 22m 26s slow                |               |
| 390  | On 23 June your 0900 zone time DR position is LAT 21°26.0'N, LONG 137°46.0'W. Your vessel is on course 059°T at a speed of 19.0 knots. What is the zone time of local apparent noon (LAN)?  | 1159                        | 1205                      | <b>1210</b>                    | 1214                        |               |
| 391  | On 23 June in DR position LAT 21°39.0'S, LONG 106°28.0'W, you observe an amplitude of the Sun. The Sun's center is on the celestial horizon and bears 078°psc. The chronometer reads 02h 14m 39s and is 01m 43s slow. Variation in the area is 9°W. What is the deviation of the standard magnetic compass?   | 2.8°E                       | 3.9°W                     | <b>4.3°W</b>                   | 4.6°E                       |               |
| 392  | On 23 March your 1600 ZT DR position is LAT 27°16.3' N, LONG 156°48.2' W. You are on course 063°T at a speed of 18.0 knots. Considering their magnitude, azimuth, and altitude, which group includes the three stars best suited for a fix at star time?  | Arcturus, Regulus, Sirius   | Procyon, Sirius, Capella  | <b>Hamal, Rigel, Alphard</b>   | Betelgeuse, Dubhe, Regulus  |               |

| ID # | Question  | Choice A   | Choice B   | Choice C   | Choice D   | Illustrations |
|------|---|------------|------------|------------|------------|---------------|
| 393  | On 23 May your 0628 zone time position was LAT 28°18.0'S, LONG 102°42.0'E. Your vessel was steaming on course 040°T at a speed of 20.0 knots. An observation of the Sun's lower limb was made at 0758 ZT. The chronometer read 01h 02m 06s and was fast 04m 04s. The observed altitude (Ho) was 13°16.7'. LAN occurred at 1201 zone time. The observed altitude (Ho) was 42°32.0'. What was the longitude of your 1201 zone time running fix? | 103°57.9'E | 104°00.4'E | 104°03.5'E | 104°06.3'E |               |
| 394  | On 23 October in DR position LAT 21°13.0'N, LONG 152°18.0'E, you observe an amplitude of the Sun. The Sun's center is on the visible horizon and bears 259°psc. The chronometer reads 07h 21m 46s and is 01m 32s slow. Variation in the area is 5°E. What is the deviation of the magnetic compass?   | 0.9°E      | 1.5°W      | 5.9°W      | 6.5°E      |               |
| 395  | On 23 October your vessel's 1722 zone time DR position is LAT 27°36'S, LONG 96°16'W, when an amplitude of the Sun is observed. The Sun's lower limb is about 20 minutes of arc above the visible horizon and bears 246° per standard compass. Variation in the area is 14.0°E. The chronometer reads 11h 24m 19s and is 01m 43s fast. What is the deviation of the standard compass?  | 2.3°E      | 2.7°E      | 2.7°W      | 3.1°W      |               |
| 396  | On 23 September while taking stars for an evening fix, an unidentified star is observed bearing 261°T at an observed altitude of 61°35'. Your 1836 zone time DR position is LAT 25°18' S, LONG 162°36' E. The chronometer reads 07h 34m 12s, and the chronometer error is 01m 54s slow. Your vessel is steaming on a course of 230°T at a speed of 18 knots. What star did you observe?   | Antares    | Canopus    | Achernar   | Sirius     |               |
| 397  | On 23 September your 1836 DR position is LAT 25°18'S, LONG 162°23'E. You observe an unidentified star bearing 000°T at an observed altitude (Ho) of 26°18'. The chronometer reads 07h 34m 12s, and is 01m 54s slow. What star did you observe?  | Antares    | Canopus    | Achernar   | Vega       |               |

| ID # | Question   | Choice A                 | Choice B                    | Choice C                     | Choice D                  | Illustrations |
|------|--|--------------------------|-----------------------------|------------------------------|---------------------------|---------------|
| 398  | On 23 September your 1836 DR position is LAT 25°18'S, LONG 162°36'E. You observe an unidentified star bearing 022°T at an observed altitude (Ho) of 13°16'. The chronometer reads 07h 34m 12s, and is 01m 54s slow. What star did you observe?   | Antares                  | <b>Deneb</b>                | Achernar                     | Sirius                    |               |
| 399  | On 23 September your 1836 DR position is LAT 25°18'S, LONG 162°36'E. You observe an unidentified star bearing 148°T at an observed altitude (Ho) of 13°32'. The chronometer reads 07h 34m 12s, and is 01m 54s slow. Which star did you observe?  | Antares                  | Canopus                     | <b>Achernar</b>              | Sirius                    |               |
| 400  | On 24 August in DR position LAT 26°49.4'N, LONG 146°19.4'E, you observe an amplitude of the Sun. The Sun's center is on the celestial horizon and bears 084°psc. The chronometer reads 07h 55m 06s and is 01m 11s fast. Variation in the area is 15°W. What is the deviation of the magnetic compass?                              | 8.0°E                    | <b>8.3°E</b>                | 8.5°E                        | 8.7°E                     |               |
| 401  | On 24 August your vessel is enroute from Perth, Australia, to Bombay, India. Evening twilight will occur at 1807 zone time, and your vessel's DR position for this time will be LAT 27°17.0' S, LONG 83°17.0' E. Considering their magnitude and location, what are the three stars best suited to observe for a fix at star time? | Arcturus, Antares, Atria | <b>Spica, Altair, Acrux</b> | Pollux, Canopus, Hamal       | Rasalhague, Spica, Kochab |               |
| 402  | On 24 January your 0700 zone time DR position is LAT 22°25.0'N, LONG 46°10.0'W. Your vessel is on course 110°T at a speed of 12.0 knots. What is the zone time of local apparent noon (LAN)?   | 1203                     | 1208                        | <b>1212</b>                  | 1215                      |               |
| 403  | On 24 July your 1912 zone time DR position is LAT 24°28.0' N, LONG 73°46.5' W. Considering their magnitude, azimuth, and altitude, which group includes the three stars best suited for a fix at star time?  | Fomalhaut, Rigel, Pollux | Arcturus, Acrux, Hadar      | <b>Spica, Altair, Alioth</b> | Vega, Deneb, Regulus      |               |

| ID # | Question   | Choice A                       | Choice B                             | Choice C                              | Choice D                       | Illustrations |
|------|--|--------------------------------|--------------------------------------|---------------------------------------|--------------------------------|---------------|
| 404  | On 24 March your 0800 zone time fix gives you a position of LAT 22°16.0'N, LONG 31°45.0'W. Your vessel is steaming a course of 285°T at a speed of 16.5 knots. An observation of the Sun's upper limb is made at 0938 zone time, and the observed altitude (Ho) is 46°32.2'. The chronometer reads 11h 41m 01s, and the chronometer error is 02m 50s fast. Local apparent noon occurs at 1214 zone time, and a meridian altitude of the Sun's lower limb is made. The observed altitude (Ho) for this sight is 68°55.8'. Determine the vessel's 1200 zone time position. | LAT 22°35.0'N, LONG 30°29.0'W  | <b>LAT 22°35.0'N, LONG 32°51.0'W</b> | LAT 22°36.0'N, LONG 32°10.5'W         | LAT 22°36.0'N, LONG 32°55.2'W  |               |
| 405  | On 24 March your vessel is enroute from Cadiz to Norfolk. Evening twilight will occur at 1830 zone time, and your vessel's DR position will be LAT 35°06' N, LONG 60°48' W. Considering their azimuth, altitude, and magnitude, which group of stars is best suited for plotting a star fix at star time?  | Adhara, Rigel, Suhail          | Regulus, Denebola, Alkaid            | Adhara, Procyon, Alphard              | <b>Sirius, Dubhe, Mirfak</b>   |               |
| 406  | On 24 May , your vessel's 1000 ZT position is LAT 25°36.0'N, LONG 118°39.5'W, when you take an azimuth of the Sun. Determine the gyro error using the azimuth information.<br>Chronometer time: 06h 21m 48s Chronometer error: fast 01m 36s Gyro bearing: 099.4° Variation: 11.1°E   | 0.3°W                          | <b>1.3°W</b>                         | 1.8°E                                 | 2.4°E                          |               |
| 407  | On 24 October your 0100 DR position is LAT 27°42' N, LONG 158°35' E. You are on course 085°T at a speed of 12 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0700 running fix.   | LAT 27°48.8'N, LONG 160°12.5'E | LAT 27°52.5'N, LONG 160°18.2'E       | <b>LAT 27°56.0'N, LONG 159°47.3'E</b> | LAT 27°58.4'N, LONG 159°43.5'E | NP-0026       |
| 408  | On 24 September your 1841 zone time DR position is LAT 25°15.0' N, LONG 129°34.5' E. At that time you observe Polaris with a sextant altitude (hs) of 25°20.8'. The chronometer time of the sight is 09h 38m 12s, and the chronometer error is 03m 12s slow. The index error is 4.3' off the arc, and the height of eye is 52.0 feet. What is your latitude by Polaris?  | 24°28.4'N                      | 25°16.0'N                            | <b>25°37.6'N</b>                      | 25°42.3'N                      |               |



| ID # | Question   | Choice A                       | Choice B                              | Choice C                       | Choice D                       | Illustrations |
|------|--|--------------------------------|---------------------------------------|--------------------------------|--------------------------------|---------------|
| 409  | On 24 September your 1841 zone time DR position is LONG 129°34.5' E. At that time you observe Polaris with a sextant altitude (hs) of 25°20.8'. The chronometer time of the sight is 09h 38m 12s, and the chronometer error is 03m 12s slow. The index error is 4.3' off the arc, and the height of eye is 52 feet (15.9 meters). What is your latitude by Polaris?  | 24°28.1'N                      | 25°16.0'N                             | <b>25°37.6'N</b>               | 25°42.3'N                      |               |
| 410  | On 25 April your 0930 zone time position is LAT 28°35'S, LONG 82°30'W. Your vessel is on course 300°T at a speed of 20.0 knots. Determine the zone time of LAN.  | <b>1131</b>                    | 1158                                  | 1211                           | 1225                           |               |
| 411  | On 25 April your 1130 DR position is LAT 24°50.0'N, LONG 61°25.0'W. Your vessel is on a course of 300°T at a speed of 16.0 knots. Determine the zone time of (LAN) for your vessel.  | 1154                           | 1156                                  | 1202                           | <b>1204</b>                    |               |
| 412  | On 25 August your 0300 zone time DR position is LAT 21°28.0' N, LONG 167°48.0' E. You are on course 248°T at a speed of 12 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix.  | LAT 20°52.4'N, LONG 167°32.1'E | <b>LAT 20°57.1'N, LONG 167°01.0'E</b> | LAT 20°59.5'N, LONG 166°54.8'E | LAT 21°06.0'N, LONG 167°10.9'E | NP-0032       |
| 413  | On 25 August your 1926 zone time DR position is LAT 24°17.0' S, LONG 05°47.0' W. At that time, you observe Fomalhaut bearing 117°psc. The chronometer reads 07h 26m 52s, and the chronometer error is 00m 15s fast. The variation is 1.5°E. What is the deviation of the standard magnetic compass?  | 0.2°W                          | 0.4°E                                 | 1.3°W                          | <b>2.8°W</b>                   |               |
| 414  | On 25 December , your 0330 ZT DR position is LAT 25°15.0'N, LONG 32°16.0'W. You are on course 145°T at a speed of 20 knots. What will be the zone time of sunrise at your vessel?  | 0623                           | 0635                                  | 0641                           | <b>0647</b>                    |               |
| 415  | On 25 February at 0622 ZT, you observe the upper limb of the Moon with a sextant altitude of 59°58.6'. Your DR position is LAT 30°28.3'S, LONG 102°39.3 E. The chronometer reading at the time of the sight is 11h 21m 18s and the chronometer is 48s slow. The height of eye is 59 feet and the index error is 2.5' on the arc. What are the azimuth (Zn) and intercept (a) of this sight using the assumed position? | <b>Zn 305.4°, a 4.2°T</b>      | Zn 234.6°, a 4.2° A                   | Zn 305.4°, a 1.5°T             | Zn 305.4°, a 9.2°T             |               |

| ID # | Question  | Choice A                      | Choice B                      | Choice C                      | Choice D                      | Illustrations |
|------|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|---------------|
| 416  | On 25 June at 0612 zone time, morning stars were observed, and the vessel's position was determined to be LAT 28°13.0'S, LONG 49°34.0'E. Your vessel is steaming at 17.0 knots on a course of 066°T. A sextant observation of the Sun's lower limb is made at 1022 zone time. The chronometer reads 07h 19m 17s, and the sextant altitude is 35°26.3'. The index error is 1.5' on the arc, and the chronometer error is 02m 51s slow. Your height of eye on the bridge is 58.0 feet. What is the azimuth (Zn) of this sight using the assumed position? | 021.5°T                       | 157.5°T                       | 201.5°T                       | 338.5°T                       |               |
| 417  | On 25 June your 0900 zone time DR position is LAT 24°10.0'S, LONG 148°30.0'W. Your vessel is on a course of 230°T at a speed of 18.0 knots. What is the zone time of local apparent noon (LAN)?   | 1154                          | 1156                          | 1200                          | 1204                          |               |
| 418  | On 25 March your 0500 ZT DR position is LAT 28°14.0' S, LONG 93°17.0' E. You are on course 291°T at a speed of 16.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0550 running fix.  | LAT 28°15.9'S, LONG 92°56.9'E | LAT 28°19.3'S, LONG 92°59.0'E | LAT 28°06.4'S, LONG 93°02.5'E | LAT 27°53.2'S, LONG 93°17.6'E | NP-0006       |
| 419  | On 25 May your vessel's 1858 zone time position is LAT 21°05.0'N, LONG 143°27.0'E. At that time a sextant observation of the planet Venus was made. The sextant altitude is 12°53.4' and the chronometer reads 08h 59m 15s. The index error is 4.5' off the arc, and the chronometer error is 01m 25s fast. Your height of eye is determined to be 55.0 feet. What is the azimuth (Zn) of the sight using the assumed position?   | 069.6°T                       | 110.4°T                       | 249.6°T                       | 290.4°T                       |               |
| 420  | On 25 May your vessel's 1917 zone time position is LAT 24°16.0'N, LONG 017°26.0'W. At that time a sextant observation of the planet Saturn was made. The sextant altitude is 63°05.1', and the chronometer reads 08h 18m 24s. The index error is 4.5' off the arc, and the chronometer error is 01m 05s fast. Your height of eye is determined to be 62.0 feet. What is the azimuth (Zn) of this sight using the assumed position?  | 143.8°                        | 147.3°                        | 148.7°                        | 149.9°                        |               |

| ID # | Question  | Choice A                         | Choice B                      | Choice C                             | Choice D                      | Illustrations |
|------|---|----------------------------------|-------------------------------|--------------------------------------|-------------------------------|---------------|
| 421  | On 25 October your 0430 ZT DR position is LAT 24°48' N, LONG 65°31' W. Your vessel is on course 030°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0455 running fix.   | <b>LAT 24°53'N, LONG 65°28'W</b> | LAT 24°53'N, LONG 65°12'W     | LAT 24°54'N, LONG 65°17'W            | LAT 25°03'N, LONG 65°18'W     | NP-0025       |
| 422  | On 26 February , your vessel's 1615 ZT DR position is LAT 25°14'S, LONG 57°22'W, when an azimuth of the Sun is observed. The chronometer time of the sight is 8h 13m 19s, and the Sun is bearing 266.0° per standard magnetic compass. The chronometer error is 01m 46s slow, and the variation in the area is 6°E. What is the deviation of the standard compass?                          | <b>1.7°E</b>                     | 3.4°W                         | 7.7°E                                | 13.7°E                        |               |
| 423  | On 26 January your 1615 ZT DR position is LAT 27°14.0'S, LONG 57°22.0'W. At that time, you observe the Sun bearing 266°psc. The chronometer reads 08h 13m 19s, and the chronometer error is 01m 46s slow. The variation is 4°E. What is the deviation of the standard magnetic compass?   | 4.8°E                            | 4.9°W                         | <b>5.9°W</b>                         | 7.8°E                         |               |
| 424  | On 26 July your 1030 ZT DR position is LAT 18°25'N, LONG 51°15'W. You are on course 231°T, speed 15 knots. Determine your 1200 position using the following observations of the Sun.<br><br>ZONE TIME    GHA    DECLINATION    Ho<br>1228            50°23.5'    N 19°21.9'    88°14.3'<br>1236            52°23.5'    N 19°21.8'    88°29.0'   | LAT 18°00.9'N, LONG 51°31.9'W    | LAT 18°03.5'N, LONG 51°36.2'W | <b>LAT 18°07.2'N, LONG 51°30.4'W</b> | LAT 18°10.6'N, LONG 51°25.1'W |               |
| 425  | On 26 July your 1901 ZT position is LAT 28°28'N, LONG 157°16'E when you take an observation of Jupiter. The chronometer at the time of the sight reads 08h 54m 34s and is 06m 24s slow. The sextant altitude (hs) is 33°51.5'. The index error is 2.8'off the arc, and the height of eye is 48 feet. What are the azimuth (Zn) and intercept (a) for this sight using the assumed position? | Zn 110.8°, a 32.0' T             | Zn 249.2°, a 32.0' A          | <b>Zn 248.2°, a 34.2' T</b>          | Zn 290.8°, a 44.2' A          |               |

| ID # | Question   | Choice A | Choice B | Choice C | Choice D | Illustrations |
|------|--|----------|----------|----------|----------|---------------|
| 426  | On 26 May , your 0723 zone time DR position is LAT 24°50.0'N, LONG 38°11.0'W. At that time, you observe the Sun bearing 076.5°psc. The chronometer reads 10h 25m 43s, and the chronometer error is 02m 57s fast. The variation is 7°W. What is the deviation of the standard magnetic compass?   | 3.3°E    | 3.7°W    | 8.3°W    | 10.7°E   |               |
| 427  | On 26 May your vessel's 1906 zone time position is LAT 27°16.0'N, LONG 24°37.0'W. At that time, a sextant observation of the planet Jupiter was made. The sextant altitude is 63°27.6', and the chronometer reads 09h 05m 16s. The index error is 5.2' on the arc, and the chronometer error is 01m 25s slow. Your height of eye is determined to be 52.6 feet. What is the (Zn) of this sight using the assumed position? | 011.3°T  | 168.7°T  | 191.3°T  | 348.7°T  |               |
| 428  | On 26 November at 0535 ZT, while taking sights for a morning fix, you observe an unidentified planet bearing 074°T at an observed altitude (Ho) of 38°29.8'. Your DR position is LAT 27°18.9' S, LONG 30°18.4' E. The chronometer time of the sight is 03h 33m 16s, and the chronometer is 01m 48s slow. What planet did you observe?  | Saturn   | Jupiter  | Mars     | Venus    |               |
| 429  | On 26 November your 0535 DR position is LAT 27°18.9' S, LONG 30°18.4' E. You observe an unidentified planet bearing 037°T at an observed altitude (Ho) of 50°06.4'. The chronometer reads 03h 33m 16s and is 01m 48s slow. What planet did you observe?  | Saturn   | Jupiter  | Mars     | Venus    |               |
| 430  | On 26 November your 0535 DR position is LAT 27°18.9' S, LONG 30°18.4' E. You observe an unidentified planet bearing 085°T at an observed altitude (Ho) of 32°15.2'. The chronometer reads 03h 33m 16s, and is 01m 48s slow. What planet did you observe?   | Saturn   | Jupiter  | Mars     | Venus    |               |
| 431  | On 26 September your 0830 DR position is LAT 26°04.0'N, LONG 129°16.0'W. Your vessel is on a course of 119°T at a speed of 20.0 knots. What is the zone time of local apparent noon (LAN)?   | 1124     | 1128     | 1142     | 1146     |               |

| ID # | Question   | Choice A | Choice B | Choice C | Choice D | Illustrations |
|------|--|----------|----------|----------|----------|---------------|
| 432  | On 26 September your 0830 zone time DR position is LAT 23°04.0'N, LONG 129°16.0'E. Your vessel is on course 119°T at a speed of 20.0 knots. What is the zone time of local apparent noon (LAN)?  | 1158     | 1205     | 1210     | 1214     |               |
| 433  | On 26 September your 0830 zone time DR position is LAT 26°04.0'N, LONG 129°16.0'W. Your vessel is on course 119°T at a speed of 20.0 knots. What is the zone time of local apparent noon (LAN)?  | 1124     | 1127     | 1130     | 1133     |               |
| 434  | On 27 August your 0900 zone time DR position is LAT 24°25.0'N, LONG 94°20.0'W. Your vessel is on course 071°T at a speed of 20.0 knots. What is the zone time of local apparent noon (LAN)?  | 1214     | 1208     | 1206     | 1158     |               |
| 435  | On 27 June , your 0734 zone time DR position is LAT 22°14.0'N, LONG 53°52.0'W. At that time, you observe the Sun bearing 069.5°psc. The chronometer reads 11h 32m 51s and the chronometer error is 01m 26s slow. The variation is 5°E. What is the deviation of the standard magnetic compass?   | 1.6°E    | 2.9 W    | 2.9°E    | 3.2°E    |               |
| 436  | On 27 June , your vessel's 0816 ZT DR position is LAT 22°14'S, LONG 53°52'W, when an azimuth of the Sun is observed. The chronometer time of the sight is 12h 15m 02s, and the Sun is bearing 047.5° per standard magnetic compass. The chronometer error is 00m 46s slow, and the variation in the area is 6.0°E. What is the deviation of the standard magnetic compass? | 1.5°E    | 1.9°W    | 3.0°W    | 3.0°E    |               |
| 437  | On 27 June your 1905 ZT DR position is LAT 24°35.0'N, LONG 50°15.0'W. At that time, you observe Saturn bearing 211°pgc. The chronometer reads 10h 04m 26s and the chronometer error is 01m 20s slow. The variation is 4.5°E. What is the gyro error?   | 1.1°W    | 3.4°E    | 3.4°W    | 5.6°W    |               |
| 438  | On 27 March , your 0330 zone time DR position is LAT 23°32'N, LONG 154°47'E. Your vessel is on a course of 105°T at a speed of 20 knots. What will be the zone time of sunrise at your vessel?   | 0534     | 0557     | 0612     | 0624     |               |

| ID # | Question   | Choice A                             | Choice B                      | Choice C                      | Choice D                      | Illustrations |
|------|--|--------------------------------------|-------------------------------|-------------------------------|-------------------------------|---------------|
| 439  | On 27 March in DR position LAT 32°31.0'N, LONG 76°25.0'W, you take an ex-meridian observation of the Sun's lower limb. The chronometer time of the sight is 05h 23m 32s, and the chronometer error is 01m 30s fast. The sextant altitude (hs) is 59°59.0'. The index error is 1.8' off the arc, and your height of eye is 52 feet. What is the latitude at meridian transit?   | LAT 32°21.6'N                        | <b>LAT 32°29.5'N</b>          | LAT 32°37.6'N                 | LAT 32°46.2'N                 |               |
| 440  | On 27 March your 0730 zone time position is LAT 28°16'N, LONG 56°37'W. Your vessel is on course 158°T at a speed of 15.0 knots. An observation of the Sun's lower limb is made at 0915 zone time. The chronometer reads 01h 14m 11s, and the chronometer error is 00m 53s slow. The observed altitude (Ho) is 45°10.7'. LAN occurs at 1150 zone time, and a meridian altitude of the Sun's lower limb is made. The observed altitude (Ho) is 65°32.8'. Determine the vessel's 1200 zone time position. | <b>LAT 27°08.8'N, LONG 56°04.2'W</b> | LAT 27°08.8'N, LONG 56°10.3'W | LAT 27°11.6'N, LONG 56°04.2'W | LAT 27°11.6'N, LONG 56°10.3'W |               |
| 441  | On 27 September , your 0345 ZT DR position is LAT 26°18.0'S, LONG 4°18.0'W. You are on course 271°T at a speed of 15 knots. What will be the zone time of sunrise at your vessel?  | 0525                                 | 0545                          | 0555                          | <b>0605</b>                   |               |
| 442  | On 28 April your vessel's 0515 zone time position is LAT 23°26'S, LONG 95°30'E. At this time, the observed altitude (Ho) of the star Rigel Kentaurus is 24°51.4'. Your chronometer reads 11h 16m 36s and is 01m 18s fast. What is the intercept (a) based on the assumed position method?  | 30.9 miles                           | 32.3 miles                    | 33.1 miles                    | <b>34.4 miles</b>             |               |
| 443  | On 28 February your 1850 zone time DR position is LAT 27°49.0' N, LONG 159°24.0' W. Considering their magnitude, azimuth, and altitude, which group includes the three stars best suited for a fix at star time?   | <b>Rigel, Schedar, Regulus</b>       | Sirius, Mirfak, Elnath        | Hamal, Alkaid, Canopus        | Bellatrix, Vega, Regulus      |               |
| 444  | On 28 July your 0800 zone time (ZT) fix gives you a position of LAT 25°16.0'N, LONG 71°19.0'W. Your vessel is on course 026°T, and your speed is 17.5 knots. Local apparent noon (LAN) occurs at 1150 ZT, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 82°28.7'. What is the latitude at 1200 ZT?   | 26°25.0'N                            | <b>26°27.6'N</b>              | 26°29.8'N                     | 26°32.0'N                     |               |

| ID # | Question  | Choice A                              | Choice B                       | Choice C                       | Choice D                       | Illustrations |
|------|---|---------------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------|
| 445  | On 28 July your 0800 zone time fix gives you a position of LAT 25°16.0'N, LONG 71°19.0'W. Your vessel is on course 026°T, and your speed is 17.5 knots. Local apparent noon (LAN) occurs at 1149 zone time, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 82°28.7'. What is the calculated latitude at LAN? | 26°21.9'N                             | 26°23.4'N                      | <b>26°25.0'N</b>               | 26°27.7'N                      |               |
| 446  | On 28 July your 1937 zone time DR position is LAT 26°13.0' N, LONG 78°27.0' E. At that time, you observe Deneb bearing 048.7°pgc. The chronometer reads 02h 37m 42s, and the chronometer error is 00m 15s fast. The variation is 4°W. What is the gyro error?   | 2.4°W                                 | <b>2.8°E</b>                   | 3.6°W                          | 3.6°E                          |               |
| 447  | On 28 June , your 1820 ZT DR position is LAT 16°00.0'N, LONG 31°00.0'W. You are on course 310°T at a speed of 18 knots. What will be the zone time of sunset at your vessel?  | 1828                                  | 1832                           | 1836                           | <b>1840</b>                    |               |
| 448  | On 28 May your 0200 DR position is LAT 19°16.5' S , LONG 119°24.0' W. You are on course 107°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix.   | <b>LAT 19°43.0'S, LONG 117°54.0'W</b> | LAT 19°48.2'S, LONG 118°04.5'W | LAT 20°07.5'S, LONG 117°32.0'W | LAT 20°17.1'S, LONG 118°06.0'W | NP-0034       |
| 449  | On 28 November your vessel's 0652 DR position is LAT 37°30'N, LONG 124°12'W, when an amplitude of the Sun is observed. The Sun's center is on the visible horizon and bears 103° per standard magnetic compass. Variation in the area is 16.3°E. The chronometer reads 02h 54m 18s and is 02m 06s fast. What is the deviation of the compass?                                     | <b>2.5°W</b>                          | 3.0°W                          | 2.0°E                          | 3.0°E                          |               |
| 450  | On 28 November your vessel's 0712 zone time DR position is LAT 26°54'S, LONG 45°18'W, when you take an azimuth of the Sun. Determine the gyro error using the azimuth information.<br>Chronometer time: 10h 09m 18s<br>Chronometer error: slow 02m 54s<br>Gyro bearing: 102°  | 1.7°W                                 | <b>0.6°W</b>                   | 1.1°E                          | 0.8°E                          |               |

| ID # | Question   | Choice A                        | Choice B                    | Choice C                         | Choice D              | Illustrations |
|------|--|---------------------------------|-----------------------------|----------------------------------|-----------------------|---------------|
| 451  | On 28 October at 1754 ZT, your vessel's DR position is LAT 28°30' N, LONG 63°24' W. At this time, you obtain a sextant altitude (hs) of Polaris reading 28°42.6', with an index error of 2.4' on the arc. Your chronometer reads 09h 50m 00s, and is 4m 14s slow. What is your latitude by Polaris, given a height of eye of 28 feet (8.5 meters)?   | 28°25.2'N                       | 28°30.6'N                   | <b>28°34.9'N</b>                 | 28°41.3'N             |               |
| 452  | On 28 October morning twilight will occur around 0524 ZT in LAT 25°25.0' N, LONG 32°33.3' W. Considering their magnitude and location, which group will be the three stars best suited to observe for a star fix at star time?   | Sirius, Hamal, Denebola         | Sirius, Denebola, Dubhe     | <b>Sirius, Capella, Denebola</b> | Sirius, Mirfak, Hamal |               |
| 453  | On 28 September in DR position LAT 24°12.0'S, LONG 85°25.0'E, you observe an amplitude of the Sun. The Sun's center is on the visible horizon and bears 094°psc. The chronometer reads 11h 29m 42s and is 03m 30s slow. Variation in the area is 4°W. What is the deviation of the magnetic compass?   | 1.5°W                           | 2.1°W                       | 1.8°E                            | <b>2.4°E</b>          |               |
| 454  | On 28 September in DR position LAT 27°16.7'S, LONG 113°27.2'W, you observe an amplitude of the Sun. The Sun's center is on the celestial horizon and bears 273°psc. The chronometer reads 01h 17m 26s and is 01m 49s slow. Variation in the area is 6°W. What is the deviation of the standard magnetic compass?   | 0.2°W                           | <b>0.4°E</b>                | 0.6°W                            | 0.8°E                 |               |
| 455  | On 29 April your 0300 ZT DR position is LAT 28°39' N, LONG 168°03' E. You are on course 108°T at a speed of 22 knots. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?  | <b>Moon, Alpheratz, Polaris</b> | Deneb, Dubhe, Zubenelgenubi | Venus, Polaris, Arcturus         | Moon, Altair, Sabik   |               |
| 456  | On 29 April your 0530 zone time position was LAT 23°04.0'S, LONG 162°12.0'E. Your vessel was steaming on course 120°T at a speed of 9.0 knots. An observation of the Sun's upper limb was made at 0830 ZT. The chronometer read 09h 27m 32s and was slow 02m 24s. The observed altitude (Ho) was 24°58.0'. LAN occurred at 1205 zone time. The observed altitude (Ho) was 52°04.0'. What was the longitude of your 1200 zone time running fix? | LONG 163°02.1'E                 | <b>LONG 163°06.0'E</b>      | LONG 163°09.5'E                  | LONG 163°11.3'E       |               |



| ID # | Question   | Choice A                             | Choice B                      | Choice C                      | Choice D                      | Illustrations |
|------|--|--------------------------------------|-------------------------------|-------------------------------|-------------------------------|---------------|
| 457  | On 29 April your 1913 zone time DR position is LAT 22°09.0' N, LONG 56°16.0' W. At that time you observe Polaris with a sextant altitude (hs) of 22°25.8'. The chronometer time of the sight is 11h 11m 14s, and the chronometer error is 02m 18s slow. The index error is 1.5' off the arc, and the height of eye is 61.5 feet. What is your latitude by Polaris?   | 21°39.9'N                            | 21°55.7'N                     | <b>22°39.9'N</b>              | 22°48.8'N                     |               |
| 458  | On 29 July your 1930 zone time DR position is LONG 164°26.0' E. At that time you observe Polaris with a sextant altitude (hs) of 23°46.8'. The chronometer time of the sight is 08h 32m 18s, and the chronometer error is 02m 26s fast. The index error is 2.7' on the arc, and the height of eye is 56.0 feet. What is your latitude by Polaris?  | 24°01.9'N                            | <b>24°19.5'N</b>              | 24°31.7'N                     | 25°19.6'N                     |               |
| 459  | On 29 June you observe the star Achernar at a sextant altitude (Hs) of 54°18.9'. The index error is 4.7' off the arc. The height of eye is 58 feet. What is the observed altitude (Ho)?  | 54°06.1'                             | <b>54°15.5'</b>               | 54°31.5'                      | 54°43.7'                      |               |
| 460  | On 29 June your 0800 zone time fix gives you a position of LAT 26°16.0'S, LONG 61°04.0'E. Your vessel is steaming a course of 079°T at a speed of 15.5 knots. An observation of the Sun's upper limb is made at 0905 zone time, and the observed altitude (Ho) is 25°20.1. The chronometer reads 05h 08m 12s, and the chronometer error is 02m 27s fast. Local apparent noon occurs at 1154 zone time, and a meridian altitude of the Sun's lower limb is made. The observed altitude (Ho) for this sight is 40°44.2'. Determine the vessel's 1200 zone time position. | <b>LAT 26°02.0'S, LONG 62°05.0'E</b> | LAT 26°02.0'S, LONG 62°23.2'E | LAT 26°05.1'S, LONG 62°06.3'E | LAT 25°56.0'S, LONG 62°03.0'E |               |
| 461  | On 29 October in DR position LAT 41°12.0'N, LONG 50°18.9'W, you take an ex-meridian observation of the Sun's lower limb, near upper transit. The chronometer time of the sight is 03h 21m 12s, and the chronometer error is 01m 50s slow. The sextant altitude (hs) is 34°54.2'. The index error is 2.0' on the arc, and your height of eye is 45 feet. What is the latitude at meridian transit?  | 41°12.0'N                            | <b>41°16.0'N</b>              | 41°20.2'N                     | 41°23.6'N                     |               |

| ID # | Question  | Choice A                        | Choice B                              | Choice C                       | Choice D                         | Illustrations |
|------|---|---------------------------------|---------------------------------------|--------------------------------|----------------------------------|---------------|
| 462  | On 3 April your vessel's 1400 ZT DR position is LAT 20°08.0' N, LONG 147°45.0' W. You are steering course 023°T at 18.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1900 running fix.  | LAT 21°39.8'N, LONG 146°59.7'W  | <b>LAT 21°40.0'N, LONG 147°03.2'W</b> | LAT 21°41.8'N, LONG 147°05.5'W | LAT 21°41.8'N, LONG 147°01.5'W   | NP-0022       |
| 463  | On 3 December evening twilight for your vessel will occur at 1901 zone time. Your vessel's DR position for this time will be LAT 24°18.5' S, LONG 110°30.6' W. Considering their magnitude and location, what are the three stars best suited to observe for a fix at star time?  | Canopus, Hamal, Deneb           | <b>Alpheratz, Achernar, Nunki</b>     | Antares, Fomalhaut, Mirfak     | Rigel, Canopus, Regulus          |               |
| 464  | On 3 February your 0451 zone time DR position is LAT 24°15.0' S, LONG 124°24.0' W. Considering their magnitude, azimuth and altitude, which group includes the three bodies best suited for a fix at star time?   | <b>Alphard, Denebola, Acrux</b> | Spica, Venus, Procyon                 | Jupiter, Dubhe, Antares        | Mars, Arcturus, Spica            |               |
| 465  | On 3 February your 0547 zone time DR position is LAT 24°18.5' N, LONG 167°25.0' E. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?  | <b>Regulus, Deneb, Antares</b>  | Altair, Saturn, Regulus               | Arcturus, Kochab, Venus        | Jupiter, Denebola, Regulus       |               |
| 466  | On 3 February your 0550 zone time DR position is LAT 26°16.0' N, LONG 112°05.0' W. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?  | Spica, Antares, Saturn          | Vega, Antares, Dubhe                  | Venus, Regulus, Vega           | <b>Spica, Kochab, Rasalhague</b> |               |
| 467  | On 3 January your 1759 zone time DR position is LONG 60°53.2' W. At that time you observe Polaris with a sextant altitude (hs) of 22°55.8'. The chronometer time of the sight is 09h 57m 10s, and the chronometer error is 02m 26s slow. The index error is 2.9' off the arc, and the height of eye is 52.5 feet. What is your latitude by Polaris? | 21°35.2'N                       | 21°52.5'N                             | <b>22°03.6'N</b>               | 22°22.6'N                        |               |
| 468  | On 3 May your 1009 zone time DR position is LAT 30°01.0'N, LONG 123°15.0'W. Your vessel is on course 330°T at a speed of 8.6 knots. What is the zone time of local apparent noon (LAN)?   | 1206                            | 1208                                  | <b>1211</b>                    | 1214                             |               |
| 469  | On 3 October , your 2122 ZT position is LAT 26°32'N, LONG 84°26'W. You observe Polaris bearing 359.8°pgc. At the time of the observation the helmsman noted that he was heading 106°pgc and 107°psc. The variation is 0°. What is the deviation for that heading?   | 1°E                             | <b>0°</b>                             | 1°W                            | 2°W                              |               |

| ID # | Question   | Choice A      | Choice B      | Choice C      | Choice D      | Illustrations |
|------|--|---------------|---------------|---------------|---------------|---------------|
| 470  | On 3 October your 0330 zone time (ZD + 5) DR position is LAT 47°41'N, LONG 86°49'W. At that time, you observe Polaris bearing 357.5°pgc. The chronometer time of the observation is 08h 32m 04s, and the chronometer is 0m 27s slow. The variation is 5.5°W. What is the gyro error?   | 7.5°E         | 5.0°E         | 3.5°E         | 2.0°E         |               |
| 471  | On 3 October your 0830 zone time DR position is LAT 26°15.0'S, LONG 73°16.0'E. Your vessel is on course 280°T at a speed of 19.0 knots. What is the zone time of local apparent noon (LAN)?  | 1201          | 1158          | 1155          | 1152          |               |
| 472  | On 3 October your 0830 ZT position is LAT 26°15.0'S, LONG 73°16.0'E. Your vessel is on course 280°T at a speed of 19.0 knots. What is the ZT of local apparent noon (LAN)?   | 1151          | 1154          | 1158          | 1201          |               |
| 473  | On 30 August in DR position LAT 26°34.0'N, LONG 141°36.0'W, you take an ex-meridian observation of the Sun's lower limb. The chronometer time of the sight is 09h 15m 26s, and the chronometer error is 00m 00s. The sextant altitude (hs) is 71°41.7'. The index error is 3.2' off the arc, and your height of eye is 49.6 feet. What is the latitude at meridian transit?  | LAT 26°41.9'N | LAT 26°44.6'N | LAT 26°48.2'N | LAT 26°52.3'N |               |
| 474  | On 30 August your 0554 zone time (ZT) position was LAT 25°39.0'S, LONG 31°51.0'E. Your vessel was steaming on course 325°T at a speed of 15.0 knots. An observation of the Sun's lower limb was made at 0836 ZT. The chronometer read 06h 38m 36s and was fast 02m 24s. The observed altitude (Ho) was 30°49.2'. LAN occurred at 1157 ZT. The observed altitude (Ho) was 56°40.0'. What was the longitude of your 1157 ZT running fix? | 30°59.8'E     | 30°57.6'E     | 30°55.9'E     | 30°52.5'E     |               |
| 475  | On 30 December in DR position LAT 28°24.0'S, LONG 32°15.0'W, you take an ex-meridian observation of the Sun's lower limb. The chronometer time of the sight is 02h 09m 16s, and the chronometer error is 00m 00s. The sextant altitude (hs) is 84°03.3'. The index error is 3.5' off the arc, and your height of eye is 62.0 feet. What is the latitude at meridian transit?   | LAT 28°50.6'S | LAT 28°51.9'S | LAT 28°54.2'S | LAT 28°56.6'S |               |

| ID # | Question   | Choice A                       | Choice B                              | Choice C                       | Choice D                              | Illustrations |
|------|--|--------------------------------|---------------------------------------|--------------------------------|---------------------------------------|---------------|
| 476  | On 30 July , your 0200 zone time (ZD +4) DR position is LAT 43°48'N, LONG 78°00' W. At that time, you observe Polaris bearing 008.7°psc. The chronometer time of the observation is 05h 58m 07s, and the chronometer is 0m 23s slow. The variation is 10.5°W. What is the deviation of the magnetic compass?   | 0.5°E                          | <b>3.0°E</b>                          | 7.5°W                          | 18.0°W                                |               |
| 477  | On 30 July your 1030 ZT DR position is LAT 17°46'N, LONG 139°30'W. You are on course 129°T, speed 24 knots. Determine your 1200 position using the following observations of the Sun.<br>ZONE TIME    GHA    DECLINATION    Ho<br>1220           138°25.0'    N 18°22.3'    88°43.3'<br>1226           139°55.0'    N 18°22.2'    88°24.0'   | LAT 17°24.0'N, LONG 138°59.8'W | LAT 17°21.6'N, LONG 138°56.2'W        | LAT 17°18.7'N, LONG 139°07.6'W | <b>LAT 17°15.1'N, LONG 139°00.0'W</b> |               |
| 478  | On 30 July your 1030 ZT DR position is LAT 19°02'N, LONG 138°12'W. You are on course 309°T, speed 24 knots. Determine your 1200 position using the following observations of the Sun.<br>ZONE TIME    GHA    DECLINATION    Ho<br>1220           138°25.0'    N 18°22.3'    88°43.3'<br>1226           139°55.0'    N 18°22.2'    88°24.0'   | LAT 19°28.0'N, LONG 138°35.2'W | <b>LAT 19°29.7'N, LONG 138°42.0'W</b> | LAT 19°32.6'N, LONG 138°49.4'W | LAT 19°34.5'N, LONG 138°40.9'W        |               |
| 479  | On 30 June at 0630 zone time, morning stars were observed, and the vessel's position was determined to be LAT 25°15.0'S, LONG 175°36.0'E. Your vessel is steaming at 16.0 knots on a course of 302°T. A sextant observation of the Sun's lower limb is made at 1015 zone time. The chronometer reads 10h 14m 38s, and the sextant altitude is 32°07.9'. The index error is 4.5' on the arc, and the chronometer error is 01m 25s slow. Your height of eye on the bridge is 58.0 feet. What is the azimuth (Zn) of this sight using the assumed position? | <b>035.3°T</b>                 | 144.7°T                               | 186.5°T                        | 248.5°T                               |               |

| ID # | Question   | Choice A             | Choice B             | Choice C       | Choice D      | Illustrations |
|------|--|----------------------|----------------------|----------------|---------------|---------------|
| 480  | On 30 March in DR position LAT 20°26.2'N, LONG 131°17.9'E, you take an ex-meridian observation of the Moon's lower limb at upper transit. The chronometer time of the sight is 10h 36m 02s, and the chronometer error is 02m 06s slow. The sextant altitude (hs) is 48°21.4'. The index error is 2.0' on the arc, and your height of eye is 40 feet. What is the latitude at meridian transit?   | LAT 20°44.8'N        | <b>LAT 20°31.9'N</b> | LAT 20Z°23.7'N | LAT 20°15.6'N |               |
| 481  | On 30 October an ex-meridian altitude of the Sun's lower limb at upper transit was observed at 1144 ZT. Your DR position is LAT 22°42.0'S, LONG 137°16.0'W, and your sextant altitude (hs) is 80°59.4'. The index error is 2.5' off the arc, and your height of eye is 42.5 feet. The chronometer time of the observation is 08h 46m 15s, and the chronometer error is 02m 12s fast. Find the latitude at meridian transit from the ex-meridian observation. | <b>LAT 22°31.4'S</b> | LAT 22°42.3'S        | LAT 22°46.2'S  | LAT 23°00.9'S |               |
| 482  | On 31 January your 0920 zone time DR position is LAT 24°16.0'S, LONG 151°33.0'E. Your vessel is on course 258°T at a speed of 18.5 knots. What is the zone time of local apparent noon (LAN)?  | 1202                 | 1207                 | <b>1211</b>    | 1215          |               |
| 483  | On 31 May , your vessel's 1420 zone time DR position is LAT 29°06'N, LONG 120°06'W, when an azimuth of the Sun is observed. The bearing of the Sun per standard magnetic compass was 255.3°. The chronometer time of the observation is 10h 17m 24s. The chronometer error is 02m 32s slow. The variation for this area is 12.9°E. What is the deviation of the standard magnetic compass?   | <b>2.5°W</b>         | 2.9°W                | 2.9°E          | 3.2°E         |               |
| 484  | On 31 October your 1700 zone time DR position is LAT 27°17.0'N, LONG 116°10.0'W, when an amplitude of the Sun is observed. The Sun's center is on the visible horizon and bears 246.5° per standard magnetic compass. Variation in the area is 8.5°E. The chronometer reads 01h 01m 23s and the chronometer error is 01m 54s slow. What is the deviation of the standard compass?  | 0.8°E                | <b>0.8°W</b>         | 2.5°E          | 2.5°W         |               |

| ID # | Question   | Choice A                      | Choice B                      | Choice C                      | Choice D                             | Illustrations |
|------|--|-------------------------------|-------------------------------|-------------------------------|--------------------------------------|---------------|
| 485  | On 4 December your 1500 ZT DR position is LAT 18°06.0' N, LONG 75°42.0' W. You are on course 020°T at a speed of 15.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1548 running fix.   | LAT 18°10.3'N, LONG 75°34.5'W | LAT 18°12.6'N, LONG 75°42.0'W | LAT 18°14.0'N, LONG 75°40.0'W | <b>LAT 18°17.3'N, LONG 75°37.7'W</b> |               |
| 486  | On 4 January your 0800 zone time DR position is LAT 25°25.0 S, LONG 16°09.0'W. Your vessel is on course 290°T at a speed of 13.5 knots. What is the zone time of local apparent noon (LAN)?  | 1157                          | 1205                          | 1209                          | <b>1213</b>                          |               |
| 487  | On 4 July at 0630 ZT, morning stars were observed, and the vessel's position was determined to be LAT 21°15.0'S, LONG 21°20.0'W. Your vessel is steaming at 13.0 knots on a course of 146°T. A sextant observation of the Sun's lower limb is made at 0915 ZT. The chronometer reads 10h 14m 27s, and the sextant altitude is 25°29.8'. The index error is 3.1' off the arc, and the chronometer error is 0m 53s slow. Your height of eye on the bridge is 48.0 feet. What is the azimuth (Zn) of this sight using the assumed position? | <b>049.5°T</b>                | 052.6°T                       | 054.3°T                       | 058.9°T                              |               |
| 488  | On 4 July you observe the lower limb of the Sun at a sextant altitude (hs) of 25°29.8'. The index error is 3.1' off the arc. The height of eye is 48 feet (14.6 meters). What is the observed altitude (Ho)?   | 25°37.1'                      | <b>25°40.2'</b>               | 25°42.8'                      | 25°44.3'                             |               |
| 489  | On 4 July your vessel's 1722 zone time DR position is LAT 34°30'S, LONG 174°48'E, when an amplitude of the Sun is observed. The sun's center is on the visible horizon and bears 282° per standard magnetic compass. Variation in the area is 17.2°E. The chronometer reads 05h 21m 48s and is 02m 01s fast. What is the deviation of the compass?   | <b>1.5°W</b>                  | 2.0°W                         | 1.5°E                         | 2.0°E                                |               |

| ID # | Question   | Choice A                  | Choice B                   | Choice C                            | Choice D            | Illustrations |
|------|--|---------------------------|----------------------------|-------------------------------------|---------------------|---------------|
| 490  | On 4 June at 0630 ZT, morning stars were observed, and the vessel's position was determined to be LAT 26°15'S, LONG 121°20'W. Your vessel is steaming at 13.0 knots on a course of 246°T. A sextant observation of the Sun's lower limb is made at 0915 ZT. The chronometer reads 05h 14m 27s, and the sextant altitude is 25°57.8'. The index error is 2.1' off the arc, and the chronometer error is 0m 53s slow. Your height of eye is 39.0 feet. What is the intercept (a) and azimuth (Zn) of this sight using the assumed position method? | Zn 044.6°, a 1.7' A       | <b>Zn 044.6°, a 2.5' T</b> | Zn 135.1°, a 1.7' A                 | Zn 135.1°, a 2.5' T |               |
| 491  | On 4 October , your 0734 zone time DR position is LAT 24°11.0'N, LONG 162°34.0'E. At that time, you observe the Sun bearing 105.5°psc. The chronometer reads 08h 36m 11s, and the chronometer error is 01m 46s fast. The variation is 7°W. What is the deviation of the standard compass?  | 1.2°W                     | 1.9°E                      | 5.3°W                               | <b>5.8°E</b>        |               |
| 492  | On 4 October your 1907 zone time DR position is LAT 25°15.0' S, LONG 105°44.0' E. At that time, you observe Deneb bearing 011.5°psc. The chronometer reads 00h 07m 42s, and the chronometer error is 00m 36s fast. The variation is 7.5°W. What is the deviation of the standard compass?  | <b>3.2°E</b>              | 4.3°W                      | 2.1°E                               | 2.1°W               |               |
| 493  | On 4 September your 1813 zone time DR position is LAT 24°18.0' S, LONG 95°16.0' E. Considering their magnitude, azimuth, and altitude, which group includes the three stars best suited for a fix at star time?  | Enif, Miaplacidus, Alkaid | Betelgeuse, Acrux, Hamal   | <b>Rasalhague, Fomalhaut, Spica</b> | Deneb, Altair, Vega |               |
| 494  | On 5 April at 0509 zone time, morning stars were observed and the vessel's position was LAT 28°32'N, LONG 177°13.0'W. Your vessel is steaming at 19.0 knots on a course of 258°T. A sextant observation of the Sun's lower limb is made at 1021 zone time. The chronometer reads 10h 20m 09s, and the sextant altitude (hs) is 58°06.6'. The index error is 1.0' off the arc, and the chronometer error is 00m 54s slow. Your height of eye on the bridge is 55.0 feet. What is the azimuth (Zn) of this sight using the assumed position?       | 125.8°T                   | 128.8°T                    | <b>129.2°T</b>                      | 130.2°T             |               |

| ID # | Question  | Choice A      | Choice B         | Choice C             | Choice D      | Illustrations |
|------|---|---------------|------------------|----------------------|---------------|---------------|
| 495  | On 5 August your 0310 ZT position is LAT 09°02'N, LONG 21°08'W. You observe Polaris bearing 002°pgc. At the time of the observation the helmsman noted that he was heading 316°pgc and 329°psc. The variation is 15°W. What is the deviation for that heading?  | 0.0°          | 1.5°W            | 3.0°W                | <b>0.5°E</b>  |               |
| 496  | On 5 February , your 2320 ZT position is LAT 52°28'N, LONG 23°48'W. You observe Polaris bearing 000.2°pgc. At the time of the observation the helmsman noted that he was heading 224°pgc and 244°psc. The variation is 20°W. What is the deviation for that heading?  | 0.0°          | <b>1.5°W</b>     | 3.0°W                | 4.5°W         |               |
| 497  | On 5 June your 0420 zone time DR position is LAT 26°47.0' N, LONG 133°19.5' W. At that time, you observe Vega bearing 298.1°psc. The chronometer reads 01h 21m 17s, and the chronometer error is 02m 25s fast. The variation is 3.5°E. What is the deviation of the standard compass?   | 1.8°E         | 5.2°E            | <b>1.8°W</b>         | 5.2°W         |               |
| 498  | On 5 May , your 1300 ZT DR position is LAT 25°16.0'S, LONG 12°30.0'W. You are on course 012°T at a speed of 14 knots. What will be the zone time of sunset at your vessel?  | 1702          | <b>1719</b>      | 1730                 | 1741          |               |
| 499  | On 5 May , your 1800 ZT DR position is LAT 26°11.5'N, LONG 65°35.0'W. You are on course 270°T at a speed of 12 knots. What will be the ZT of sunset at your vessel?   | 1825          | 1840             | <b>1857</b>          | 1901          |               |
| 500  | On 5 May at 1953 zone time, you take a sextant observation of Polaris. Your vessel's DR position is LAT 29°30.0' N, LONG 66°25.7' W, and your sextant reads 29°07.2'. Your chronometer reads 11h 51m 45s, and your chronometer error is 01m 36s slow. Your height of eye is 56 feet, and the index error for your sextant is 1.5' on the arc. What is the latitude of your vessel from your observation of Polaris? | 29°14.3'N     | <b>29°23.6'N</b> | 29°32.3'N            | 29°38.8'N     |               |
| 501  | On 5 May in DR position LAT 38°34.5'N, LONG 124°20.7'W, you take an ex-meridian observation of the Sun's lower limb. The chronometer time of the sight is 07h 59m 10s, and the chronometer error is 01m 10s slow. The sextant altitude (hs) is 67°27.0'. The index error is 1.4' on the arc, and your height of eye is 30 feet. What is the latitude at meridian transit?   | LAT 38°26.4'N | LAT 38°30.2'N    | <b>LAT 38°36.0'N</b> | LAT 38°41.2'N |               |



| ID # | Question   | Choice A                              | Choice B                              | Choice C                       | Choice D                       | Illustrations |
|------|--|---------------------------------------|---------------------------------------|--------------------------------|--------------------------------|---------------|
| 502  | On 5 May your 1600 zone time DR position is LAT 17°28' S, LONG 143°39' E. You are on course 316°T at a speed of 17 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1800 running fix.  | <b>LAT 17°05.2'S, LONG 143°11.4'E</b> | LAT 17°07.8'S, LONG 143°17.5'E        | LAT 17°08.2'S, LONG 143°07.9'E | LAT 17°09.7'S, LONG 143°10.1'E | NP-0038       |
| 503  | On 5 September in DR position LAT 23°17.0'S, LONG 154°35.0'E, you observe an amplitude of the Sun. The Sun's center is on the visible horizon and bears 275° per standard magnetic compass. The chronometer reads 07h 49m 26s and is 01m 52s fast. Variation in the area is 3°W. What is the deviation of the standard magnetic compass?   | 2.1°E                                 | 2.4°W                                 | <b>5.1°E</b>                   | 5.4°W                          |               |
| 504  | On 6 April your 0300 DR position is LAT 27°42' S, LONG 128°58' W. You are on course 097°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix.  | LAT 27°15.5'S, LONG 128°12.4'W        | <b>LAT 27°44.7'S, LONG 127°47.5'W</b> | LAT 27°52.4'S, LONG 127°49.4'W | LAT 28°15.2'S, LONG 128°11.6'W | NP-0029       |
| 505  | On 6 April your 1830 ZT DR position is LAT 26°33.0' N, LONG 64°31.0' W. You are on course 082°T at a speed of 16 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1900 running fix.  | LAT 26°49.5'N, LONG 64°06.5'W         | <b>LAT 26°32.5'N, LONG 64°27.1'W</b>  | LAT 26°31.2'N, LONG 64°32.1'W  | LAT 26°28.7'N, LONG 64°32.1'W  | NP-0008       |
| 506  | On 6 August , your 1552 zone time DR position is LAT 24°26.0'S, LONG 73°19.0'E. At that time, you observe the Sun bearing 302°psc. The chronometer reads 10h 55m 07s, and the chronometer error is 02m 38s fast. The variation is 6°E. What is the deviation of the standard magnetic compass?   | 4.1°W                                 | 4.6°E                                 | 5.9°E                          | <b>6.1°W</b>                   |               |
| 507  | On 6 December your 0800 zone time DR position was LAT 21°48.0'N, LONG 124°30.0'E. Your vessel was steaming on course 045°T at a speed of 20.0 knots. An observation of the Sun's lower limb was made at 1012 ZT. The chronometer read 02h 10m 42s and was slow 01m 02s. The observed altitude (Ho) was 41°17.1'. LAN occurred at 1129 zone time. The observed altitude (Ho) was 44°53.7'. What was the longitude of your 1200 zone time running fix? | LONG 125°25.0'E                       | LONG 125°28.9'E                       | LONG 125°32.5'E                | <b>LONG 125°35.2'E</b>         |               |

| ID # | Question  | Choice A  | Choice B         | Choice C       | Choice D     | Illustrations |
|------|---|-----------|------------------|----------------|--------------|---------------|
| 508  | On 6 March at 0550 zone time, morning stars were observed, and the vessel's position was determined to be LAT 23°56.0'N, LONG 27°19.0'W. Your vessel is steaming at 25.0 knots on a course of 149.0°T. A sextant observation of the Sun's lower limb is made at 0830 zone time. The chronometer reads 10h 32m 05s, and the sextant altitude is 31°31.5'. The index error is 2.5' on the arc, and the chronometer error is 01m 45s fast. Your height of eye on the bridge is 76.0 feet. What is the azimuth (Zn) of this sight using the assumed position? | 109.8°T   | 111.2°T          | <b>112.8°T</b> | 114.3°T      |               |
| 509  | On 6 March your 1854 zone time DR position is LAT 23°51.5' N, LONG 73°14.0' W. At that time you observe Polaris with a sextant altitude (hs) of 24°16.5'. The chronometer time of the sight is 11h 52m 40s, and the chronometer error is 01m 56s slow. The index error is 5.0' on the arc, and the height of eye is 43.5 feet (13.3 meters.) What is your latitude by Polaris?  | 23°29.5'N | <b>23°36.3'N</b> | 23°49.9'N      | 24°02.9'N    |               |
| 510  | On 6 November , your 0752 zone time DR position is LAT 25°11.0'N, LONG 76°07.0'W. At that time, you observe the Sun bearing 119°psc. The chronometer reads 12h 53m 07s, and the chronometer error is 01m 19s fast. The variation is 3°W. What is the deviation of the standard magnetic compass?  | 2.2°W     | 3.8°W            | 2.8°E          | <b>3.2°E</b> |               |
| 511  | On 6 November , your vessel's 0706 zone time DR position is LAT 25°30.0'N, LONG 85°35.0'W, when an azimuth of the Sun is observed. The chronometer time of the sight is 01h 03m 30s, and the Sun is bearing 114.0°pgc. The chronometer error is 02m 30s slow, and the variation in the area is 2°W. What is the gyro error?   | 0.8°E     | 0.8°W            | 2.0°W          | <b>2.0°E</b> |               |
| 512  | On 6 October your 0416 zone time DR position is LAT 25°16.0'N, LONG 130°25.0'E. At that time, you observe Mars bearing 083°psc. The chronometer reads 07h 16m 22s, and the chronometer error is 00m 10s fast. The variation is 1.5°E. What is the deviation of the standard compass?  | 0.4°E     | <b>1.2°W</b>     | 3.5°E          | 19.0°E       |               |

| ID # | Question  | Choice A  | Choice B  | Choice C  | Choice D  | Illustrations |
|------|---|-----------|-----------|-----------|-----------|---------------|
| 513  | On 7 April in DR position LAT 27°42.0'N, LONG 114°03.0'W, you observe an amplitude of the Sun. The Sun's center is on the celestial horizon and bears 076°psc. The chronometer reads 02h 10m 17s and is 01m 52s slow. Variation in the area is 8°E. What is the deviation of the standard magnetic compass?   | 1.8°W     | 2.3°E     | 6.2°E     | 7.8°W     |               |
| 514  | On 7 December, your vessel's 0835 zone time DR position is LAT 28°30.0'N, LONG 125°39.3'W, when an azimuth of the Sun is observed. The chronometer time of the sight is 04h 34m 48s, and the Sun is bearing 113° per standard magnetic compass. The chronometer error is 01m 24s slow, and the variation in the area is 13.0°E. What is the deviation of the standard magnetic compass? | 0.7°E     | 1.0°W     | 2.3°E     | 3.0°W     |               |
| 515  | On 7 December your 0350 ZT position is LAT 35°42'N, LONG 17°38'E. You observe Polaris bearing 359.7°pgc. At the time of the observation the helmsman noted that he was heading 016°pgc and 014°psc. The variation is 1°E. What is the deviation for that heading?   | 0.3°E     | 1.5°E     | 0.3°W     | 1.5°W     |               |
| 516  | On 7 February your 0800 zone time DR position is LAT 22°16.0'N, LONG 92°26.0'W. Your vessel is on course 270°T at a speed of 20.0 knots. What is the zone time of local apparent noon (LAN)?  | 1218      | 1222      | 1226      | 1230      |               |
| 517  | On 7 March at 1838 ZT, in DR position LAT 34°26.9' N, LONG 58°16.2' W, you observe Polaris for latitude. The sextant altitude (hs) is 35°08.4'. The index error is 2.5' off the arc. The height of eye is 54 feet. What is the latitude at the time of the sight?   | 34°29.8'N | 34°33.4'N | 34°34.8'N | 34°36.8'N |               |
| 518  | On 7 May you observe Polaris for latitude at 0303 ZT. Your DR position is LAT 56°35.4' N, LONG 05°38.9' W. The sextant altitude is 56°11.1'. The height of eye is 36', and the index error is 3.3' off the arc. What is the latitude at the time of the sight?  | 56°24.6'N | 56°32.6'N | 56°35.0'N | 56°38.7'N |               |

| ID # | Question  | Choice A          | Choice B   | Choice C         | Choice D         | Illustrations |
|------|---|-------------------|------------|------------------|------------------|---------------|
| 519  | On 7 November your 0830 zone time fix gives you a position of LAT 27°36.0'N, LONG 162°19.0'W. Your vessel is on course 289°T and your speed is 19.0 knots. Local apparent noon (LAN) occurs at 1138 zone time, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 45°35.0'. What is the latitude at 1200 ZT?   | 27°55.1'N         | 27°57.2'N  | <b>27°59.5'N</b> | 28°01.9'N        |               |
| 520  | On 7 November your 0830 zone time fix gives you a position of LAT 27°36.0'N, LONG 163°19.0'W. Your vessel is on course 289°T, and your speed is 19.0 knots. Local apparent noon (LAN) occurs at 1138 zone time, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 45°35.0'. What is the calculated latitude at LAN?   | 27°52.3'N         | 27°53.4'N  | 27°55.1'N        | <b>27°57.2'N</b> |               |
| 521  | On 7 November your 0830 zone time position was LAT 27°36.0'N, LONG 162°19.0'W. Your vessel was steaming on course 289°T at a speed of 19.0 knots. An observation of the Sun's lower limb was made at 0945 ZT. The chronometer read 08h 43m 11s and was slow 01m 51s. The observed altitude (Ho) was 38°21.1'. Local Apparent Noon (LAN) occurred at 1138 zone time. The observed altitude (Ho) was 45°35.0'. What was the longitude of your 1200 zone time running fix? | <b>163°38.8'W</b> | 163°34.0'W | 163°30.2'W       | 163°26.0'W       |               |
| 522  | On 8 April while taking observations for an evening fix, you observe an unidentified star bearing 250.7°T at an observed altitude of 51°44.8'. Your DR position at the time of the sight was LAT 22°16.0' N, LONG 157°58.3' W. The chronometer reads 05h 09m 57s and is 01m 23s slow. What star did you observe?  | Betelgeuse        | Aldebaran  | Alnilam          | <b>Bellatrix</b> |               |
| 523  | On 8 April your 0830 zone time DR position is LAT 22°49.0'N, LONG 84°37.0'W. Your vessel is on course 228° T at a speed of 19.0 knots. What is the zone time of local apparent noon (LAN)?  | <b>1144</b>       | 1147       | 1150             | 1154             |               |

| ID # | Question  | Choice A          | Choice B          | Choice C          | Choice D          | Illustrations |
|------|---|-------------------|-------------------|-------------------|-------------------|---------------|
| 524  | On 8 April your evening DR position is LAT 22°16' N, LONG 157°58.3' W. You observe an unidentified star bearing 246°T at an observed altitude (Ho) of 58°45.5'. The chronometer reads 05h 09m 57s, and is 01m 23s slow. What star did you observe?  | Betelgeuse        | Aldebaran         | Alnilam           | Bellatrix         |               |
| 525  | On 8 April your evening DR position is LAT 22°16.0' N, LONG 157°58.3' W. You observe an unidentified star bearing 238°T at an observed altitude (Ho) of 50°02.7'. The chronometer reads 05h 09m 57s, and is 01m 23s slow. What star did you observe?  | Betelgeuse        | Aldebaran         | Alnilam           | Bellatrix         |               |
| 526  | On 8 April your evening DR position is LAT 22°16.0' N, LONG 157°58.3' W. You observe an unidentified star bearing 271°T at an observed altitude (Ho) of 44°08.2'. The chronometer reads 05h 09m 57s, and is 01m 23s slow. What star did you observe?  | Betelgeuse        | Aldebaran         | Alnilam           | Bellatrix         |               |
| 527  | On 8 August at 0545 ZT, morning stars were observed, and the vessel's position was determined to be LAT 26°16.0' S, LONG 94°16.0'E. Your vessel is steaming at 20.0 knots on a course of 346°T. A sextant observation of the Sun's lower limb is made at 0905 ZT. The chronometer reads 03h 02m 52s, and the sextant altitude (hs) is 38°07.5'. The index error is 5.2' off the arc, and the chronometer error is 2m 17s slow. Your height of eye on the bridge is 72 feet (22.0 meters). What is the observed altitude (Ho) and azimuth (Zn) of this sight using the assumed position? | 38°19.4', 048.4°T | 38°19.4', 131.6°T | 38°54.9', 048.4°T | 38°54.9', 131.6°T |               |
| 528  | On 8 August your 0400 ZT DR position is LAT 23°16.0'S, LONG 105°33.0'W. You are on course 295°T at a speed of 25 knots. What will be the zone time of sunrise at your vessel?   | 0623              | 0629              | 0636              | 0654              |               |
| 529  | On 8 December in DR position LAT 21°56.1'S, LONG 17°21.6'E you observe an amplitude of the Sun. The Sun's center is on the celestial horizon and bears 240.5°psc. The chronometer reads 05h 27m 21s and is 00m 47s fast. Variation in the area is 3.3°E. What is the deviation of the standard magnetic compass?  | 1.5°W             | 0.3°W             | 0.6°E             | 1.5°E             |               |

| ID # | Question   | Choice A                      | Choice B                      | Choice C                      | Choice D                      | Illustrations |
|------|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|---------------|
| 530  | On 8 February your 0800 zone time (ZT) position was LAT 28°55.0'S, LONG 52°27.0'W. Your vessel was steaming on course 036°T at a speed of 19.0 knots. An observation of the Sun's lower limb was made at 0938 ZT. The chronometer read 12h 37m 23s and was slow 01m 24s. The observed altitude (Ho) was 45°29.2'. Local Apparent Noon (LAN) occurred at 1240 ZT. The observed altitude (Ho) was 77°10.5'. What was the longitude of your 1200 ZT running fix?  | 51°29.6'W                     | 51°31.4'W                     | 51°33.1'W                     | 51°35.4'W                     |               |
| 531  | On 8 February your 0800 zone time position is LAT 21°55'S, LONG 52°27'W. Your vessel is on course 056°T at a speed of 17.5 knots. An observation of the Sun's lower limb is made at 0938 zone time, and the observed altitude (Ho) is 46°06.5'. The chronometer reads 12h 37m 23s, and the chronometer error is 1m 24s slow. LAN occurs at 1243 zone time, and a meridian altitude of the Sun's lower limb is made. The observed altitude (Ho) for this sight is 83°56.1'. Determine the vessel's 1200 zone time position. | LAT 20°57.0'S, LONG 51°21.5'W | LAT 20°58.0'S, LONG 51°25.5'W | LAT 21°04.0'S, LONG 51°12.0'W | LAT 21°04.0'S, LONG 51°21.5'W |               |
| 532  | On 8 May in DR position LAT 30°26.0'N, LONG 46°55.1'W, you take an ex-meridian observation of Dubhe. The chronometer time of the sight is 11h 10m 54s, and the chronometer error is 01m 18s slow. The sextant altitude (hs) is 58°35.0'. The index error is 1.5' on the arc, and your height of eye is 44 feet. What is the latitude at meridian transit?  | LAT 30°12.5'N                 | LAT 30°19.8'N                 | LAT 30°27.6'N                 | LAT 30°35.8'N                 |               |
| 533  | On 8 November your 1731 zone time DR position is LAT 27°16.0' N, LONG 137°25.0' W. Considering their magnitude, azimuth, and altitude, which group includes the three stars best suited for a fix at star time?  | Alphecca, Fomalhaut, Schedar  | Antares, Rasalhague, Altair   | Sirius, Hamal, Dubhe          | Peacock, Ankaa, Al Na'ir      |               |
| 534  | On 9 February, your 0739 zone time DR position is LAT 23°31.0'N, LONG 143°41.0'E. At that time, you observe the Sun bearing 104.5°psc. The chronometer reads 09h 37m 12s, and the chronometer error is 01m 52s slow. The variation is 3.5°W. What is the deviation of the standard magnetic compass?   | 1.6°E                         | 2.3°W                         | 5.1°W                         | 8.6°E                         |               |

| ID # | Question   | Choice A   | Choice B  | Choice C   | Choice D   | Illustrations |
|------|--|--|---|--|--|---------------|
| 535  | On 9 February your 0830 zone time DR position is LAT 22°19.0'N, LONG 64°37.0'E. Your vessel is on course 128°T at a speed of 19.0 knots. What is the zone time of local apparent noon (LAN)?   | 1152   | 1156  | 1201   | 1205   |               |
| 536  | On 9 May your vessel's 1809 ZT DR position is LAT 48°13.7'N, LONG 168°36.3'E, when an amplitude of the Sun is observed. The Sun's center is on the celestial horizon and bears 283.7° per standard magnetic compass. Variation in the area is 13.0°E. The chronometer reads 07h 13m 19s and is 02m 56s fast. What is the deviation of the standard compass?  | 0.1°W  | 1.1°W   | 1.1°E  | 1.9°W  |               |
| 537  | On 9 November at 0426 ZT, your position was LAT 25°17.0'S, LONG 154°16.0'E. Your vessel is steaming at 14.0 knots on course 066°T. A sextant observation of the Sun's lower limb is made at 0837 ZT. The chronometer reads 10h 35m 21s, and the sextant altitude (hs) is 50°26.9'. The index error is 1.5' on the arc, and the chronometer error is 01m 48s slow. Your height of eye on the bridge is 56.0 feet. What is the observed altitude (Ho) and azimuth (Zn) of this sight using the assumed position? | 50°18.1', 086.3°T  | 50°18.1', 093.7°T   | 50°33.5', 085.9°T  | 50°33.5', 093.7°T  |               |
| 538  | On 9 November your 0400 DR position is LAT 18°24.0' S, LONG 97°36.0' W. You are on course 138°T at a speed of 16 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix.  | LAT 18°15.0'S, LONG 98°52.5'W  | LAT 18°45.0'S, LONG 97°06.8'W   | LAT 18°52.5'S, LONG 97°10.6'W  | LAT 19°15.5'S, LONG 98°08.8'W  | NP-0027       |
| 539  | On 9 September , your 2043 ZT position is LAT 24°18'N, LONG 66°46'W. You observe Polaris bearing 001°pgc. At the time of the observation the helmsman noted that he was heading 031°pgc and 040°psc. The variation is 11°W. What is the deviation for that heading?  | 0°   | 1°W   | 3°W  | 2°E  |               |
| 540  | On a North Pacific voyage, you wish to sail the shortest distance from LAT 46°05'N, LONG 124°00'W to LAT 44°00'N, LONG 150°00'E. You do not want to exceed 50°N latitude due to anticipated fog conditions. Which voyage plot meets these requirements? (Use gnomonic tracking chart WOXZC 5270)   | A great circle between departure and arrival with Mercator legs north of the Aleutians | A great circle between departure and arrival with parallel sailing where the track intersects the 50°N parallel | A great circle to 50°N, 153°W, parallel sailing to 50°N, 173°W, then a great circle to arrival | A great circle from departure to the mid-longitude at 50°N, then another great circle to arrival |               |

| ID # | Question  | Choice A   | Choice B  | Choice C   | Choice D  | Illustrations |
|------|---|--|---|--|---|---------------|
| 541  | On a voyage via the southern tip of Nova Scotia (LAT 43°20'N, LONG 65°35'W) you wish to sail the shortest route to La Coruna, Spain (LAT 43°20'N, LONG 8°24'W). Which of the following will require you to plot a composite sailing? (Use gnomonic tracking chart WOXZC 5274)   | Shoals extending 15 miles from Sable Island                      | Sea ice reported 68 miles ESE of St. John's, Newfoundland                   | <b>Icebergs reported extending west to west-northwest from LAT 47°00'N, LONG 35°00'W</b> | Naval exercises using live ammunition being conducted within a 150 mile radius of LAT 49°00'N, LONG 20°00'W |               |
| 542  | On May 20 , you are keeping ZD +4, and your 2300 (ZD +4) DR position is LAT 42°07'N, LONG 81°02'W. At that time, you observe Polaris bearing 012°psc. The chronometer time of the observation is 03h 02m 23s, and the chronometer is 1m 17s fast. The variation is 9.5°W. What is the deviation of the magnetic compass?  | <b>2.7°W</b>   | 12.2°W  | 6.8°E  | 12.2°E  |               |
| 543  | On September 9 , your 2130 zone time (ZD +5) DR position is LAT 45°08'N, LONG 82°38'W. At that time, you observe Polaris bearing 000.5°pgc. The chronometer time of the observation is 02h 26m 09s, and the chronometer is 1m 43s slow. The variation is 8.7°W. What is the gyro error?   | <b>0.7°E</b>   | 1.2°E   | 0.8°W  | 9.4°W   |               |
| 544  | On Sunday, 8 November, your ship is enroute from Texas City, TX, to Portland, ME. At 0632 ZT, you fix your position at LAT 27°06'N, LONG 90°36'W. When the lower limb of the Sun was two-thirds of a diameter above the visible horizon, the Sun bore 105° per standard magnetic compass. At this time the chronometer read 12h 39m 20s and is 3m 20s slow. If the variation is 3°E, determine the deviation of the standard compass. | <b>0.8°E</b>   | 0.8°W   | 3.8°E  | 3.8°W   |               |
| 545  | On which voyage would a great circle track be significantly shorter than a rhumb line track? (Use gnomonic tracking chart WOXZC 5274)   | <b>Savannah, GA, to Lisbon, Portugal</b>                         | Dublin, Ireland (Irish Sea), to La Coruna, Spain (LAT 43°22'N, LONG 8°24'W) | Reykjavik, Iceland, to Lisbon, Portugal  | Boston to Sable Island  |               |
| 546  | On which voyage would a great circle track provide a significant savings in distance to steam, when compared to a rhumb line track? (Use gnomonic tracking chart WOXZC 5270.)   | Valdez, AK, to the Marquesas Islands (LAT 8°00'S, LONG 140°00'W) | San Francisco to Kodiak, AK   | Christmas Island (LAT 2°00'N, LONG 157°30'W) to Singapore via LAT 3°00'N, LONG 126°00'E  | <b>Guam (LAT 14°00'N, LONG 145°00'E) to Seattle via LAT 47°30'N, LONG 125°30'W</b>                          |               |



| ID # | Question  | Choice A         | Choice B         | Choice C         | Choice D  | Illustrations |
|------|---|------------------|------------------|------------------|-----------|---------------|
| 547  | The great circle distance from LAT 08°50.0'N, LONG 80°21.0'W to LAT 12°36.0'N, LONG 128°16.0'E is 8664 miles, and the initial course is 306.6°T. Determine the latitude of the vertex.  | <b>37°30.2'N</b> | 37°39.6'N        | 37°48.2'N        | 37°53.6'N |               |
| 548  | The great circle distance from LAT 08°50.0'N, LONG 80°21.0'W to LAT 22°36.0'N, LONG 128°16.0'E is 7801 miles and the initial course is 318°45' T. The latitude of the vertex is 49°20.6'N. What is the longitude of the vertex?   | 156°43'W         | <b>162°41'W</b>  | 159°32'W         | 161°18'W  |               |
| 549  | The great circle distance from LAT 24°25.3'N, LONG 83°02.6'W to LAT 35°57.2'N, LONG 5°45.7'W is 3966.5 miles. Determine the latitude of the vertex.   | 38°46.2'N        | 38°16.4'N        | <b>38°09.4'N</b> | 37°57.3'N |               |
| 550  | The great circle distance from LAT 25°50'N, LONG 77°00'W to LAT 35°56'N, LONG 06°15'W is 3616 miles, and the initial course is 061.7°T. Determine the latitude of the vertex.   | 37°32.2'N        | <b>37°34.9'N</b> | 37°41.6'N        | 37°45.2'N |               |
| 551  | The great circle distance from LAT 25°50'N, LONG 77°00'W to LAT 35°56'N, LONG 06°15'W is 3616 miles, and the initial course is 061.7°T. Determine the longitude of the vertex, given the latitude of the vertex as 37°34.9'N.   | 25°49.8'W        | 25°53.2'W        | <b>25°59.0'W</b> | 26°03.4'W |               |
| 552  | The great circle distance from LAT 25°50'N, LONG 77°00'W to LAT 35°56'N, LONG 06°15'W is 3616 miles, and the initial course is 061.7°T. The position of the vertex is LAT 37°34.9'N, LONG 25°59.0'W. Determine the latitude intersecting the great circle track 600 miles west of the vertex, along the great circle track.   | <b>36°54.9'N</b> | 36°50.2'N        | 36°45.9'N        | 36°36.8'N |               |
| 553  | The great circle distance from LAT 25°50'N, LONG 77°00'W to LAT 35°56'N, LONG 06°15'W is 3616 miles, and the initial course is 061.7°T. The position of the vertex is LAT 37°34.9'N, LONG 25°59.0'W. The difference of longitude from the vertex to a point (X) on the great circle track is 10°W. Determine the latitude which intersects the great circle at point (X). | 37°02.5'N        | <b>37°09.5'N</b> | 37°15.6'N        | 37°21.2'N |               |
| 554  | The great circle distance from LAT 35°08.0'S, LONG 19°26.0'E to LAT 33°16.0'S, LONG 115°36.0'E is 4559 miles and the initial course is 121°T. Determine the latitude of the vertex.   | 44°29.1'S        | <b>45°30.9'S</b> | 46°18.2'S        | 43°41.8'S |               |
| 555  | The great circle distance from LAT 35°08.0'S, LONG 19°26.0'E to LAT 33°16.0'S, LONG 115°36.0'E is 4559 miles and the initial course is 121°T. Determine the longitude of the vertex.  | 26°50.9'E        | <b>65°45.9'E</b> | 69°19.1'E        | 72°18.3'E |               |

| ID # | Question   | Choice A     | Choice B         | Choice C     | Choice D          | Illustrations |
|------|--|--------------|------------------|--------------|-------------------|---------------|
| 556  | The great circle distance from LAT 35°57.2'N, LONG 05°45.7'W to LAT 24°25.3'N, LONG 83°02.6'W is 3966.5 miles and the initial course is 283.7°T. The latitude of the vertex is 38°09.4'N. What is the longitude of the vertex? | 28°02.6'W    | <b>28°18.2'W</b> | 28°46.3'W    | 28°54.7'W         |               |
| 557  | The great circle distance from LAT 38°17.0'N, LONG 123°16.0'W to LAT 35°01.0'N, LONG 142°21.0'E is 4330 miles and the initial course is 300.9°T. The latitude of the vertex is 47°40.5'N. What is the longitude of the vertex? | 173°04.6'E   | 167°18.0'E       | 173°04.6'W   | <b>167°18.5'W</b> |               |
| 558  | The great circle distance from LAT 38°17'N, LONG 123°16'W to LAT 35°01'N, LONG 142°21'E is 4330 miles, and the initial course is 300.9°T. Determine the latitude of the vertex.  | 46°54.8'N    | 47°24.7'N        | 47°35.2'N    | <b>47°40.5'N</b>  |               |
| 559  | The observed distance for a day's run was 302.7 miles. The propeller had a pitch of 20'06", and the average RPM was 67. What was the slip?   | +0.7%        | -0.7%            | <b>+7.0%</b> | -7.0%             |               |
| 560  | The observed noon to noon run for a 24 hour period is 489 miles. The average RPM for the day was 95. The pitch of the wheel is 22.5 feet. What is the slip of the wheel?   | +3.2%        | <b>+3.4%</b>     | +3.7%        | +3.9%             |               |
| 561  | The pitch of the propeller on your vessel is 19'09". You estimate the slip at -3%. If you averaged 82 RPM for the day's run, how many miles did you steam?   | 370.8        | 373.6            | 393.7        | <b>395.3</b>      |               |
| 562  | The propeller of a vessel has a pitch of 19.0 feet. If the vessel traveled 183.5 miles (observed distance) in 24 hours at an average of 44 RPM, what was the slip?   | <b>+7.4%</b> | -7.4%            | +11.6%       | -11.6%            |               |
| 563  | The propeller on a vessel has a diameter of 18.8 feet and a pitch of 21.4 feet. What would be the slip if the vessel cruised 378 miles in a 24 hour day (observed distance) at an average RPM of 76?                           | <b>+1.9%</b> | -1.9%            | +4.7%        | -4.7%             |               |
| 564  | The propeller on a vessel has a diameter of 19.9 feet and a pitch of 21.6 feet. What would be the apparent slip if the vessel cruised 395 miles in a 23 hour day (observed distance) at an average RPM of 78?                  | <b>-3.2%</b> | +3.2%            | -12.0%       | +12.0%            |               |
| 565  | The propeller on a vessel has a diameter of 20.2 feet and a pitch of 19.0 feet. What would be the apparent slip if the vessel cruised 367 miles in a 24 hour day (observed distance) at an average RPM of 84?                  | <b>+2.9%</b> | -2.9%            | +5.2%        | -5.2%             |               |

| ID # | Question   | Choice A | Choice B | Choice C | Choice D | Illustrations |
|------|--|----------|----------|----------|----------|---------------|
| 566  | The propeller on a vessel has a diameter of 20.6 feet and a pitch of 23.4 feet. What would be the apparent slip if the vessel cruised 538 miles in a 24 hour day (observed distance) at an average RPM of 87?  | -11.6%   | +11.6%   | -10.3%   | +10.3%   |               |
| 567  | The propeller on a vessel has a diameter of 20.9 feet and a pitch of 19.6 feet. What would be the apparent slip if the vessel cruised 447 miles in a 23 hour day (observed distance) at an average RPM of 108? | -5.6%    | +5.6%    | -7.0%    | +7.0%    |               |
| 568  | The propeller on a vessel has a diameter of 21.2 feet and a pitch of 20.0 feet. What would be the apparent slip if the vessel cruised 391 miles in a 24 hour day (observed distance) at an average RPM of 88?  | -11.5%   | +11.5%   | -6.2%    | +6.2%    |               |
| 569  | The propeller on a vessel has a diameter of 21.5 feet and a pitch of 24.5 feet. What would be the apparent slip if the vessel cruised 458 miles in a 23 hour day (observed distance) at an average RPM of 78?  | +5.6%    | -5.6%    | +12.3%   | -12.3%   |               |
| 570  | The propeller on a vessel has a diameter of 22.8 feet and a pitch of 19.3 feet. What would be the apparent slip if the vessel cruised 287 miles in a 24 hour day (observed distance) at an average RPM of 67?  | -6.3%    | +6.3%    | -24.0%   | +24.0%   |               |
| 571  | The propeller on a vessel has a diameter of 23.7 feet and a pitch of 24.8 feet. What would be the apparent slip if the vessel cruised 442 miles in a 23 hour day (observed distance) at an average RPM of 89?  | -7.6%    | +7.6%    | -11.8%   | +11.8%   |               |
| 572  | The propeller on a vessel has a diameter of 24.0 feet and a pitch of 21.3 feet. What would be the slip if the vessel cruised 510 miles in a 24 hour day (observed distance) at an average RPM of 86?           | -12.2%   | +12.2%   | -17.5%   | +17.5%   |               |
| 573  | The propeller on a vessel has a diameter of 24.6 feet and a pitch of 26.1 feet. What would be the apparent slip if the vessel cruised 462 miles in a 24 hour day (observed distance) at an average RPM of 72?  | -2.7%    | +2.7%    | -3.8%    | +3.8%    |               |
| 574  | The propeller on a vessel has a diameter of 25.3 feet and a pitch of 23.2 feet. What would be the apparent slip if the vessel cruised 515 miles in a 23 hour day (observed distance) at an average RPM of 93?  | -3.6%    | +3.6%    | -5.2%    | +5.2%    |               |

| ID # | Question  | Choice A                   | Choice B                                     | Choice C                          | Choice D                                     | Illustrations |
|------|---|----------------------------|--|-----------------------------------|--|---------------|
| 575  | The propeller on your vessel has a pitch of 18'09". If the observed distance for a day's run was 399.4 miles and the average RPM was 86, which statement is TRUE?   | The slip is a positive 5%. | The day's run by engine RPM was 404.5 miles. | <b>The slip is a negative 5%.</b> | The day's run by engine RPM was 390.6 miles. |               |
| 576  | The propeller on your vessel has a pitch of 22.8 feet. From 0800, 18 April, to 1020, 19 April, you steamed an observed distance of 403.6 miles. If your average RPM was 74, what was the slip?                            | +7.0%                      | -7.0%  | <b>+8.0%</b>                      | -8.0%  |               |
| 577  | The propellers on your twin screw vessel have a pitch of 16'04". What is the distance in a day's run if the average RPM is 94, and you estimate 7% positive slip?   | <b>338.3 miles</b>         | 389.3 miles                                  | 676.6 miles                       | 778.6 miles                                  |               |
| 578  | The speed necessary to reach port at a designated time is 18.7 knots. The propeller pitch is 24'03", and you estimate 3% positive slip. How many RPM's will the shaft have to turn?                                       | <b>81 RPM</b>              | 87 RPM                                       | 98 RPM                            | 104 RPM                                      |               |
| 579  | The speed of advance necessary to arrive in port at a designated time is 15.8 knots. The pitch of the propeller is 20.75 feet. You estimate 5% positive slip. How many RPM must you turn to make the necessary speed?     | 73.5                       | 76.2   | 79.9                              | <b>81.2</b>                                  |               |
| 580  | The track line on the chart is 274°T. Variation is 4°E and deviation is 2°E. The gyro error is 1.5°E. What course would be steered by gyrocompass to make good the desired course?  | 280.5°pgc                  | 278.0°pgc                                    | 275.5°pgc                         | <b>272.5°pgc</b>                             |               |
| 581  | The true course between two points is 023°T. Your gyrocompass has an error of 1°W and you make an allowance of 4° leeway for an east wind. What gyro course should be steered to make the true course good?               | 020°pgc                    | 021°pgc                                      | 026°pgc                           | <b>028°pgc</b>                               |               |
| 582  | The true course between two points is 041°. Your gyrocompass has an error of 1°W. You make an allowance of 2° leeway for a east-southeast wind. What gyro course should be steered to make the true course good?          | 040°pgc                    | 042°pgc                                      | 043°pgc                           | <b>044°pgc</b>                               |               |
| 583  | The true course between two points is 057°. Your gyrocompass has an error of 3° east and you make an allowance of 1° leeway for a north-northwest wind. Which gyro course should be steered to make the true course good? | <b>053°pgc</b>             | 056°pgc                                      | 059°pgc                           | 060°pgc                                      |               |

| ID # | Question  | Choice A | Choice B | Choice C | Choice D | Illustrations |
|------|---|----------|----------|----------|----------|---------------|
| 584  | The true course between two points is 078°. Your gyrocompass has an error of 2°E. You make an allowance of 3° leeway for a north wind. What gyro course should be steered to make the true course good?           | 073°pgc  | 075°pgc  | 077°pgc  | 079°pgc  |               |
| 585  | The true course between two points is 106°. Your gyrocompass has an error of 2°E and you make an allowance of 2° leeway for a south wind. What gyro course should be steered to make the true course good?        | 102°pgc  | 104°pgc  | 106°pgc  | 108°pgc  |               |
| 586  | The true course between two points is 119°. Your gyrocompass has an error of 3°E. You allow of 4° leeway for a south-southwest wind. What gyro course should be steered to make the true course good?             | 112°pgc  | 118°pgc  | 120°pgc  | 126°pgc  |               |
| 587  | The true course between two points is 194°. Your gyrocompass has an error of 2°W and you make an allowance of 1° leeway for a southwest wind. What gyro course should you steer to make the true course good?     | 193°pgc  | 195°pgc  | 197°pgc  | 199°pgc  |               |
| 588  | The true course between two points is 220°. Your gyrocompass has an error of 1°E. You make an allowance of 1° leeway for a north-northwest wind. What gyro course should be steered to make the true course good? | 220°pgc  | 221°pgc  | 222°pgc  | 223°pgc  |               |
| 589  | The true course between two points is 312°. Your gyrocompass has an error of 3°W. You make an allowance of 4° leeway for a west by south wind. What gyro course should be steered to make the true course good?   | 305°pgc  | 311°pgc  | 315°pgc  | 318°pgc  |               |
| 590  | The true course between two points is 337°. Your gyrocompass has an error of 3°E and you make an allowance of 5° leeway for a west wind. Which gyro course should be steered to make the true course good?        | 329°pgc  | 335°pgc  | 339°pgc  | 345°pgc  |               |
| 591  | The true course from point A to point B is 317°. A SSW wind causes a 4° leeway, variation is 6°W and deviation is 1°E. What is the magnetic compass course to steer to make good the true course?                 | 326°psc  | 318°psc  | 313°psc  | 308°psc  |               |
| 592  | Two beacons form a range in the direction of 221.5°T. The range is seen in line from your vessel bearing 223° per gyro compass. The variation in the area is 4°E. What is the error of your gyro compass?         | 1.5°W    | 2.5°W    | 5.5°W    | 2.5°E    |               |

| ID # | Question  | Choice A  | Choice B  | Choice C  | Choice D  | Illustrations |
|------|---|---|---|---|---|---------------|
| 593  | Using gnomonic tracking chart WOXZC 5270, determine which of the following statements about a voyage from San Francisco to San Bernardino Strait (LAT 13°00'N, LONG 125°30'E) is TRUE.  | A composite sailing should be used to avoid the Bonin Islands.                    | Distance is measured using the length of a degree of longitude at the point of tangency.  | <b>You will cross the Northern Hemisphere vertex at the approximate longitude of 159°W.</b>   | The entire track line is west of the Northern Hemisphere vertex.  |               |
| 594  | Using gnomonic tracking chart WOXZC 5270, determine which of the following statements about a voyage from Valdez, AK, to Hilo, HI, is TRUE.   | <b>A great circle track is not significantly shorter than a rhumb line track.</b> | You will cross the Northern Hemisphere vertex where the track line crosses LAT 45°N.  | Distance is measured by using the length of a degree of longitude at the mid-latitude line.   | When plotted on a Mercator chart, the track line will be convex to San Francisco.   |               |
| 595  | Which statement about a great circle track between Cape Flattery (LAT 48°30'N, LONG 125°00'W) and Guam (LAT 14°00'N, LONG 145°00'E) is TRUE? (Use gnomonic tracking chart WOXZC 5270)   | The entire track line is to the west of the Northern Hemisphere vertex.           | <b>Military exercises being carried out within a 150 mile radius of LAT 47°10'N, LONG 137°30'W will interfere with the proposed track line.</b> | Distance is measured by determining the length of a line in minutes of arc from the midpoint of the track to the point of tangency. | When plotted on a Mercator chart the great circle track will appear as an S curve with the curve reversing at the latitude of the point of tangency (30°N). |               |
| 596  | While enroute from Cape Town to Rio a vessel's course is 281°pgc. The variation for the locality is 24°W. The deviation is 4°E. The gyro error is 2°W. What is the true course made good?   | <b>279°T</b>  | 261°T   | 301°T   | 283°T   |               |
| 597  | While enroute from Montevideo to Walvis Bay a vessel's course is 116°psc. The variation for the locality is 25°W and the deviation is 6°W. What is the true course made good if a northerly wind produces 1° leeway?  | 084°T   | <b>086°T</b>  | 148°T   | 085°T   |               |
| 598  | While enroute from Montevideo to Walvis Bay a vessel's course is 116°psc. The variation for the locality is 25°W and the deviation is 6°W. What is the true course made good if a southerly wind produces 1° leeway?  | <b>084°T</b>  | 086°T   | 148°T   | 085°T   |               |
| 599  | While enroute from Sydney to the Panama Canal a vessel's true course is 071°. Variation is 14°E. Deviation is 4°W. A northerly breeze causes 2° leeway. What course would you steer psc in order to make good the true course?  | <b>059°psc</b>  | 061°psc   | 063°psc   | 079°psc   |               |
| 600  | While entering a harbor on a course of 225° per gyrocompass, you take a bearing on a pair of range lights and get 220° per gyrocompass. The bearing on the chart is 217°T. The variation for the area is 6°W, and deviation is 2°W. What course would you steer per gyrocompass to make good a true course of 232°? | 229°pgc   | 231°pgc   | 233°pgc   | <b>235°pgc</b>  |               |

| ID # | Question   | Choice A       | Choice B       | Choice C       | Choice D       | Illustrations |
|------|--|----------------|----------------|----------------|----------------|---------------|
| 601  | While on a course of 019°pgc, a light bears 14° on the port bow at a distance of 15.3 miles. What course should you steer to pass 1.5 miles abeam of the light, leaving it to port?      | 006°pgc        | <b>011°pgc</b> | 013°pgc        | 015°pgc        |               |
| 602  | While on a course of 034°pgc, a light bears 8° on the port bow at a distance of 8.8 miles. What course should you steer to pass 2.5 miles abeam of the light leaving it to port?         | 035°pgc        | <b>043°pgc</b> | 051°pgc        | 059°pgc        |               |
| 603  | While on a course of 066°pgc, a light bears 13° on the port bow at a distance of 12.3 miles. What course should you steer to pass 4 miles abeam of the light leaving it to port?         | 067°pgc        | <b>072°pgc</b> | 079°pgc        | 085°pgc        |               |
| 604  | While on a course of 066°pgc, a light bears 18° on the port bow at a distance of 12.3 miles. What course should you steer to leave the light 4 miles abeam to port?                      | <b>067°pgc</b> | 072°pgc        | 079°pgc        | 085°pgc        |               |
| 605  | While on a course of 097°pgc, a light bears 8° on the port bow at a distance of 11.7 miles. What course should you steer to pass 3 miles abeam of the light leaving it to port?          | 082°pgc        | 091°pgc        | <b>104°pgc</b> | 112°pgc        |               |
| 606  | While on a course of 138°T, a light bears 14° on the starboard bow at a distance of 8.6 miles. What course should you steer to pass 3 miles abeam of the light leaving it to starboard?  | <b>132°T</b>   | 135°T          | 138°T          | 141°T          |               |
| 607  | While on a course of 152°T, a light bears 9° on the port bow at a distance of 11.6 miles. What course should you steer to pass 3 miles abeam of the light leaving it to port?            | 153°           | <b>158°</b>    | 163°           | 167°           |               |
| 608  | While on a course of 159°T, a light bears 11° on the starboard bow at a distance of 10.6 miles. What course should you steer to pass 2 miles abeam of the light leaving it to starboard? | <b>159°T</b>   | 163°T          | 167°T          | 171°T          |               |
| 609  | While on a course of 192°T, a light bears 11° on the starboard bow at a distance of 12.7 miles. What course should you steer to pass 3 miles abeam of the light leaving it to starboard? | 167°T          | 173°T          | 185°T          | <b>189°T</b>   |               |
| 610  | While on a course of 214°pgc, a light bears 9° on the port bow at a distance of 7.4 miles. What course should you steer to pass 2 miles abeam of the light leaving it to port?           | 189°pgc        | 209°pgc        | <b>221°pgc</b> | 229°pgc        |               |
| 611  | While on a course of 216°pgc, a light bears 12° on the port bow at a distance of 11.2 miles. Which course should you steer to pass 2 miles abeam of the light leaving it to port?        | 208°pgc        | 210°pgc        | 212°pgc        | <b>214°pgc</b> |               |

| ID # | Question  | Choice A     | Choice B     | Choice C     | Choice D     | Illustrations |
|------|---|--------------|--------------|--------------|--------------|---------------|
| 612  | While on a course of 279°T, a light bears 12° on the starboard bow at a distance of 9.3 miles. What course should you steer to pass 4 miles abeam of the light leaving it to starboard?   | 253°T        | 265°T        | 291°T        | 305°T        |               |
| 613  | While on a course of 283°pgc, a light bears 10° on the port bow at a distance of 8.3 miles. What course should you steer to pass 3.5 miles abeam of the light leaving it to port?   | 289°pgc      | 294°pgc      | 298°pgc      | 302°pgc      |               |
| 614  | While on a course of 321°T, a light bears 7° on the starboard bow at a distance of 9.7 miles. What course should you steer to pass 3.5 miles abeam of the light leaving it to starboard?  | 297°T        | 300°T        | 303°T        | 307°T        |               |
| 615  | While on a course of 349°T, a light bears 13° on the starboard bow at a distance of 10.8 miles. What course should you steer to pass 2.5 miles abeam of the light leaving it to starboard?  | 346°T        | 349°T        | 352°T        | 355°T        |               |
| 616  | While on a course of 349°T, a light bears 13° on your starboard bow at a distance of 10.8 miles. What course should you steer to pass 2.5 miles abeam of the light, leaving it to starboard?  | 323°         | 336°         | 349°         | 002°         |               |
| 617  | While on course 321°pgc with a 1°W gyro error, you pick up a buoy on radar bearing 001° relative at 5.2 miles. What will be the course to pass the buoy by 1 mile abeam to starboard, if you change course when the buoy is 4.5 miles away?   | 305°T        | 310°pgc      | 316°T        | 336°pgc      |               |
| 618  | While proceeding up a channel on course 010° per gyro compass, you notice a pair of range lights in alignment with the masts of your vessel when viewed forward. A check of the chart shows the range to be 009°T and the variation to be 15°W. If the ship's course is 026°psc, what is the deviation for the present heading? | 2°W          | 2°E          | 1°W          | 1°E          |               |
| 619  | While steaming at 12 knots, your vessel burns 45 tons of fuel per day. What will be the rate of fuel consumption if you decrease speed to 11.5 knots?   | 31 tons/day  | 36 tons/day  | 40 tons/day  | 43 tons/day  |               |
| 620  | While steaming at 12.3 knots, your vessel burns 168 bbls of fuel per day. What will be the rate of fuel consumption if you increase speed to 13.5 knots?  | 192 bbls/day | 204 bbls/day | 222 bbls/day | 238 bbls/day |               |



| ID # | Question  | Choice A            | Choice B            | Choice C          | Choice D          | Illustrations |
|------|---|---------------------|---------------------|-------------------|-------------------|---------------|
| 621  | While steaming at 13.5 knots, your vessel consumes 251 barrels of fuel oil per day. In order to reduce consumption to 129 barrels of fuel oil per day, what is the maximum speed the vessel can turn for? | 6.9 knots           | 9.7 knots           | <b>10.8 knots</b> | 12.7 knots        |               |
| 622  | While steaming at 14 knots, your vessel burns 276 bbls of fuel per day. What will be the rate of fuel consumption if you decrease speed to 11.7 knots?  | 135 bbls/day        | <b>161 bbls/day</b> | 196 bbls/day      | 245 bbls/day      |               |
| 623  | While steaming at 14.5 knots, your vessel consumes 242 barrels of fuel oil per day. In order to reduce consumption to 152 barrels of fuel oil per day, what is the maximum speed the vessel can turn for? | 9.1 knots           | 10.2 knots          | 11.5 knots        | <b>12.4 knots</b> |               |
| 624  | While steaming at 14.5 knots, your vessel consumes 319 barrels of fuel oil per day. In order to reduce consumption to 217 barrels of fuel oil per day, what is the maximum speed the vessel can turn for? | 9.8 knots           | 11.9 knots          | <b>12.8 knots</b> | 13.5 knots        |               |
| 625  | While steaming at 15 knots, your vessel burns 326 bbls of fuel per day. What will be the rate of fuel consumption if you decrease speed to 12.2 knots?  | <b>175 bbls/day</b> | 215 bbls/day        | 277 bbls/day      | 300 bbls/day      |               |
| 626  | While steaming at 15.0 knots, your vessel consumes 326 barrels of fuel oil per day. In order to reduce consumption to 178 barrels of fuel oil per day, what is the maximum speed the vessel can turn for? | 8.1 knots           | 8.5 knots           | 11.1 knots        | <b>12.2 knots</b> |               |
| 627  | While steaming at 15.5 knots, your vessel consumes 333 barrels of fuel oil per day. In order to reduce consumption to 176 barrels of fuel oil per day, what is the maximum speed the vessel can turn for? | 11.3 knots          | <b>12.5 knots</b>   | 13.6 knots        | 14.8 knots        |               |
| 628  | While steaming at 15.7 knots, your vessel consumes 329 barrels of fuel oil per day. In order to reduce consumption to 267 barrels of fuel oil per day, what is the maximum speed the vessel can turn for? | 12.7 knots          | 13.5 knots          | <b>14.6 knots</b> | 15.5 knots        |               |
| 629  | While steaming at 16.3 knots, your vessel consumes 363 barrels of fuel oil per day. In order to reduce consumption to 298 barrels of fuel oil per day, what is the maximum speed the vessel can turn for? | 12.6 knots          | 13.1 knots          | 14.7 knots        | <b>15.3 knots</b> |               |

| ID # | Question  | Choice A                      | Choice B          | Choice C    | Choice D          | Illustrations |
|------|---|-------------------------------|-------------------|-------------|-------------------|---------------|
| 630  | While steaming at 16.5 knots, your vessel consumes 349 barrels of fuel oil per day. In order to reduce consumption to 189 barrels of fuel oil per day, what is the maximum speed the vessel can turn for?   | 12.1 knots                    | <b>13.5 knots</b> | 14.6 knots  | 15.4 knots        |               |
| 631  | While steaming at 17.0 knots, your vessel consumes 382 barrels of fuel oil per day. In order to reduce consumption to 223 barrels of fuel oil per day, what is the maximum speed the vessel can turn for?   | 9.9 knots                     | 11.8 knots        | 13.0 knots  | <b>14.2 knots</b> |               |
| 632  | While steaming at 17.5 knots, your vessel consumes 378 barrels of fuel oil per day. In order to reduce consumption to 194 barrels of fuel oil per day, what is the maximum speed the vessel can turn for?   | 12.5 knots                    | <b>14.0 knots</b> | 15.5 knots  | 16.8 knots        |               |
| 633  | While steaming at 18.9 knots, your vessel consumes 386 barrels of fuel oil per day. In order to reduce consumption to 251 barrels of fuel oil per day, what is the maximum speed the vessel can turn for?   | 11.6 knots                    | 12.3 knots        | 15.2 knots  | <b>16.4 knots</b> |               |
| 634  | While steaming at 19.4 knots, your vessel consumes 392 barrels of fuel oil per day. In order to reduce consumption to 182 barrels of fuel oil per day, what is the maximum speed the vessel can turn for?   | 13.2 knots                    | <b>15.0 knots</b> | 17.4 knots  | 18.2 knots        |               |
| 635  | While steaming at 19.5 knots, your vessel burns 297 bbls of fuel per day. What will be the rate of fuel consumption if you decrease speed to 15 knots?  | <b>135 bbls</b>               | 176 bbls          | 229 bbls    | 243 bbls          |               |
| 636  | While underway you sight a light $11^\circ$ on your port bow at a distance of 12 miles. Assuming you make good your course, what will be your distance off the light when abeam?  | <b>2.3 miles</b>              | 3.1 miles         | 3.9 miles   | 4.5 miles         |               |
| 637  | While your vessel is proceeding down a channel you notice a range of lights in line with your vessel's mast. If your vessel is on course $001^\circ$ per gyro compass and the charted value of the range of lights is $359^\circ T$ , what is the gyro compass error? | <b><math>2^\circ W</math></b> | $2^\circ E$       | $1^\circ E$ | $1^\circ W$       |               |

| ID #             | Question   | Choice A         | Choice B    | Choice C    | Choice D    | Illustrations |     |      |     |         |         |         |         |  |
|------------------|--|------------------|-------------|-------------|-------------|---------------|-----|------|-----|---------|---------|---------|---------|--|
| 638              | <p>You are heading 328°pgc to make good a course of 332°T, allowing 3° leeway for westerly winds and 1°E gyro error. The variation is 17°E. What should your heading be by standard magnetic compass to make good 332°T.</p> <p>DEVIATION TABLE</p> <table> <tr> <td>MAGNETIC HEADING</td> <td>DEV.</td> </tr> <tr> <td>345°</td> <td>1°E</td> </tr> <tr> <td>330°</td> <td>1°W</td> </tr> <tr> <td>315°</td> <td>3°W</td> </tr> </table>  | MAGNETIC HEADING | DEV.        | 345°        | 1°E         | 330°          | 1°W | 315° | 3°W | 315°psc | 318°psc | 343°psc | 345°psc |  |
| MAGNETIC HEADING | DEV.   |                  |             |             |             |               |     |      |     |         |         |         |         |  |
| 345°             | 1°E  |                  |             |             |             |               |     |      |     |         |         |         |         |  |
| 330°             | 1°W  |                  |             |             |             |               |     |      |     |         |         |         |         |  |
| 315°             | 3°W  |                  |             |             |             |               |     |      |     |         |         |         |         |  |
| 639              | <p>You are keeping ZD +4 on your vessel. On 21 June at 0906 DST, your position is LAT 30°48.0'N, LONG 71°00.0'W. You are on a course of 167°T at 15.2 knots. At what time will local apparent noon (LAN) occur ZT at your vessel? You are keeping DST.</p>   | 1145             | 1202        | 1218        | 1245        |               |     |      |     |         |         |         |         |  |
| 640              | <p>You are off the coast of Mexico and are taking a time tick for 1600. At approximately 1554, you hear the preparatory signal "VVVV de XDD" from the time signal station. Then you hear a series of 1 second dashes followed by a 9 second silent period and then a long 1.3 second dash. At the beginning of the long dash, your comparing watch reads 03h 59m 56s. When compared to the chronometer, the comparing watch reads 04h 01m 22s, and the chronometer reads 04h 02m 11s. What is the chronometer error?</p> | 0m 04s slow      | 2m 15s slow | 0m 45s fast | 1m 26s fast |               |     |      |     |         |         |         |         |  |
| 641              | <p>You are off the coast of Mexico and are taking a time tick for 1800. At approximately 1754, you hear the preparatory signal "VVVV de XDD" from the time signal station. Then you hear a series of 1 second dashes followed by a 9 second silent period and then a long 1.3 second dash. At the beginning of the long dash, your comparing watch reads 06h 00m 07s. When compared to the chronometer, the comparing watch reads 06h 01m 24s, and the chronometer reads 05h 59m 23s. What is the chronometer error?</p> | 0m 07s fast      | 1m 17s fast | 0m 37s slow | 1m 54s slow |               |     |      |     |         |         |         |         |  |

| ID # | Question  | Choice A                      | Choice B                                | Choice C   | Choice D  | Illustrations |
|------|---|-------------------------------|---|--|---|---------------|
| 642  | You are on a great circle track departing from LAT 25°50.0'N, LONG 77°00.0'W and your initial course is 061.7°T. The position of the vertex is LAT 37°35.6'N, LONG 25°57.8'W.<br><br>What is the distance along the great circle track between the point of departure and the vertex?   | 2735.1 miles                  | <b>2664.9 miles</b>                     | 2583.2 miles                                     | 2420.0 miles                                      |               |
| 643  | You are on a great circle track departing from position LAT 25°50'N, LONG 77°00'W. The position of the vertex is LAT 37°35.6'N, LONG 25°57.8'W. The distance along the great circle track from the vertex to a point (X) is 600 miles westward. Determine the position of point (X) on the great circle track.                        | LAT 36°47.5'N, LONG 38°21.8'W | LAT 36°50.4'N, LONG 38°25.6'W           | <b>LAT 36°55.6'N, LONG 38°30.0'W</b>             | LAT 37°02.3'N, LONG 38°34.4'W                     |               |
| 644  | You are on a voyage from Baltimore, MD, to Seattle, WA. The distance from pilot to pilot is 5960 miles. The speed of advance is 16.0 knots. You estimate 16 hours for bunkering at Colon, and 12.0 hours for the Panama Canal transit. If you take departure at 0824 hours (ZD +5), 18 November, what is your ETA (ZD +8) at Seattle? | 1654, 5 December              | 1354, 5 December                        | <b>2154, 4 December</b>                          | 1354, 4 December                                  |               |
| 645  | You are on a voyage from Belem, Brazil, to Mobile, AL. The distance from departure to arrival is 3150 miles. The speed of advance is 14.0 knots. You estimate a layover in San Juan, Puerto Rico, of 17.5 hours. If you took departure at 2200 (ZD +3h 30m), 26 February , what was your ETA (ZD +6) at Mobile?                       | 1900, 8 March                 | <b>2200, 8 March</b>                    | 0400, 9 March                                    | 2200, 9 March                                     |               |
| 646  | You are on a voyage from Boston, MA, to the South Pass, LA. The distance is 1870 miles, and the speed of advance is 13.6 knots. You estimate 16.5 hours for bunkering enroute at Port Everglades, FL. If you sailed at 0836 hours (ZD +5), 26 February , what was your ETA (ZD +6) at the South Pass?                                 | 2336, 3 March                 | 1136, 4 March                           | 1236, 4 March                                    | <b>1736, 4 March</b>                              |               |
| 647  | You are on a voyage from Cape May (LAT 39°50'N, LONG 74°45'W) to the English Channel (LAT 49°00'N, LONG 05°00'W). What will NOT prohibit the use of a great circle track from departure to arrival? (Use gnomonic chart WOXZC5274.)   | Newfoundland                  | Icebergs north of 48°N and west of 49°W | Islands approximately 50 miles south of Cape Cod | <b>The high latitude in which the vertex lies</b> |               |

| ID # | Question  | Choice A   | Choice B  | Choice C   | Choice D  | Illustrations |
|------|---|--|---|--|---|---------------|
| 648  | You are on a voyage from Corpus Christi, TX, to Fort de France, Martinique. The distance from pilot to pilot is 2190 miles (2521 statute miles). The speed of advance is 15.0 knots. You estimate a layover in Charlotte Amalie, Virgin Islands, of 16.0 hours. If you take departure at 0654 (ZD +6), 27 November, what is your ETA (ZD +4) at Fort de France? | 2054, 3 December   | 2254, 3 December  | <b>0254, 4 December</b>  | 2054, 4 December  |               |
| 649  | You are on a voyage from Halifax, Nova Scotia, to Galveston, TX. The distance is 2138 miles, and the speed of advance is 12.5 knots. You estimate 18.0 hours for bunkering enroute at Port Everglades, FL. If you sail at 0648 hours (ZD +4), 12 June, what is your ETA (ZD +5) at Galveston?   | <b>0250, 20 June</b>   | 0350, 20 June   | 0550, 20 June  | 1350, 20 June   |               |
| 650  | You are on a voyage from Limoy, Costa Rica, to Los Angeles, CA. The distance from departure to arrival is 3150 miles. The speed of advance is 14.0 knots. You estimate 24.0 hours for bunkering at Colon, and 12.0 hours for the Panama Canal transit. If you take departure at 1836 hours (ZD +6), 28 January, what is your ETA (ZD +8) at Los Angeles?        | 1736, 9 February   | 1736, 8 February  | <b>1336, 8 February</b>  | 0536, 8 February  |               |
| 651  | You are on a voyage from New York, NY, to San Francisco, CA. The distance from pilot to pilot is 5132 miles. The speed of advance is 13.5 knots. You estimate 32 hours for bunkering at Colon, and 14 hours for the Panama Canal transit. If you take departure at 0600 hours (ZD +4), 16 May, what is your ETA (ZD +7) at San Francisco?                       | 0609, 1 June   | <b>2109, 2 June</b>   | 0009, 3 June   | 0409, 3 June  |               |
| 652  | You are on a voyage from Nome to Honolulu via Unimak Pass (LAT 54°30'N, LONG 164°30'W). The great circle track passes through a point at LAT 38°00'N, LONG 161°40'W. Using gnomonic chart WOXZC5270, determine which answer is TRUE. (The great circle distance, Unimak Pass to Honolulu, is 2013 miles.)   | A great circle track results in a significant savings in distance when compared to a rhumb line. | The northern vertex of the great circle track would lie between Unimak Pass and Nome. | Distance of the great circle track is measured by using the length of degree of latitude at the mid-latitude of the track. | <b>A great circle course would offer no significant advantage because the rhumb line course is close to 180°.</b> |               |

| ID # | Question   | Choice A   | Choice B  | Choice C   | Choice D   | Illustrations |
|------|--|--|---|--|--|---------------|
| 653  | You are on a voyage from San Diego, CA, to New York, NY. The distance from pilot to pilot is 4860 miles. The speed of advance is 15.0 knots. You estimate 18 hours for bunkering at Colon, and 14 hours for the Panama Canal transit. If you take departure at 0836 hours (ZD +7), 4 July, what is your ETA (ZD +4) at New York? | 0336, 20 July  | 0036, 19 July   | 0336, 19 July  | <b>0736, 19 July</b>                                   |               |
| 654  | You are on a voyage from St. John, Canada, to Galveston, TX. The distance is 2280 miles, and the speed of advance is 15.0 knots. You estimate 16.5 hours for bunkering enroute at Ft. Lauderdale, FL. If you sailed at 1642 hours (ZD +4), 27 February , what was your ETA (ZD +6) at Galveston?                                 | <b>1512, 6 March</b>   | 0812, 6 March   | 0712, 6 March  | 2312, 5 March  |               |
| 655  | You are on a voyage from Valdez, AK, to the Panama Canal. The distance from pilot to pilot is 4950 miles. The speed of advance is 15.0 knots. You estimate a layover in San Francisco, CA, of 36.0 hours. If you take departure at 0800 (ZD +10), 29 October, what is your ETA (ZD +5) at the Panama Canal?                      | <b>1900, 13 November</b>   | 1400, 13 November   | 1400, 14 November  | 0900, 13 November                                      |               |
| 656  | You are on a voyage via position LAT 44°00'N, LONG 150°00'E to LAT 46°15'N, LONG 124°00'W. Using gnomonic chart WOXZC 5270, determine which statement is TRUE?   | <b>A composite sailing with a limiting latitude of 51°N will clear the Aleutian Islands.</b> | The northern hemisphere vertex is east of the arrival position. | The Aleutian Islands are not a navigational hazard on the direct great circle track. | The final course angle lies in the northeast quadrant. |               |
| 657  | You are on course 006°T, speed 16.6 knots. At 0516 you see a light bearing 008°T at a range of 10.2. If you change course at 0528 to leave the light abeam to port at 1.0 mile, at what time will the light be abeam?  | <b>0553</b>  | 0556  | 0604   | 0607   |               |
| 658  | You are on course 035°T, speed 18.3 knots. At 0719 you see a buoy bearing 036°T at a range of 4.1. If you change course at 0725 to leave the buoy abeam to port at 1.0 mile, at what time will the buoy be abeam?  | 0740   | 0738  | 0735   | <b>0732</b>  |               |
| 659  | You are on course 061°T, at a speed of 12.4 knots. At 0839 you see a rock bearing 059°T at a range of 4.4 miles. If you change course at 0845 to leave the rock abeam to starboard at 1.5 mile, at what time will the rock be abeam?   | 0854   | <b>0859</b>   | 0903   | 0906   |               |

| ID # | Question  | Choice A  | Choice B  | Choice C   | Choice D   | Illustrations |
|------|---|---|---|--|--|---------------|
| 660  | You are on course 079°T, speed 11.2 knots. At 0904 you see a daymark bearing 078°T at a range of 4.6. If you change course at 0910 to leave the daymark abeam to starboard at 0.5 mile, at what time will the daymark be abeam?                       | 0918  | 0923  | <b>0928</b>  | 0935   |               |
| 661  | You are on course 086°T, speed 11.7 knots. At 1013 you see a buoy bearing 088°T at a range of 4.8 miles. If you change course at 1019 to leave the buoy abeam to port at 1.0 mile, at what time will the buoy be abeam?                               | <b>1037</b>   | 1040  | 1043   | 1052   |               |
| 662  | You are on course 251°pgc and 241° per magnetic compass, when you observe a range in line bearing 192°pgc. The chart indicates that the range is in line on a bearing of 194°T. The variation is 16°E. What is the deviation of the magnetic compass? | 2°E   | 2°W   | <b>4°W</b>   | 10°W   |               |
| 663  | You are planning a voyage between Portland, LAT 46°05'N, LONG 124°00'W, and Korea via LAT 44°00'N, LONG 155°00'E. Which statement is TRUE? (Use gnomonic tracking chart WOXZC 5270)   | You can sail a great circle track between the two points.   | The vertex of the great circle track is north of the Aleutian Islands.                        | Distance is measured in 60-mile segments using the length of a degree of latitude at the mid-latitude. | <b>You can steam on course 270°T, at latitude 52°N, between longitudes 149°W and 160°W in a composite sailing.</b> |               |
| 664  | You are planning a voyage by great circle from LAT 38°00'N, LONG 73°00'W to LAT 49°00'N, LONG 06°00'W. Which of the following statements is TRUE? (Use gnomonic tracking chart WOXZC 5274)  | You will pass to the south of icebergs reported extending to 100 miles south of Cape Race Newfoundland.                                     | <b>The shoals with a 25-mile radius around Sable Island will be a hazard.</b>                 | You will reach the maximum northerly latitude at longitude 29°45'W.                                    | The distance is measured in 60-mile segments using the length of a degree of latitude at the vertex.               |               |
| 665  | You are planning a voyage by great circle from LAT 59°00'N, LONG 07°00'W via LAT 38°00'N, LONG 61°30'W. Which of the following statements is TRUE? (Use gnomonic tracking chart WOXZC 5274)   | You are to the east of the Northern Hemisphere vertex.  | When plotted on a Mercator chart the track line will be concave to Cape Farwell (Kap Farvel). | <b>All courses are in the southwest quadrant of the compass.</b>                                       | Distance is measured by using the length of a degree of latitude at the midpoint of the track line.                |               |
| 666  | You are planning a voyage by great circle from Reykjavik (LAT 63°30'N, LONG 24°00'W) to the Azores (LAT 39°30'N, LONG 29°00'W). Which statement is TRUE? (Use gnomonic tracking chart WOXZC 5274)   | The distance is measured in sixty-mile segments based on the length of a degree of latitude at the mid-latitude and mid-longitude position. | The Northern Hemisphere vertex lies south of Reykjavik.                                       | <b>The great circle track is not appreciably shorter than a rhumb line track.</b>                      | When plotted on a Mercator chart, the great circle track will be convex to the British Isles.                      |               |

| ID # | Question  | Choice A   | Choice B  | Choice C   | Choice D   | Illustrations |
|------|---|--|---|--|--|---------------|
| 667  | You are planning a voyage by great circle from the mouth of the Delaware River (LAT 38°40'N, LONG 75°00'W) to Lisbon, Portugal. Which statement is TRUE? (Use gnomonic tracking chart WOXZC 5274.)                                    | <b>You will reach the northernmost latitude of the voyage in the vicinity of LONG 42°30'W.</b>   | The Northern Hemisphere vertex lies to the east of Lisbon.                    | You must plot a composite sailing to remain south of icebergs reported north of 44°N.                                | The distance is measured in 60-mile segments using the length of the degree of latitude crossed by the track line. |               |
| 668  | You are planning a voyage by great circle to Reykjavik, Iceland, via Cape Race, Newfoundland, LAT 46°30'N, LONG 53°00'W. Which statement is TRUE? (Use gnomonic tracking chart WOXZC 5274)  | The track line will be concave to Cape Farewell (Kap Farvel) when plotted on a Mercator chart.   | <b>You will reach the northernmost latitude in the vicinity of Reykjavik.</b> | The distance is measured using the length of a degree of latitude at the mid-latitude and mid-longitude position.    | The Northern Hemisphere vertex is in the vicinity of 49°W longitude.   |               |
| 669  | You are planning a voyage from Cape May (LAT 38°45'N, LONG 74°45'W) to Lisbon (LAT 38°37'N, LONG 09°45'W). Which of the following is TRUE? (Use gnomonic chart WOXZC 5274)  | Because the latitudes are almost the same, a great circle track approximates a parallel sailing. | <b>The northern hemisphere vertex is approximately at longitude 42°26'W.</b>  | The distance is measured by using the length of one degree of the meridian at the position of the vertex.            | A composite sailing must be plotted to remain south of a limiting latitude of 44°N.                                |               |
| 670  | You are planning a voyage from departure Seattle (LAT 48°30'N, LONG 125°00'W) to a position at LAT 44°00'N, LONG 161°00'E. Which statement is TRUE? (Use gnomonic chart WOXZC 5270.)  | You must plot a composite sailing to remain south of the Aleutians.                              | The northern hemisphere vertex lies to the west of your arrival position.     | <b>Military exercises north of 53°N, between 150°W and 165°W, will not affect your voyage.</b>                       | At your highest latitude, the sun will be visible at upper and lower transit if the voyage occurs on 21 June.      |               |
| 671  | You are planning a voyage from Godthab, Greenland, to Cayenne, French Guiana. Using chart WOXZC 5274, determine which statement is TRUE.  | Godthab is located at the Northern Hemisphere vertex.  | <b>The rhumb line track approximates a great circle track.</b>                | A great circle track will be considerably shorter due to the length of the voyage.                                   | Distance is measured by using the length of meridian at the point of tangency.                                     |               |
| 672  | You are planning a voyage from Jacksonville, FL, to the Strait of Gibraltar. Using chart WOXZC 5274, determine which statement is TRUE.   | All of the courses lie in the northeast quadrant of the compass.                                 | You will be east of the Northern Hemisphere vertex during the entire voyage.  | The great circle track approximates a rhumb line track because there is little difference in the latitudes.          | <b>None of the above are true.</b>   |               |
| 673  | You are planning a voyage from LAT 48°30'N, LONG 125°00'W to Korea via LAT 48°30'N, LONG 153°00'E. Which of the following track lines would you select for the safest and most direct route? (Use gnomonic tracking chart WOXZC 5270) | Parallel sailing along 48°30'N   | Great circle track line between the two points                                | <b>Great circle to LAT 51°00'N, LONG 178°00'W, parallel sailing for 80 miles, then great circle to the via point</b> | Rhumb line track between the two points  |               |
| 674  | You are running coastwise at 14 knots. You sight a lighthouse abeam at 0912. At 0939 the lighthouse is 4 points abaft the beam. What is your distance off at the second bearing?  | 5.5 miles  | 6.3 miles   | 7.8 miles  | <b>8.9 miles</b>   |               |



| ID # | Question  | Choice A  | Choice B         | Choice C          | Choice D         | Illustrations |
|------|---|-----------|------------------|-------------------|------------------|---------------|
| 675  | You are running coastwise in hazy weather; the visibility improves just before you pass a lighthouse abeam. Your speed is 15 knots, and the lighthouse was abeam at 1015. At 1037 the lighthouse is 4 points abaft the beam. What is your distance off at the second bearing? | 3.9 miles | 5.5 miles        | 6.6 miles         | <b>7.8 miles</b> |               |
| 676  | You are running coastwise on a course of 323°T, and you have a buoy bearing 11° on your port bow at a distance of 7 miles. You desire to leave the buoy abeam to port at a distance of 2.5 miles. What course should you steer?   | 291°T     | 312°T            | <b>333°T</b>      | 344°T            |               |
| 677  | You are steaming at 19 knots and burning 440 barrels of fuel per day. You must decrease your consumption to 137 barrels per day. What must you reduce your speed to in order to burn this amount of fuel?   | 18.2      | 14.8             | <b>12.9</b>       | 11.1             |               |
| 678  | You are steaming at 22 knots and burning 319 barrels of fuel per day. You must decrease your consumption to 137 barrels per day. What must you reduce your speed to in order to burn this amount of fuel?   | 12.4      | 14.8             | <b>16.6</b>       | 18.2             |               |
| 679  | You are steaming at 22 knots and burning 319 barrels of fuel per day. You must decrease your consumption to 137 barrels per day. What must you reduce your speed to in order to burn this amount of fuel?   | 12.4      | 14.8             | <b>16.6</b>       | 18.2             |               |
| 680  | You are steaming on a course of 025°T at 15.5 knots. At 0645 you observe a lighthouse bearing 059°T. At 0655 the same lighthouse bears 075°T. What is your distance off at the second bearing?  | 1.5 miles | 2.6 miles        | 4.0 miles         | <b>5.3 miles</b> |               |
| 681  | You are steaming on a course of 058°T at 11.5 knots. At 0209 you observe a lighthouse bearing 129°T. At 0252 the lighthouse bears 173°T. What is your distance off at the second bearing?   | 9.4 miles | 10.7 miles       | <b>11.2 miles</b> | 12.8 miles       |               |
| 682  | You are steaming on a course of 071°T at 19 knots. At 1907 you observe a lighthouse bearing 122°T. At 1915 the lighthouse bears 154°T. What is your distance off at the second bearing?   | 3.4 miles | <b>3.7 miles</b> | 4.0 miles         | 4.3 miles        |               |

| ID # | Question   | Choice A          | Choice B         | Choice C          | Choice D         | Illustrations |
|------|--|-------------------|------------------|-------------------|------------------|---------------|
| 683  | You are steaming on a course of 084°T at a speed of 13 knots. At 1919 a lighthouse bears 106.5°T. At 1957 the same lighthouse bears 129°T. What will be your distance off the lighthouse when abeam? | 4.3 miles         | <b>5.7 miles</b> | 7.1 miles         | 8.2 miles        |               |
| 684  | You are steaming on a course of 114°T at 17 knots. At 1122 you observe a lighthouse bearing 077°T. At 1133 the lighthouse bears 051°T. What is your distance off at the second bearing?              | 3.3 miles         | 3.9 miles        | <b>4.3 miles</b>  | 4.9 miles        |               |
| 685  | You are steaming on a course of 133°T at 16 knots. At 2216 you observe a lighthouse bearing 086°T. At 2223 the lighthouse bears 054°T. What is your distance off at the second bearing?              | 1.7 miles         | 2.0 miles        | 2.3 miles         | <b>2.6 miles</b> |               |
| 686  | You are steaming on a course of 167°T at 19.5 knots. At 1837 you observe a lighthouse bearing 224°T. At 1904 the lighthouse bears 268°T. What is your distance off at the second bearing?            | 8.8 miles         | 9.5 miles        | <b>10.4 miles</b> | 11.3 miles       |               |
| 687  | You are steaming on a course of 198°T at 18.5 knots. At 0316 you observe a lighthouse bearing 235°T. At 0348 the lighthouse bears 259°T. What is your distance off at the second bearing?            | <b>14.8 miles</b> | 15.3 miles       | 15.8 miles        | 16.3 miles       |               |
| 688  | You are steaming on a course of 208°T at 21 knots. At 2019 you observe a lighthouse bearing 129°T. At 2030 the lighthouse bears 103°T. What is your distance off at the second bearing?              | 8.2 miles         | <b>8.6 miles</b> | 8.9 miles         | 9.3 miles        |               |
| 689  | You are steaming on a course of 211°T at 17 knots. At 0417 a light bears 184°T, and at 0428 the same light bears 168°T. What is the distance off the light at 0428?                                  | 3.4 miles         | 4.6 miles        | <b>5.1 miles</b>  | 5.6 miles        |               |
| 690  | You are steaming on a course of 215°T at 14 knots. At 1841 you observe a lighthouse bearing 178°T. At 1904 the same lighthouse bears 156°T. What is your distance off at the second bearing?         | 5.4 miles         | 6.6 miles        | 7.5 miles         | <b>8.7 miles</b> |               |
| 691  | You are steaming on a course of 246°T at 17 knots. At 2107 you observe a lighthouse bearing 207°T. At 2119 the lighthouse bears 179°T. What is your distance off at the second bearing?              | 3.9 miles         | 4.2 miles        | <b>4.6 miles</b>  | 5.1 miles        |               |

| ID # | Question   | Choice A                                      | Choice B                               | Choice C                               | Choice D                               | Illustrations |
|------|--|---|--|--|--|---------------|
| 692  | You are steaming on a course of 253°T at 14 knots. At 2329 you observe a lighthouse bearing 282°T. At 2345 the lighthouse bears 300°T. What is your distance off at the second bearing?  | 3.7 miles                                     | 4.3 miles                              | 5.2 miles                              | <b>5.9 miles</b>                       |               |
| 693  | You are steaming on a course of 267°T at 22 knots. At 0433 you observe a lighthouse bearing 290°T. At 0452 the lighthouse bears 328°T. What is your distance off at the second bearing?  | <b>4.5 nm</b>                                 | 5.9 nm                                 | 6.6 nm                                 | 7.2 nm                                 |               |
| 694  | You are steaming on a course of 327°T at 13 knots. At 0207 you observe a lighthouse bearing 020°T. At 0226 the lighthouse bears 042°T. What is your distance off at the second bearing?  | 8.5 miles                                     | <b>8.9 miles</b>                       | 9.2 miles                              | 9.7 miles                              |               |
| 695  | You are steaming on course 126°T at 14.8 knots. At 1022 you sight a buoy bearing 128°T, at a range of 4.8 miles. If you change course at 1026, what true course will you steer to leave the buoy 0.5 mile abeam to port?                                     | <b>136°</b>                                   | 133°                                   | 122°                                   | 119°                                   |               |
| 696  | You are steaming on course 168°T at a speed of 18 knots. At 1426 you sight a buoy bearing 144°T. At 1435 you sight the same buoy bearing 116°T. What is your distance off at the second bearing and predicted distance when abeam?                           | <b>2.3 miles 2nd bearing, 1.8 miles abeam</b> | 2.5 miles 2nd bearing, 2.8 miles abeam | 2.8 miles 2nd bearing, 1.8 miles abeam | 3.3 miles 2nd bearing, 2.8 miles abeam |               |
| 697  | You are steering 019°T, and a light is picked up dead ahead at a distance of 11.6 miles at 0216. You change course to pass the light 3 miles off abeam to port. If you are making 14 knots, what is your ETA at the position 3 miles off the light?          | 0258  | 0301                                   | <b>0304</b>                            | 0307                                   |               |
| 698  | You are steering 031°T, and a light is picked up dead ahead at a distance of 12.7 miles at 0017. You change course to pass the light 3.5 miles off abeam to starboard. If you are making 11 knots, what is your ETA at the position 3.5 miles off the light? | 0118  | 0121                                   | <b>0124</b>                            | 0127                                   |               |
| 699  | You are steering 078°T, and a light is picked up dead ahead at a distance of 15.6 miles at 2316. You change course to pass the light 4.5 miles off abeam to port. If you are making 17 knots, what is your ETA at the position 4.5 miles off the light?      | 0006  | <b>0009</b>                            | 0012                                   | 0015                                   |               |

| ID # | Question   | Choice A | Choice B | Choice C | Choice D | Illustrations |
|------|--|----------|----------|----------|----------|---------------|
| 700  | You are steering 107°T, and a light is picked up dead ahead at a distance of 11 miles at 0847. You change course to leave the light 3 miles off to starboard. If you are making 15.5 knots, what is your ETA at the position 3 miles off the light?              | 0928     | 0931     | 0934     | 0937     |               |
| 701  | You are steering 115°T, and a light is picked up dead ahead at a distance of 16.7 miles at 0522. You change course to pass the light 3.5 miles off abeam to port. If you are making 12 knots, what is your ETA at the position 3.5 miles off the light?          | 0644     | 0647     | 0650     | 0653     |               |
| 702  | You are steering 125°pgc. The wind is southwest by south causing a 3° leeway. The variation is 6°E, the deviation is 2°W, and the gyro error is 1°W. What is the true course made good?  | 121°T    | 123°T    | 127°T    | 129°T    |               |
| 703  | You are steering 142°pgc to make good your desired course. The gyro error is 1°E. The variation is 8°W. What should you steer by standard magnetic compass to make good the desired course?<br>DEVIATION TABLE<br>MG HDG DEV.<br>120° 4°E<br>135° 2°E<br>150° 0° | 133°psc  | 146°psc  | 148°psc  | 151°psc  |               |
| 704  | You are steering 143°T, and a light is picked up dead ahead at a distance of 18.2 miles at 2006. You change course to pass the light 5.5 miles off abeam to port. If you are making 14.5 knots, what is your ETA at a position 5.5 miles off the light?          | 2115     | 2118     | 2121     | 2124     |               |
| 705  | You are steering 154° per gyrocompass. The wind is northeast by east, causing 4° leeway. The gyro error is 3° east, variation is 11° west, and deviation is 7°E. What is the true course made good?  | 151°T    | 158°T    | 161°T    | 164°T    |               |
| 706  | You are steering 154°pgc. The wind is southwest causing 4° leeway. The gyro error is 3°E, variation is 11°W and deviation is 7°E. What is the true course made good?   | 153°T    | 158°T    | 161°T    | 164°T    |               |

| ID # | Question   | Choice A    | Choice B    | Choice C    | Choice D | Illustrations |
|------|--|-------------|-------------|-------------|----------|---------------|
| 707  | You are steering 163°T, and a light is picked up dead ahead at a distance of 11 miles at 0142. You change course to pass the light 2 miles off abeam to starboard. If you are making 13 knots, what is your ETA at the position 2 miles off the light?     | 0226        | 0229        | <b>0232</b> | 0235     |               |
| 708  | You are steering 173°T, and a light is picked up dead ahead at a distance of 13.9 miles at 0054. You change course to pass the light 4.5 miles off abeam to port. If you are making 21 knots, what is your ETA at the position 4.5 miles off the light?    | 0122        | 0125        | <b>0131</b> | 0134     |               |
| 709  | You are steering 202°T, and a light is picked up dead ahead at a distance of 14.6 miles at 2234. You change course to pass the light 5 miles off abeam to starboard. If you are making 21 knots, what is your ETA at the position 5 miles off the light?   | 2310        | <b>2313</b> | 2316        | 2319     |               |
| 710  | You are steering 231°T, a light is picked up dead ahead at a distance of 12.3 miles at 0338. You change course to pass the light 4 miles off abeam to starboard. If you are making 16.5 knots, what is your ETA at the position 4 miles off the light?     | <b>0420</b> | 0423        | 0426        | 0429     |               |
| 711  | You are steering 246°T, and a light is picked up dead ahead at a distance of 14 miles at 1037. You change course to pass the light 2.5 miles off abeam to port. If you are making 12 knots, what is your ETA at the position 2.5 miles off the light?      | 1143        | <b>1146</b> | 1149        | 1152     |               |
| 712  | You are steering 257°T, and a light is picked up dead ahead at a distance of 13.3 miles at 2016. You change course to pass the light 4 miles off abeam to starboard. If you are making 18.5 knots, what is your ETA at the position 4 miles off the light? | <b>2057</b> | 2100        | 2103        | 2113     |               |
| 713  | You are steering 287°T, and a light is picked up dead ahead at a distance of 19.4 miles at 0419. You change course to pass the light 4 miles off abeam to starboard. If you are making 13 knots, what is your ETA at the position 4 miles off the light?   | 0541        | 0544        | <b>0547</b> | 0550     |               |

| ID # | Question   | Choice A    | Choice B     | Choice C    | Choice D           | Illustrations |
|------|--|-------------|--------------|-------------|--------------------|---------------|
| 714  | You are steering 318°psc. A northeasterly wind causes 3° of leeway. The variation is 14°E and the deviation table is extracted below. What will be the true course made good?<br>DEVIATION TABLE<br>MAG HDG      DEV<br>300°          2°E<br>315°          0°<br>330°          2°W   | 301°T       | 303°T        | 327°T       | <b>329°T</b>       |               |
| 715  | You are steering 349°T, and a light is picked up dead ahead at a distance of 17.2 miles at 2122. You change course to pass the light 4.5 miles off abeam to port. If you are making 19.5 knots, what is your ETA at the position 4.5 miles off the light?  | 2207        | 2210         | <b>2213</b> | 2216               |               |
| 716  | You are steering a course of 240°T, and a lighthouse bears 025° on the starboard bow at 2116. At 2144 the same lighthouse bears 050° on the starboard bow, and you have run 6 miles since the first bearing. What is the ETA when the lighthouse is abeam?   | 2156        | 2159         | <b>2202</b> | 2205               |               |
| 717  | You are steering a course of 316°T, and a light bears 34° on the port bow at 2053. At 2126 the same light bears 68° on the port bow, and you have run 5 miles since the first bearing. What is the ETA when the lighthouse is abeam?   | <b>2139</b> | 2143         | 2149        | 2159               |               |
| 718  | You are steering a magnetic compass course of 075°. The variation for the area is 10°W, and the compass deviation is 5°E. What is the true course you are steering?  | 060°T       | <b>070°T</b> | 080°T       | 090°T              |               |
| 719  | You are taking a time tick using the 1200 signal from Valparaiso, Chile. You hear a series of 1 second dashes followed by a 9 second silent period, then a long 1.3 second dash. At the beginning of the long dash, your comparing watch reads 12h 00m 18s. When compared to the chronometer, the comparing watch reads 12h 01m 23s, and the chronometer reads 11h 59m 35s. What is the chronometer error? | 0m 18s fast | 1m 05s fast  | 0m 25s slow | <b>1m 30s slow</b> |               |

| ID # | Question  | Choice A    | Choice B    | Choice C           | Choice D           | Illustrations |
|------|---|-------------|-------------|--------------------|--------------------|---------------|
| 720  | You are taking a time tick using the 1400 signal from Buenos Aires, Argentina. You hear a 0.4 second dash followed by a series of dots, noting that the 29th and the 56th to 59th dots are omitted. At the start of the following 0.4 second dash (which is followed by an 8 second pulse), the comparing watch reads 01h 59m 57s. When compared to the chronometer, the comparing watch reads 02h 00m 38s, and the chronometer reads 02h 01m 33s. What is the chronometer error? | 0m 03s slow | 0m 41s slow | <b>0m 52s fast</b> | 1m 36s fast        |               |
| 721  | You are taking a time tick using the 1400 signal from Buenos Aires, Argentina. You hear a 0.4 second dash followed by a series of dots, noting that the 29th and the 56th to 59th dots are omitted. At the start of the following 0.4 second dash (which is followed by an 8 second pulse), the comparing watch reads 02h 00m 15s. When compared to the chronometer, the comparing watch reads 02h 01m 29s, and the chronometer reads 01h 59m 50s. What is the chronometer error? | 0m 15s fast | 1m 14s fast | <b>1m 24s slow</b> | 1m 54s slow        |               |
| 722  | You are taking a time tick using the 1930 signal from Rio de Janeiro, Brazil. You hear the preparatory signal "CQ DE PPE" repeated several times followed by a short dash (0.4 sec), 60 dots (0.1 sec each) and another short dash. At the beginning of the last dash, the comparing watch reads 07h 30m 13s. When compared to the chronometer, the comparing watch reads 07h 31m 56s, and the chronometer reads 07h 30m 21s. What is the chronometer error?                      | 0m 13s fast | 1m 43s fast | <b>1m 22s slow</b> | 1m 48s slow        |               |
| 723  | You are taking a time tick using the 1930 signal from Rio de Janeiro, Brazil. You hear the preparatory signal "CQ DE PPE" repeated several times followed by a short dash (0.4 sec), 60 dots (0.1 sec each) and another short dash. At the beginning of the last dash, the comparing watch reads 07h 30m 08s. When compared to the chronometer, the comparing watch reads 07h 31m 48s, and the chronometer reads 07h 32m 16s. What is the chronometer error?                      | 0m 28s slow | 1m 40s slow | 0m 08s fast        | <b>0m 36s fast</b> |               |

| ID # | Question   | Choice A    | Choice B    | Choice C    | Choice D    | Illustrations |
|------|--|-------------|-------------|-------------|-------------|---------------|
| 724  | You are taking a time tick using the 2000 signal from Kekaha-Kauai, Hawaii (WWVH). You hear a series of 1 second dashes followed by a 9 second silent period, then a long 1.3 second dash. At the beginning of the long dash, your comparing watch reads 07h 59m 54s. When compared to the chronometer, the comparing watch reads 08h 00m 00s, and the chronometer reads 08h 00m 06s. What is the chronometer error? | 0m 06s slow | 0m 06s fast | 0m 12s fast | No error    |               |
| 725  | You are taking a time tick using the 2000 signal from Kekaha-Kauai, Hawaii (WWVH). You hear a series of 1 second dashes followed by a 9 second silent period, then a long 1.3 second dash. At the beginning of the long dash, your comparing watch reads 08h 00m 49s. When compared to the chronometer, the comparing watch reads 08h 01m 33s, and the chronometer reads 08h 00m 56s. What is the chronometer error? | 0m 12s fast | 0m 56s fast | 0m 44s slow | 1m 26s slow |               |
| 726  | You are taking a time tick using the 2000 signal from Kekaha-Kauai, Hawaii (WWVH). You hear a series of 1 second dashes followed by a 9 second silent period, then a long 1.3 second dash. At the beginning of the long dash, your comparing watch reads 08h 00m 08s. When compared to the chronometer, the comparing watch reads 08h 01m 15s, and the chronometer reads 07h 59m 55s. What is the chronometer error? | 0m 08s fast | 1m 07s fast | 1m 12s slow | 1m 28s slow |               |
| 727  | You are taking a time tick using the 2000 signal from Kekaha-Kauai, Hawaii (WWVH). You hear a series of 1 second dashes followed by a 9 second silent period, then a long 1.3 second dash. At the beginning of the long dash, your comparing watch reads 08h 00m 12s. When compared to the chronometer, the comparing watch reads 08h 01m 22s, and the chronometer reads 07h 59m 39s. What is the chronometer error? | 0m 12s fast | 1m 10s fast | 0m 21s slow | 1m 31s slow |               |



| ID # | Question  | Choice A    | Choice B    | Choice C    | Choice D    | Illustrations |
|------|---|-------------|-------------|-------------|-------------|---------------|
| 728  | You are taking a time tick using the 2100 signal from Callao, Peru. You hear a series of 1 second dashes followed by a 9 second silent period, then a long 1.3 second dash. At the beginning of the long dash, your comparing watch reads 09h 00m 07s. When compared to the chronometer, the comparing watch reads 09h 01m 12s, and the chronometer reads 08h 59m 32s. What is the chronometer error? | 1m 33s slow | 0m 28s slow | 1m 05s fast | 0m 07s fast |               |
| 729  | You are taking a time tick using the 2100 signal from Callao, Peru. You hear a series of 1 second dashes followed by a 9 second silent period, then a long 1.3 second dash. At the beginning of the long dash, your comparing watch reads 09h 00m 10s. When compared to the chronometer, the comparing watch reads 09h 01m 20s, and the chronometer reads 08h 59m 22s. What is the chronometer error? | 1m 48s slow | 0m 38s slow | 1m 10s fast | 0m 10s fast |               |
| 730  | You are turning 100 RPM, with a propeller pitch of 25 feet, and an estimated slip of -5%. What is the speed of advance?   | 24.7 knots  | 23.5 knots  | 25.9 knots  | 22.3 knots  |               |
| 731  | You are turning 100 RPM, with propeller pitch of 25 feet, and an estimated negative slip of 5%. What is the speed of advance?   | 23.4 knots  | 24.7 knots  | 25.9 knots  | 26.3 knots  |               |
| 732  | You are turning 105 RPM, with a propeller pitch of 17 feet, and an estimated slip of -1%. What is the speed of advance?   | 15.3 knots  | 16.9 knots  | 17.4 knots  | 17.8 knots  |               |
| 733  | You are turning 68 RPM, with a propeller pitch of 18 feet, and an estimated slip of +2%. What is the speed of advance?  | 10.7 knots  | 11.5 knots  | 11.8 knots  | 12.3 knots  |               |
| 734  | You are turning 78 RPM, with a propeller pitch of 21 feet, and an estimated slip of -7%. What is the speed of advance?  | 14.9 knots  | 15.7 knots  | 17.3 knots  | 17.8 knots  |               |
| 735  | You are turning 82 RPM, with a propeller pitch of 23 feet, and an estimated slip of +6%. What is the speed of advance?  | 17.5 knots  | 17.9 knots  | 18.4 knots  | 19.7 knots  |               |
| 736  | You are turning 84 RPM, with a propeller pitch of 22 feet, and an estimated slip of 0%. What is the speed of advance?   | 16.8 knots  | 17.7 knots  | 18.0 knots  | 18.2 knots  |               |
| 737  | You are turning 85 RPM, with a propeller pitch of 19 feet, and an estimated slip of +3%. What is the speed of advance?  | 14.7 knots  | 15.5 knots  | 16.4 knots  | 17.1 knots  |               |
| 738  | You are turning 88 RPM, with a propeller pitch of 19 feet, and an estimated slip of 0%. What is the speed of advance?   | 16.5 knots  | 16.9 knots  | 17.3 knots  | 18.1 knots  |               |

| ID # | Question  | Choice A   | Choice B          | Choice C          | Choice D          | Illustrations |
|------|---|------------|-------------------|-------------------|-------------------|---------------|
| 739  | You are turning 90 RPM, with a propeller pitch of 24 feet, and an estimated slip of -3%. What is the speed of advance?  | 18.8 knots | 19.2 knots        | 20.6 knots        | <b>21.9 knots</b> |               |
| 740  | You are turning 93 RPM, with a propeller pitch of 25 feet, and an estimated slip of 0%. What is the speed of advance?   | 20.2 knots | 21.9 knots        | 22.4 knots        | <b>22.9 knots</b> |               |
| 741  | You are underway and intend to make good a course of 040°T. You experience a current with a set and drift of 190°T at 1.4 knots, and a northwest wind produces a leeway of 3°. You adjust your course to compensate for the current and leeway, while maintaining an engine speed of 10 knots. What will be your speed made good over your intended course of 040°T?  | 7.8 knots  | <b>8.8 knots</b>  | 9.8 knots         | 11.0 knots        |               |
| 742  | You are underway and intend to make good a course of 088°T. You experience a current with a set and drift of 300°T at 2.4 knots, and a southerly wind produces a leeway of 3°. You adjust your course to compensate for the current and leeway, while maintaining an engine speed of 16 knots. What will be your speed made good over your intended course of 088°T?  | 13.4 knots | <b>13.9 knots</b> | 14.4 knots        | 14.9 knots        |               |
| 743  | You are underway and intend to make good a course of 170°T. You experience a current with a set and drift of 050°T at 2.8 knots, and a easterly wind produces a leeway of 3°. You adjust your course to compensate for the current and leeway, while maintaining an engine speed of 18.5 knots. What will be your speed made good over your intended course of 170°T? | 18.5 knots | 18.1 knots        | 17.6 knots        | <b>17.2 knots</b> |               |
| 744  | You are underway and intend to make good a course of 350°T. You experience a current with a set and drift of 070°T at 1.5 knots, and a westerly wind produces a leeway of 4°. You adjust your course to compensate for the current and leeway, while maintaining an engine speed of 10 knots. What will be your speed made good over your intended course of 350°T?   | 9.4 knots  | 9.8 knots         | <b>10.2 knots</b> | 10.6 knots        |               |
| 745  | You are underway on a course of 135°pgc at 15 knots, and you sight a lighthouse dead ahead at a range of 12.5 miles at 1145. What course would you steer to leave the lighthouse 3.0 miles off your port beam?  | 117°pgc    | 121°pgc           | <b>149°pgc</b>    | 154°pgc           |               |

| ID # | Question   | Choice A   | Choice B   | Choice C   | Choice D   | Illustrations |
|------|--|------------|------------|------------|------------|---------------|
| 746  | You are underway on course 000°T at 9.5 knots. The current is 082°T at 1.1 knots. What is the course being made good?  | 007°T      | 009°T      | 021°T      | 353°T      |               |
| 747  | You are underway on course 000°T at 9.5 knots. The current is 082°T at 1.1 knots. What is the speed being made good?   | 9.2 knots  | 9.5 knots  | 9.8 knots  | 10.1 knots |               |
| 748  | You are underway on course 017°T at a speed of 14.2 knots.<br>You sight a buoy bearing 025°T at a radar range of 3.7 miles at 1947. If you change course at 1953, what is the course to steer to leave the buoy abeam to starboard at 0.1 mile?    | 021°T      | 024°T      | 027°T      | 030°T      |               |
| 749  | You are underway on course 059°T at a speed of 13.8 knots.<br>You sight a light bearing 064°T at a radar range of 5.1 miles at 1839. If you change course at 1845, what is the course to steer to leave the light abeam to starboard at 1.0 mile?  | 047°T      | 050°T      | 053°T      | 058°T      |               |
| 750  | You are underway on course 106°T at a speed of 15.3 knots.<br>You sight a buoy bearing 109°T at a radar range of 3.6 miles at 1725. If you change course at 1728, what is the course to steer to leave the buoy abeam to port at 0.5 mile?         | 100°T      | 117°T      | 120°T      | 125°T      |               |
| 751  | You are underway on course 128°T at a speed of 17.6 knots. You sight a daymark bearing 126°T at a radar range of 4.3 miles at 1649. If you change course at 1654, what is the course to steer to leave the daymark abeam to starboard at 0.5 mile? | 113°T      | 116°T      | 119°T      | 136°T      |               |
| 752  | You are underway on course 137°T at a speed of 16.2 knots. You sight a rock bearing 134°T at a radar range of 4.6 miles at 1508. If you change course at 1514, what is the course to steer to leave the rock abeam to port at 1.5 miles?           | 162°T      | 158°T      | 154°T      | 151°T      |               |
| 753  | You are underway on course 160°T at 10 knots. The current is 210°T at 0.9 knots. What is the course made good?   | 156°T      | 160°T      | 164°T      | 169°T      |               |
| 754  | You are underway on course 160°T at 10 knots. The current is 210°T at 0.9 knots. What is the speed being made good?  | 10.7 knots | 11.0 knots | 11.6 knots | 12.3 knots |               |

| ID # | Question   | Choice A   | Choice B   | Choice C   | Choice D   | Illustrations |
|------|--|------------|------------|------------|------------|---------------|
| 755  | You are underway on course 163°T at a speed of 15.8 knots. You sight a buoy bearing 161°T at a radar range of 5.5 miles at 1319. If you change course at 1325, what is the course to steer to leave the buoy abeam to starboard at 1.0 mile?       | 145°T      | 148°T      | 151°T      | 175°T      |               |
| 756  | You are underway on course 172°T at 18.5 knots. The current is 078°T at 2.8 knots. What is the speed being made good?  | 18.5 knots | 19.0 knots | 19.5 knots | 20.0 knots |               |
| 757  | You are underway on course 204°T at a speed of 17.3 knots. You sight a light bearing 205°T at a radar range of 4.7 miles at 1222. If you change course at 1228, what is the course to steer to leave the light abeam to port at 1.5 miles?         | 223°T      | 229°T      | 236°T      | 240°T      |               |
| 758  | You are underway on course 215°T at 12 knots. The current is 000°T at 2.3 knots. What is the course made good?   | 209°T      | 217°T      | 222°T      | 232°T      |               |
| 759  | You are underway on course 215°T at 12 knots. The current is 000°T at 2.3 knots. What is the speed being made good?  | 8.5 knots  | 10.2 knots | 10.9 knots | 11.2 knots |               |
| 760  | You are underway on course 241°T at a speed of 18.2 knots. You sight a daymark bearing 241°T at a radar range of 3.9 miles at 1006. If you change course at 1009, what is the course to steer to leave the daymark abeam to starboard at 1.0 mile? | 218°T      | 222°T      | 257°T      | 260°T      |               |
| 761  | You are underway on course 254°T at a speed of 16.5 knots. You sight a rock bearing 255°T at a radar range of 6.1 miles at 0916. If you change course at 0922, what is the course to steer to leave the rock abeam to starboard at 1.5 miles?      | 268°T      | 239°T      | 236°T      | 233°T      |               |
| 762  | You are underway on course 315°T at 14 knots. The current is 135°T at 1.9 knots. What is the course being made good?   | 130°T      | 315°T      | 317°T      | 322°T      |               |
| 763  | You are underway on course 315°T at 14 knots. The current is 135°T at 1.9 knots. What is the speed being made good?  | 12.1 knots | 13.5 knots | 14.0 knots | 15.9 knots |               |

| ID # | Question   | Choice A                     | Choice B                | Choice C               | Choice D                  | Illustrations |
|------|--|------------------------------|-------------------------|------------------------|---------------------------|---------------|
| 764  | You are underway on course 340°T at a speed of 14.8 knots. You sight a buoy bearing 342°T at a radar range of 4.8 miles at 1422. If you change course at 1428, what is the true course to steer to leave the buoy abeam to port at 1.0 mile? | 327°T                        | 354°T                   | 357°T                  | <b>001°T</b>              |               |
| 765  | You depart LAT 15°48'N, LONG 174°06'E and steam 905 miles on course 090°. What is the LONG of arrival?   | 165°41'W                     | <b>170°13'W</b>         | 172°47'W               | 179°06'E                  |               |
| 766  | You depart LAT 16°24'S, LONG 169°38'W, for LAT 16°24'S, LONG 174°52'E. What are the course and distance by parallel sailing?   | 090°T, 301 miles             | 090°T, 892 miles        | 270°T, 301 miles       | <b>270°T, 892 miles</b>   |               |
| 767  | You depart LAT 22°35.0'N, LONG 157°30.0'W, and steam 4505.0 miles on course 135°T. What are the latitude and longitude of your arrival by Mercator sailing?  | <b>30°30.5'S, 102°35.3'W</b> | 30°30.5'S, 104°30.0'W   | 32°20.0'S, 102°35.3'W  | 32°20.0'S, 104°30.0'W     |               |
| 768  | You depart LAT 25°54'N, LONG 9°38'E and steam 592 miles on course 270°. What is the longitude of arrival?  | 1°20'E                       | 0°40'E                  | 0°40'W                 | <b>1°20'W</b>             |               |
| 769  | You depart LAT 26°03'S, LONG 10°28'E, for LAT 26°03'S, LONG 01°16'W. What are the course and distance by parallel sailing?   | 090°T, 547.2 miles           | 090°T, 632.5 miles      | 270°T, 547.2 miles     | <b>270°T, 632.5 miles</b> |               |
| 770  | You depart LAT 28°55.0'N, LONG 89°10.0'W, enroute to LAT 24°25.0'N, LONG 83°00.0'W. Determine the true course and distance by mid-latitude sailing?  | 418 miles, 122°T             | <b>427 miles, 129°T</b> | 436 miles, 133°T       | 442 miles, 122°T          |               |
| 771  | You depart LAT 32°16.6'N, LONG 68°28.0'W. What is the course and distance as calculated by Mercator sailing to a position at LAT 43°12.2'N, LONG 55°39.0'W?  | <b>042.8°T, 896.2 miles</b>  | 049.1°T, 955.1 miles    | 132.8°T, 896.2 miles   | 136.6°T, 955.1 miles      |               |
| 772  | You depart LAT 33°45.0'N, LONG 118°30.0'W, and steam 2216 miles on course 250°T. What is the longitude of your arrival by Mercator sailing?  | LONG 156°08.0'W              | LONG 156°36.0'W         | LONG 157°21.0'W        | <b>LONG 157°31.0'W</b>    |               |
| 773  | You depart LAT 34°22'S, LONG 18°23'E, and steam 3174 miles on course 282°T. What is the longitude of your arrival by Mercator sailing?   | <b>LONG 40°33.5'W</b>        | LONG 40°19.5'W          | LONG 40°18.2'W         | LONG 40°17.3'W            |               |
| 774  | You depart LAT 37°36'N, LONG 123°00'W, and steam 2022 miles on course 241°T. What is the longitude of your arrival by Mercator sailing?  | LONG 163°28.2'W              | LONG 163°18.2'W         | <b>LONG 156°51.7'W</b> | LONG 154°18.3'W           |               |
| 775  | You depart LAT 38°12'S, LONG 12°06'W and steam 1543 miles on course 270°. What is the Longitude of arrival?  | <b>44°49'W</b>               | 45°12'W                 | 45°37'W                | 45°42'W                   |               |

| ID # | Question   | Choice A                | Choice B                | Choice C                   | Choice D            | Illustrations |
|------|--|-------------------------|-------------------------|----------------------------|---------------------|---------------|
| 776  | You depart LAT 38°14'N, LONG 12°42'W, for LAT 38°14'N, LONG 46°09'W. What are the course and distance by parallel sailing?   | 090°T, 1576.5 miles     | 090°T, 2879.0 miles     | <b>270°T, 1576.5 miles</b> | 270°T, 2868.5 miles |               |
| 777  | You depart LAT 40°42.0'N, LONG 74°01.0'W, and steam 3365.6 miles on course 118°T. What is the longitude of your arrival by Mercator sailing?   | 24°29.0'W               | 22°58.0'W               | <b>17°41.0'W</b>           | 10°46.0'W           |               |
| 778  | You depart LAT 49°38'N, LONG 152°49'E, for LAT 49°38'N, LONG 176°12'E. What are the course and distance by parallel sailing?   | <b>090°T, 909 miles</b> | 090°T, 1204 miles       | 270°T, 909 miles           | 270°T, 1204 miles   |               |
| 779  | You depart LAT 49°45.0'N, LONG 06°35.0'W, and steam 3599 miles on course 246.5°T. What is the longitude of your arrival by Mercator sailing?   | LONG 76°36.2'W          | <b>LONG 77°02.8'W</b>   | LONG 78°14.0'W             | LONG 78°22.6'W      |               |
| 780  | You depart LAT 50°06.0'N, LONG 153°06.0'E and steam 879 miles on course 090°. What is the LONG of arrival?   | <b>175°56.0'E</b>       | 177°24.0'E              | 178°36.0'W                 | 175°04.0'W          |               |
| 781  | You depart LAT 51°48.0'S, LONG 178°35.0'W and steam 179 miles on course 270°. What is the longitude of arrival?  | 173°47'W                | 174°27'E                | <b>176°36'E</b>            | 179°52'W            |               |
| 782  | You depart LAT 52°01'N, LONG 176°09'E, for LAT 52°01'N, LONG 178°46'W. What are the course and distance by parallel sailing?   | 090°T, 95 miles         | <b>090°T, 188 miles</b> | 270°T, 95 miles            | 270°T, 188 miles    |               |
| 783  | You desire to make good 152°T. The magnetic compass deviation is 4°E, the variation is 5°E, and the gyro error is 3°E. A southwesterly wind produces a 4° leeway. Which course would you steer per standard compass to make good the true course?                            | 137°psc                 | 141°psc                 | 143°psc                    | <b>147°psc</b>      |               |
| 784  | You desire to make good a true course of 007°. The variation is 5°E, magnetic compass deviation is 3°W, and gyrocompass error is 2°E. A southwest by west wind produces a 2° leeway. What is the course to steer per standard magnetic compass to make the true course good? | <b>003°psc</b>          | 005°psc                 | 007°psc                    | 009°psc             |               |
| 785  | You desire to make good a true course of 038°. The variation is 5°E, magnetic compass deviation is 4°W, and gyrocompass error is 4°W. A southeasterly wind produces a 4° leeway. What is the course to steer per standard magnetic compass to make the true course good?     | 033°psc                 | <b>041°psc</b>          | 043°psc                    | 047°psc             |               |

| ID # | Question  | Choice A | Choice B | Choice C | Choice D | Illustrations |
|------|---|----------|----------|----------|----------|---------------|
| 786  | You desire to make good a true course of 046°. The variation is 6°E, magnetic compass deviation is 12°W, and the gyrocompass error is 3°W. A northerly wind produces a 5° leeway. What is the course to steer per standard magnetic compass to make good the true course?     | 047°psc  | 049°psc  | 052°psc  | 057°psc  |               |
| 787  | You desire to make good a true course of 067°. The variation is 11°W, magnetic compass deviation is 3°E, and gyrocompass error is 1°W. A northwesterly wind produces a 5° leeway. What is the course to steer per standard magnetic compass to make the true course good?     | 054°psc  | 064°psc  | 070°psc  | 074°psc  |               |
| 788  | You desire to make good a true course of 129°. The variation is 7°E, magnetic compass deviation is 4°E, and gyrocompass error is 2°W. An easterly wind produces a 4° leeway. What is the course to steer per standard magnetic compass to make the true course good?          | 114°psc  | 116°psc  | 122°psc  | 126°psc  |               |
| 789  | You desire to make good a true course of 132°. The variation is 10°W, magnetic compass deviation is 5°E, and gyrocompass error is 5°W. A northeast by east wind produces a 5° leeway. What is the course to steer per standard magnetic compass to make the true course good? | 132°psc  | 135°psc  | 137°psc  | 142°psc  |               |
| 790  | You desire to make good a true course of 157°. The variation is 15°E, magnetic compass deviation is 9°W, and gyrocompass error is 3°E. A southwesterly wind produces a 2° leeway. What is the course to steer per standard magnetic compass to make the true course good?     | 145°psc  | 147°psc  | 150°psc  | 153°psc  |               |
| 791  | You desire to make good a true course of 174°. The variation is 17°W, magnetic compass deviation is 4°W, and gyrocompass error is 4°E. A west-southwest wind produces a 4° leeway. What is the course to steer per standard magnetic compass to make the true course good?    | 195°psc  | 197°psc  | 199°psc  | 203°psc  |               |

| ID # | Question   | Choice A       | Choice B          | Choice C       | Choice D   | Illustrations |
|------|--|----------------|-------------------|----------------|------------|---------------|
| 792  | You desire to make good a true course of 203°. The variation is 19°E, magnetic compass deviation is 2°W, and gyrocompass error is 1°E. A westerly wind produces a 3° leeway. What is the course to steer per standard magnetic compass to make the true course good?                 | 183°psc        | <b>189°psc</b>    | 210°psc        | 223°psc    |               |
| 793  | You desire to make good a true course of 223°. The variation is 2°E, magnetic compass deviation is 2°E, and gyrocompass error is 1°W. An east-southeast wind produces 3° leeway. What is the course to steer per standard magnetic compass to make the true course good?             | 213°psc        | <b>216°psc</b>    | 220°psc        | 223°psc    |               |
| 794  | You desire to make good a true course of 236°. The variation is 8°E, magnetic compass deviation is 1°E, and gyrocompass error is 3°W. A south-southeasterly wind produces a 1° leeway. What is the course to steer per standard magnetic compass (psc) to make the true course good? | <b>226°psc</b> | 228°psc           | 244°psc        | 246°psc    |               |
| 795  | You desire to make good a true course of 279°. The variation is 8°W, magnetic compass deviation is 3°E, and gyrocompass error is 1°E. A north-northwesterly wind produces 3° leeway. What is the course to steer per standard magnetic compass (psc) to make the true course good?   | 281°psc        | 284°psc           | <b>287°psc</b> | 290°psc    |               |
| 796  | You desire to make good a true course of 329°. The variation is 13° W, magnetic compass deviation is 4°E, and gyrocompass error is 2°W. A southerly wind produces a 1° leeway. What is the course to steer per standard magnetic compass to make the true course good?               | 319°psc        | 321°psc           | <b>337°psc</b> | 339°psc    |               |
| 797  | You desire to make good a true course of 347°. The variation is 11°E, magnetic compass deviation is 7°W, and gyrocompass error is 4°W. A north by east wind produces a 4° leeway. What is the course to steer per standard magnetic compass to make the true course good?            | 339°psc        | 343°psc           | <b>347°psc</b> | 351°psc    |               |
| 798  | You have steamed 1124 miles at 21 knots, and consumed 326 tons of fuel. If you have 210 tons of usable fuel remaining, how far can you steam at 17 knots?  | 1096 miles     | <b>1105 miles</b> | 1218 miles     | 1304 miles |               |



| ID # | Question   | Choice A         | Choice B         | Choice C          | Choice D          | Illustrations |
|------|--|------------------|------------------|-------------------|-------------------|---------------|
| 799  | You have steamed 1134 miles at 10 knots, and consumed 121 tons of fuel. If you have to steam 1522 miles to complete the voyage, how many tons of fuel will be consumed while steaming at 12 knots? | 146 tons         | 189 tons         | 200 tons          | <b>234 tons</b>   |               |
| 800  | You have steamed 1175 miles at 19 knots, and consumed 257 tons of fuel. If you have to steam 1341 miles to complete the voyage, how many tons of fuel will be consumed while steaming at 18 knots? | 293 tons         | <b>263 tons</b>  | 202 tons          | 172 tons          |               |
| 801  | You have steamed 1260 miles at 18 knots, and consumed 205 tons of fuel. If you have to steam 1423 miles to complete the voyage, how many tons of fuel will be consumed while steaming at 16 knots? | 143 tons         | 163 tons         | <b>183 tons</b>   | 293 tons          |               |
| 802  | You have steamed 132 miles and consumed 14.0 tons of fuel. If you maintain the same speed, how many tons of fuel will you consume while steaming 289 miles?  | 21.6 tons        | 24.5 tons        | 27.9 tons         | <b>30.7 tons</b>  |               |
| 803  | You have steamed 142 miles and consumed 15.0 tons of fuel. If you maintain the same speed, how many tons of fuel will you consume while steaming 472 miles?  | 36.5 tons        | <b>49.9 tons</b> | 53.8 tons         | 61.4 tons         |               |
| 804  | You have steamed 142 miles and consumed 21.0 tons of fuel. If you maintain the same speed, how many tons of fuel will you consume while steaming 465 miles?  | 43.4 tons        | 57.6 tons        | <b>68.8 tons</b>  | 72.8 tons         |               |
| 805  | You have steamed 150 miles and consumed 17 tons of fuel. If you maintain the same speed, how many tons of fuel will you consume while steaming 350 miles?  | 12.82 tons       | 29.41 tons       | 34.00 tons        | <b>39.66 tons</b> |               |
| 806  | You have steamed 156 miles and consumed 19 tons of fuel. If you maintain the same speed, how many tons of fuel will you consume while steaming 273 miles?  | 23.6 tons        | 27.9 tons        | <b>33.3 tons</b>  | 37.2 tons         |               |
| 807  | You have steamed 1587 miles at 11.2 knots, and have consumed one-half of your total fuel capacity of 2840 bbls. What is the maximum speed you can steam to complete the remaining 1951 miles?      | 9.1 knots        | 9.9 knots        | <b>10.1 knots</b> | 11.6 knots        |               |
| 808  | You have steamed 162 miles and consumed 14.0 tons of fuel. If you maintain the same speed, how many tons of fuel will you consume while steaming 285 miles?  | <b>24.6 tons</b> | 34.7 tons        | 43.3 tons         | 54.8 tons         |               |

| ID # | Question   | Choice A         | Choice B         | Choice C         | Choice D    | Illustrations |
|------|--|------------------|------------------|------------------|-------------|---------------|
| 809  | You have steamed 174 miles and consumed 18.0 tons of fuel. If you maintain the same speed, how many tons of fuel will you consume while steaming 416 miles?  | 34.9 tons        | 38.4 tons        | <b>43.0 tons</b> | 46.2 tons   |               |
| 810  | You have steamed 182 miles and consumed 16.0 tons of fuel. If you maintain the same speed, how many tons of fuel will you consume while steaming 392 miles?  | 28.3 tons        | <b>34.5 tons</b> | 49.6 tons        | 74.2 tons   |               |
| 811  | You have steamed 199 miles and consumed 23.0 tons of fuel. If you maintain the same speed, how many tons of fuel will you consume while steaming 410 miles?  | 32.6 tons        | 39.9 tons        | <b>47.4 tons</b> | 97.6 tons   |               |
| 812  | You have steamed 201 miles and consumed 18.0 tons of fuel. If you maintain the same speed, how many tons of fuel will you consume while steaming 482 miles?  | 25.2 tons        | <b>43.2 tons</b> | 52.6 tons        | 103.5 tons  |               |
| 813  | You have steamed 216 miles and consumed 19.0 tons of fuel. If you maintain the same speed, how many tons of fuel will you consume while steaming 315 miles?  | <b>27.7 tons</b> | 32.3 tons        | 36.9 tons        | 40.4 tons   |               |
| 814  | You have steamed 217 miles and consumed 23.0 tons of fuel. If you maintain the same speed, how many tons of fuel will you consume while steaming 362 miles?  | 33.8 tons        | <b>38.4 tons</b> | 42.6 tons        | 45.7 tons   |               |
| 815  | You have steamed 264 miles and consumed 22.0 tons of fuel. If you maintain the same speed, how many tons of fuel will you consume while steaming 521 miles?  | 31.7 tons        | 38.6 tons        | <b>43.4 tons</b> | 85.7 tons   |               |
| 816  | You have steamed 265 miles and consumed 25.0 tons of fuel. If you maintain the same speed, how many tons of fuel will you consume while steaming 346 miles?  | <b>32.6 tons</b> | 37.4 tons        | 42.6 tons        | 49.5 tons   |               |
| 817  | You have steamed 300 miles and consumed 34 tons of fuel. If you maintain the same speed, how many tons of fuel will you consume while steaming 700 miles?  | <b>79.3 tons</b> | 74.3 tons        | 68.4 tons        | 66.2 tons   |               |
| 818  | You have steamed 369 miles at 16 knots and burning 326 barrels of fuel per day. You must decrease your consumption to 212 barrels per day with 271 miles left in your voyage. What must you reduce your speed (kts) to in order to burn this amount of fuel? | 11.1             | 12.9             | 13.6             | <b>15.1</b> |               |

| ID # | Question   | Choice A    | Choice B    | Choice C    | Choice D | Illustrations |
|------|--|-------------|-------------|-------------|----------|---------------|
| 819  | You have steamed 432 miles at 18 knots and burning 406 barrels of fuel per day. You must decrease your consumption to 221 barrels per day with 190 miles left in your voyage. What must you reduce your speed (kts) to in order to burn this amount of fuel?     | 10.6        | 12.8        | <b>20.0</b> | 22.9     |               |
| 820  | You have steamed 449 miles at 19 knots and burning 476 barrels of fuel per day. You must decrease your consumption to 185 barrels per day with 362 miles left in your voyage. What must you reduce your speed (kts) to in order to burn this amount of fuel?     | <b>13.2</b> | 14.3        | 17.1        | 18.2     |               |
| 821  | You have steamed 463 miles at 19 knots and burning 440 barrels of fuel per day. You must decrease your consumption to 200 barrels per day with 410 miles left in your voyage. What must you reduce your speed (kts) to in order to burn this amount of fuel?     | 12.1        | <b>13.6</b> | 15.2        | 17.5     |               |
| 822  | You have steamed 491 miles at 20 knots and burning 568 barrels of fuel per day. You must decrease your consumption to 265 barrels per day with 313 miles left in your voyage. What must you reduce your speed (kts) to in order to burn this amount of fuel?     | 10.9        | 14.3        | <b>17.1</b> | 18.2     |               |
| 823  | You have steamed 499 miles at 21 knots and are burning 462 barrels of fuel per day. You must decrease your consumption to 221 barrels per day with 311 miles left in your voyage. What must you reduce your speed (kts) to in order to burn this amount of fuel? | 17.3        | <b>18.4</b> | 19.1        | 20.0     |               |
| 824  | You have steamed 504 miles at 21 knots and burning 633 barrels of fuel per day. You must decrease your consumption to 410 barrels per day with 399 miles left in your voyage. What must you reduce your speed (kts) to in order to burn this amount of fuel?     | 20.1        | <b>19.0</b> | 16.2        | 15.0     |               |
| 825  | You have steamed 520 miles at 22 knots and burning 319 barrels of fuel per day. You must decrease your consumption to 137 barrels per day with 410 miles left in your voyage. What must you reduce your speed (kts) to in order to burn this amount of fuel?     | 12.8        | 14.8        | <b>16.2</b> | 18.2     |               |

| ID # | Question   | Choice A          | Choice B          | Choice C         | Choice D          | Illustrations |
|------|--|-------------------|-------------------|------------------|-------------------|---------------|
| 826  | You have steamed 525 miles at 16.0 knots, and consumed 105 tons of fuel. If you have 308 tons of usable fuel remaining, how far can you steam at 19 knots?   | 920 miles         | <b>1092 miles</b> | 1297 miles       | 2172 miles        |               |
| 827  | You have steamed 540 miles at 22 knots and burning 618 barrels of fuel per day. You must decrease your consumption to 372 barrels per day with 299 miles left in your voyage. What must you reduce your speed (kts) to in order to burn this amount of fuel? | <b>22.9</b>       | 20.0              | 19.1             | 17.6              |               |
| 828  | You have steamed 560 miles at 23 knots and burning 524 barrels of fuel per day. You must decrease your consumption to 260 barrels per day with 316 miles left in your voyage. What must you reduce your speed (kts) to in order to burn this amount of fuel? | 16.3              | 18.6              | 19.9             | <b>21.6</b>       |               |
| 829  | You have steamed 607 miles at 17.0 knots, and consumed 121 tons of fuel. If you have 479 tons of usable fuel remaining, how far can you steam at 14.5 knots?   | 1211 miles        | 1748 miles        | 2817 miles       | <b>3303 miles</b> |               |
| 830  | You have steamed 632 miles at 18.5 knots, and consumed 197 tons of fuel. If you have 278 tons of usable fuel remaining, how far can you steam at 15.0 knots?   | 681 miles         | 892 miles         | 1100 miles       | <b>1357 miles</b> |               |
| 831  | You have steamed 726 miles at 17.5 knots, and consumed 138 tons of fuel. If you have 252 tons of usable fuel remaining, how far can you steam at 13.5 knots?   | 789 miles         | 1326 miles        | 1719 miles       | <b>2228 miles</b> |               |
| 832  | You have steamed 746 miles at 14.0 knots, and consumed 152 tons of fuel. If you have 201 tons of usable fuel remaining, how far can you steam at 10 knots?   | 1381 miles        | <b>1934 miles</b> | 2263 miles       | 2707 miles        |               |
| 833  | You have steamed 775 miles at 17 knots, and consumed 145 tons of fuel. If you have to steam 977 miles to complete the voyage, how many tons of fuel will be consumed while steaming at 18 knots?   | <b>204 tons</b>   | 181 tons          | 163 tons         | 129 tons          |               |
| 834  | You have steamed 803 miles at 13 knots, and consumed 179 tons of fuel. If you have 371 tons of usable fuel remaining, how far can you steam at 16 knots?   | <b>1099 miles</b> | 1374 miles        | 1833 miles       | 2581 miles        |               |
| 835  | You have steamed 824 miles at 15.5 knots, and consumed 179 tons of fuel. If you have 221 tons of usable fuel remaining, how far can you steam at 18 knots?   | 495 miles         | 650 miles         | <b>754 miles</b> | 876 miles         |               |

| ID # | Question   | Choice A        | Choice B         | Choice C          | Choice D        | Illustrations |
|------|--|-----------------|------------------|-------------------|-----------------|---------------|
| 836  | You have steamed 836 miles at 14.5 knots, and consumed 191 tons of fuel. If you have 310 tons of usable fuel remaining, how far can you steam at 17 knots?   | 842 miles       | <b>987 miles</b> | 1157 miles        | 1865 miles      |               |
| 837  | You have steamed 916 miles at 13 knots, and consumed 166 tons of fuel. If you have 203 tons of usable fuel remaining, how far can you steam at 14 knots?   | 757 miles       | 841 miles        | <b>966 miles</b>  | 1108 miles      |               |
| 838  | You have steamed 916 miles at 13 knots, and consumed 166 tons of fuel. If you have to steam 1325 miles to complete the voyage, how many tons of fuel will be consumed while steaming at 14 knots?          | 133 tons        | 181 tons         | 207 tons          | <b>278 tons</b> |               |
| 839  | You have steamed 918 miles at 15.0 knots, and consumed 183 tons of fuel. If you have 200 tons of usable fuel remaining, how far can you steam at 12 knots?   | 1021 miles      | 1261 miles       | <b>1568 miles</b> | 1960 miles      |               |
| 840  | You have steamed 925 miles at 13.5 knots, and consumed 181 tons of fuel. If you have 259 tons of usable fuel remaining, how far can you steam at 16 knots?   | 795 miles       | <b>942 miles</b> | 1117 miles        | 1409 miles      |               |
| 841  | You have steamed 989 miles at 16.5 knots, and consumed 215 tons of fuel. If you have 345 tons of usable fuel remaining, how far can you steam at 13 knots?   | 1025 miles      | 1993 miles       | <b>2557 miles</b> | 3245 miles      |               |
| 842  | You must average 16.25 knots to reach port at a designated time. Your propeller has a pitch of 21'08", and you estimate 4% negative slip. How many RPM's must you average to arrive on time?               | <b>73 RPM</b>   | 77 RPM           | 82 RPM            | 88 RPM          |               |
| 843  | You observe the lower limb of the Sun at a sextant altitude (hs) of 22°58.6' on 16 June. The index error is 2.0' off the arc. The height of eye is 61 feet. What is the observed altitude (Ho)?            | <b>23°06.7'</b> | 23°09.9'         | 23°15.4'          | 23°22.2'        |               |
| 844  | You observe the lower limb of the Sun at a sextant altitude (hs) of 24°00.7' on 10 January. The index error is 2.6' off the arc. The height of eye is 55 feet. What is the observed altitude (Ho)?         | 24°07.4'        | 24°08.9'         | <b>24°10.2'</b>   | 24°11.8'        |               |
| 845  | You observe the lower limb of the Sun at a sextant altitude (hs) of 28°24.7' on 17 May. The index error is 1.5' off the arc. The height of eye is 86 feet (26 meters). What is the observed altitude (Ho)? | 28°29.7'        | 28°30.6'         | <b>28°31.5'</b>   | 28°32.9'        |               |

| ID # | Question  | Choice A                            | Choice B                            | Choice C                            | Choice D                            | Illustrations |
|------|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|---------------|
| 846  | You observe the lower limb of the Sun at a sextant altitude (hs) of $31^{\circ}31.5'$ on 6 March. The index error is $2.5'$ on the arc. The height of eye is 76 feet. What is the observed altitude (Ho)?                   | <b><math>31^{\circ}35.3'</math></b> | $31^{\circ}36.7'$                   | $31^{\circ}38.2'$                   | $31^{\circ}39.5'$                   |               |
| 847  | You observe the lower limb of the Sun at a sextant altitude (hs) of $34^{\circ}51.4'$ on 18 October. The index error is $2.0'$ off the arc. The height of eye is 54 feet (16.5 meters). What is the observed altitude (Ho)? | <b><math>35^{\circ}01.2'</math></b> | $35^{\circ}03.6'$                   | $35^{\circ}05.2'$                   | $35^{\circ}07.4'$                   |               |
| 848  | You observe the lower limb of the Sun at a sextant altitude (hs) of $35^{\circ}26.3'$ on 25 June. The index error is $1.5'$ on the arc. The height of eye is 58 feet (17.6 meters). What is the observed altitude (Ho)?     | $35^{\circ}28.2'$                   | $35^{\circ}29.9'$                   | <b><math>35^{\circ}32.1'</math></b> | $35^{\circ}36.7'$                   |               |
| 849  | You observe the lower limb of the Sun at a sextant altitude (hs) of $37^{\circ}47.2'$ on 11 October. The index error is $3.0'$ off the arc. The height of eye is 63 feet (19.2 meters). What is the observed altitude (Ho)? | $37^{\circ}25.2'$                   | $37^{\circ}42.5'$                   | $37^{\circ}51.5'$                   | <b><math>37^{\circ}57.5'</math></b> |               |
| 850  | You observe the lower limb of the Sun at a sextant altitude (hs) of $38^{\circ}07.5'$ on 8 August. The index error is $5.2'$ off the arc. The height of eye is 72 feet (22 meters). What is the observed altitude (Ho)?     | $38^{\circ}08.4'$                   | $38^{\circ}13.3'$                   | <b><math>38^{\circ}19.2'</math></b> | $38^{\circ}23.4'$                   |               |
| 851  | You observe the lower limb of the Sun at a sextant altitude (hs) of $41^{\circ}29.8'$ on 11 January. The index error is $2.4'$ off the arc. The height of eye is 68 feet. What is the observed altitude (Ho)?               | $41^{\circ}36.4'$                   | <b><math>41^{\circ}39.4'</math></b> | $41^{\circ}42.0'$                   | $41^{\circ}44.5'$                   |               |
| 852  | You observe the lower limb of the Sun at a sextant altitude (hs) of $42^{\circ}44.0'$ on 22 June. The index error is $0.8'$ off the arc. The height of eye is 70 feet (21.3 meters). What is the observed altitude (Ho)?    | $42^{\circ}19.8'$                   | $42^{\circ}21.7'$                   | <b><math>42^{\circ}51.7'</math></b> | $42^{\circ}54.2'$                   |               |
| 853  | You observe the lower limb of the Sun at a sextant altitude (hs) of $45^{\circ}49.7'$ on 13 November. The index error is $1.0'$ on the arc. The height of eye is 61 feet (18.6 meters). What is the observed altitude (Ho)? | $45^{\circ}59.3'$                   | <b><math>45^{\circ}56.4'</math></b> | $45^{\circ}52.9'$                   | $45^{\circ}49.8'$                   |               |
| 854  | You observe the lower limb of the Sun at a sextant altitude (hs) of $46^{\circ}20.3'$ on 1 April. The index error is $4.5'$ off the arc. The height of eye is 57 feet (17.4 meters). What is the observed altitude (Ho)?    | $46^{\circ}24.2'$                   | $46^{\circ}27.9'$                   | $46^{\circ}30.1'$                   | <b><math>46^{\circ}32.6'</math></b> |               |

| ID # | Question  | Choice A | Choice B        | Choice C        | Choice D        | Illustrations |
|------|---|----------|-----------------|-----------------|-----------------|---------------|
| 855  | You observe the lower limb of the Sun at a sextant altitude (hs) of 50°26.9' on 9 November. The index error is 1.5' on the arc. The height of eye is 56 feet (17 meters). What is the observed altitude (Ho)? | 50°04.2' | 50°18.1'        | <b>50°33.5'</b> | 50°41.4'        |               |
| 856  | You observe the lower limb of the Sun at a sextant altitude (hs) of 54°28.2' on 22 July. The index error is 1.5' off the arc. The height of eye is 56 feet (17.1 meters). What is the observed altitude (Ho)? | 54°30.9' | 54°36.2'        | <b>54°37.7'</b> | 54°37.9'        |               |
| 857  | You observe the lower limb of the Sun at a sextant altitude (hs) of 58°06.6' on 5 April. The index error is 1.0' off the arc. The height of eye is 55 feet (16.8 meters). What is the observed altitude (Ho)? | 58°14.2' | <b>58°15.8'</b> | 58°16.9'        | 58°18.1'        |               |
| 858  | You observe the lower limb of the Sun at a sextant altitude (hs) of 62°22.2' on 6 June. The index error is 1.2' on the arc. The height of eye is 28 feet (8.5 meters). What is the observed altitude (Ho)?    | 62°24.8' | 62°26.9'        | <b>62°31.4'</b> | 62°36.7'        |               |
| 859  | You observe the lower limb of the Sun at a sextant altitude (hs) of 75°12.3' on 6 August. The index error is 1.5' off the arc. The height of eye is 32 feet (9.8 meters). What is the observed altitude (Ho)? | 75°18.6' | <b>75°24.0'</b> | 75°30.7'        | 75°34.6'        |               |
| 860  | You observe the planet Jupiter at a sextant altitude (hs) of 66°27.6' on 26 May. The index error is 5.2' on the arc. The height of eye is 52 feet. What is the observed altitude (Ho)?                        | 65°39.5' | 65°32.8'        | 66°27.2'        | <b>66°15.0'</b> |               |
| 861  | You observe the planet Saturn at a sextant altitude (hs) of 63°05.1' on 25 May. The index error is 4.5' off the arc. The height of eye is 62 feet. What is the observed altitude (Ho)?                        | 63°00.6' | <b>63°01.5'</b> | 63°02.9'        | 63°04.1'        |               |
| 862  | You observe the star Antares at a sextant altitude (hs) of 38°18.7' on 28 February. The index error is 2.4' on the arc. The height of eye is 40 feet (12.2 meters). What is the observed altitude (Ho)?       | 38°07.5' | <b>38°09.0'</b> | 38°10.5'        | 38°12.5'        |               |
| 863  | You observe the star Deneb at a sextant altitude (hs) of 48°34.8' on 16 December. The index error is 4.0' off the arc. The height of eye is 58 feet. What is the observed altitude (Ho)?                      | 48°02.9' | <b>48°30.5'</b> | 48°31.4'        | 48°46.5'        |               |

| ID # | Question   | Choice A         | Choice B                | Choice C         | Choice D         | Illustrations |
|------|--|------------------|-------------------------|------------------|------------------|---------------|
| 864  | You receive a distress call from a vessel reporting her position as LAT 30°21'N, LONG 88°34'W. Your position is LAT 24°30'N, LONG 83°00'W. Determine the true course and distance to the distress scene by Mercator sailing.   | 317°T, 470 miles | <b>320°T, 460 miles</b> | 322°T, 455 miles | 324°T, 460 miles |               |
| 865  | You sight a light 9° on your starboard bow at a distance of 21 miles. Assuming you make good your course, what will be your distance off the light when abeam?   | <b>3.3 miles</b> | 3.7 miles               | 4.0 miles        | 4.3 miles        |               |
| 866  | You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°E. The variation is 8°W. Find the deviation on a gyro heading of 037°. <p>HEADING HEADING HEADING<br/>PSC PGC PSC PGC PSC PGC<br/>358.5° - 350° 122.5° - 110° 239.5° - 230°<br/>030.5° - 020° 152.0° - 140° 269.0° - 260°<br/>061.5° - 050° 181.0° - 170° 298.0° - 290°<br/>092.0° - 080° 210.0° - 200° 327.5° - 320°</p> | <b>1.0°W</b>     | 1.5°W                   | 1.5°E            | 2.0°E            |               |
| 867  | You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°E. The variation is 8°W. Find the deviation on a gyro heading of 166°. <p>HEADING HEADING HEADING<br/>PSC PGC PSC PGC PSC PGC<br/>358.5° - 350° 122.5° - 110° 239.5° - 230°<br/>030.5° - 020° 152.0° - 140° 269.0° - 260°<br/>061.5° - 050° 181.0° - 170° 298.0° - 290°<br/>092.0° - 080° 210.0° - 200° 327.5° - 320°</p> | <b>1.0°W</b>     | 1.0°E                   | 0.5°W            | 0.5°E            |               |
| 868  | You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°E. The variation is 8°W. Find the deviation on a gyro heading of 196°. <p>HEADING HEADING HEADING<br/>PSC PGC PSC PGC PSC PGC<br/>358.5° - 350° 122.5° - 110° 239.5° - 230°<br/>030.5° - 020° 152.0° - 140° 269.0° - 260°<br/>061.5° - 050° 181.0° - 170° 298.0° - 290°<br/>092.0° - 080° 210.0° - 200° 327.5° - 320°</p> | 2.0°E            | 2.0°W                   | 1.0°W            | <b>0.0°</b>      |               |



| ID #          | Question   | Choice A      | Choice B | Choice C | Choice D | Illustrations |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
|---------------|--|---------------|----------|----------|----------|---------------|---------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------|-------|-------|-------|--|
| 869           | <p>You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°E. The variation is 8°W. Find the deviation on a magnetic compass heading of 057°.</p> <table border="0"> <tr> <td>HEADING</td> <td>HEADING</td> <td>HEADING</td> </tr> <tr> <td>PSC PGC</td> <td>PSC PGC</td> <td>PSC PGC</td> </tr> <tr> <td>358.5° - 350°</td> <td>122.5° - 110°</td> <td>239.5° - 230°</td> </tr> <tr> <td>030.5° - 020°</td> <td>152.0° - 140°</td> <td>269.0° - 260°</td> </tr> <tr> <td>061.5° - 050°</td> <td>181.0° - 170°</td> <td>298.0° - 290°</td> </tr> <tr> <td>092.0° - 080°</td> <td>210.0° - 200°</td> <td>327.5° - 320°</td> </tr> </table> | HEADING       | HEADING  | HEADING  | PSC PGC  | PSC PGC       | PSC PGC | 358.5° - 350° | 122.5° - 110° | 239.5° - 230° | 030.5° - 020° | 152.0° - 140° | 269.0° - 260° | 061.5° - 050° | 181.0° - 170° | 298.0° - 290° | 092.0° - 080° | 210.0° - 200° | 327.5° - 320° | 1.0°E | 1.5°E | 1.5°W | 0.5°W |  |
| HEADING       | HEADING  | HEADING       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| PSC PGC       | PSC PGC  | PSC PGC       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 358.5° - 350° | 122.5° - 110°  | 239.5° - 230° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 030.5° - 020° | 152.0° - 140°  | 269.0° - 260° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 061.5° - 050° | 181.0° - 170°  | 298.0° - 290° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 092.0° - 080° | 210.0° - 200°  | 327.5° - 320° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 870           | <p>You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°E. The variation is 8°W. Find the deviation on a magnetic compass heading of 104°.</p> <table border="0"> <tr> <td>HEADING</td> <td>HEADING</td> <td>HEADING</td> </tr> <tr> <td>PSC PGC</td> <td>PSC PGC</td> <td>PSC PGC</td> </tr> <tr> <td>358.5° - 350°</td> <td>122.5° - 110°</td> <td>239.5° - 230°</td> </tr> <tr> <td>030.5° - 020°</td> <td>152.0° - 140°</td> <td>269.0° - 260°</td> </tr> <tr> <td>061.5° - 050°</td> <td>181.0° - 170°</td> <td>298.0° - 290°</td> </tr> <tr> <td>092.0° - 080°</td> <td>210.0° - 200°</td> <td>327.5° - 320°</td> </tr> </table> | HEADING       | HEADING  | HEADING  | PSC PGC  | PSC PGC       | PSC PGC | 358.5° - 350° | 122.5° - 110° | 239.5° - 230° | 030.5° - 020° | 152.0° - 140° | 269.0° - 260° | 061.5° - 050° | 181.0° - 170° | 298.0° - 290° | 092.0° - 080° | 210.0° - 200° | 327.5° - 320° | 1.8°E | 2.6°E | 2.2°W | 2.7°W |  |
| HEADING       | HEADING  | HEADING       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| PSC PGC       | PSC PGC  | PSC PGC       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 358.5° - 350° | 122.5° - 110°  | 239.5° - 230° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 030.5° - 020° | 152.0° - 140°  | 269.0° - 260° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 061.5° - 050° | 181.0° - 170°  | 298.0° - 290° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 092.0° - 080° | 210.0° - 200°  | 327.5° - 320° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 871           | <p>You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°E. The variation is 8°W. Find the deviation on a magnetic compass heading of 143°.</p> <table border="0"> <tr> <td>HEADING</td> <td>HEADING</td> <td>HEADING</td> </tr> <tr> <td>PSC PGC</td> <td>PSC PGC</td> <td>PSC PGC</td> </tr> <tr> <td>358.5° - 350°</td> <td>122.5° - 110°</td> <td>239.5° - 230°</td> </tr> <tr> <td>030.5° - 020°</td> <td>152.0° - 140°</td> <td>269.0° - 260°</td> </tr> <tr> <td>061.5° - 050°</td> <td>181.0° - 170°</td> <td>298.0° - 290°</td> </tr> <tr> <td>092.0° - 080°</td> <td>210.0° - 200°</td> <td>327.5° - 320°</td> </tr> </table> | HEADING       | HEADING  | HEADING  | PSC PGC  | PSC PGC       | PSC PGC | 358.5° - 350° | 122.5° - 110° | 239.5° - 230° | 030.5° - 020° | 152.0° - 140° | 269.0° - 260° | 061.5° - 050° | 181.0° - 170° | 298.0° - 290° | 092.0° - 080° | 210.0° - 200° | 327.5° - 320° | 2.0°W | 1.5°W | 0.5°W | 0.0°  |  |
| HEADING       | HEADING  | HEADING       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| PSC PGC       | PSC PGC  | PSC PGC       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 358.5° - 350° | 122.5° - 110°  | 239.5° - 230° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 030.5° - 020° | 152.0° - 140°  | 269.0° - 260° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 061.5° - 050° | 181.0° - 170°  | 298.0° - 290° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 092.0° - 080° | 210.0° - 200°  | 327.5° - 320° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 872           | <p>You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°E. The variation is 8°W. Find the deviation on a magnetic compass heading of 234°.</p> <table border="0"> <tr> <td>HEADING</td> <td>HEADING</td> <td>HEADING</td> </tr> <tr> <td>PSC PGC</td> <td>PSC PGC</td> <td>PSC PGC</td> </tr> <tr> <td>358.5° - 350°</td> <td>122.5° - 110°</td> <td>239.5° - 230°</td> </tr> <tr> <td>030.5° - 020°</td> <td>152.0° - 140°</td> <td>269.0° - 260°</td> </tr> <tr> <td>061.5° - 050°</td> <td>181.0° - 170°</td> <td>298.0° - 290°</td> </tr> <tr> <td>092.0° - 080°</td> <td>210.0° - 200°</td> <td>327.5° - 320°</td> </tr> </table> | HEADING       | HEADING  | HEADING  | PSC PGC  | PSC PGC       | PSC PGC | 358.5° - 350° | 122.5° - 110° | 239.5° - 230° | 030.5° - 020° | 152.0° - 140° | 269.0° - 260° | 061.5° - 050° | 181.0° - 170° | 298.0° - 290° | 092.0° - 080° | 210.0° - 200° | 327.5° - 320° | 2.5°W | 2.5°E | 1.0°W | 0.5°E |  |
| HEADING       | HEADING  | HEADING       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| PSC PGC       | PSC PGC  | PSC PGC       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 358.5° - 350° | 122.5° - 110°  | 239.5° - 230° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 030.5° - 020° | 152.0° - 140°  | 269.0° - 260° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 061.5° - 050° | 181.0° - 170°  | 298.0° - 290° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 092.0° - 080° | 210.0° - 200°  | 327.5° - 320° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |

| ID #          | Question   | Choice A      | Choice B | Choice C | Choice D | Illustrations |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
|---------------|--|---------------|----------|----------|----------|---------------|---------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------|-------|-------|-------|--|
| 873           | <p>You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°E. The variation is 8°W. Find the deviation on a true heading of 258°.</p> <table border="0"> <tr> <td>HEADING</td> <td>HEADING</td> <td>HEADING</td> </tr> <tr> <td>PSC PGC</td> <td>PSC PGC</td> <td>PSC PGC</td> </tr> <tr> <td>358.5° - 350°</td> <td>122.5° - 110°</td> <td>239.5° - 230°</td> </tr> <tr> <td>030.5° - 020°</td> <td>152.0° - 140°</td> <td>269.0° - 260°</td> </tr> <tr> <td>061.5° - 050°</td> <td>181.0° - 170°</td> <td>298.0° - 290°</td> </tr> <tr> <td>092.0° - 080°</td> <td>210.0° - 200°</td> <td>327.5° - 320°</td> </tr> </table>             | HEADING       | HEADING  | HEADING  | PSC PGC  | PSC PGC       | PSC PGC | 358.5° - 350° | 122.5° - 110° | 239.5° - 230° | 030.5° - 020° | 152.0° - 140° | 269.0° - 260° | 061.5° - 050° | 181.0° - 170° | 298.0° - 290° | 092.0° - 080° | 210.0° - 200° | 327.5° - 320° | 0.5°W | 0.0°  | 0.5°E | 1.0°E |  |
| HEADING       | HEADING  | HEADING       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| PSC PGC       | PSC PGC  | PSC PGC       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 358.5° - 350° | 122.5° - 110°  | 239.5° - 230° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 030.5° - 020° | 152.0° - 140°  | 269.0° - 260° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 061.5° - 050° | 181.0° - 170°  | 298.0° - 290° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 092.0° - 080° | 210.0° - 200°  | 327.5° - 320° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 874           | <p>You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°W. The variation is 8°W. Find the deviation on a gyro heading of 039°.</p> <table border="0"> <tr> <td>HEADING</td> <td>HEADING</td> <td>HEADING</td> </tr> <tr> <td>PSC PGC</td> <td>PSC PGC</td> <td>PSC PGC</td> </tr> <tr> <td>358.5° - 354°</td> <td>122.5° - 114°</td> <td>239.5° - 234°</td> </tr> <tr> <td>030.5° - 024°</td> <td>152.0° - 144°</td> <td>269.0° - 264°</td> </tr> <tr> <td>061.5° - 054°</td> <td>181.0° - 174°</td> <td>298.0° - 294°</td> </tr> <tr> <td>092.0° - 084°</td> <td>210.0° - 204°</td> <td>327.5° - 324°</td> </tr> </table>             | HEADING       | HEADING  | HEADING  | PSC PGC  | PSC PGC       | PSC PGC | 358.5° - 354° | 122.5° - 114° | 239.5° - 234° | 030.5° - 024° | 152.0° - 144° | 269.0° - 264° | 061.5° - 054° | 181.0° - 174° | 298.0° - 294° | 092.0° - 084° | 210.0° - 204° | 327.5° - 324° | 0.8°E | 0.0°  | 0.5°W | 1.0°W |  |
| HEADING       | HEADING  | HEADING       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| PSC PGC       | PSC PGC  | PSC PGC       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 358.5° - 354° | 122.5° - 114°  | 239.5° - 234° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 030.5° - 024° | 152.0° - 144°  | 269.0° - 264° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 061.5° - 054° | 181.0° - 174°  | 298.0° - 294° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 092.0° - 084° | 210.0° - 204°  | 327.5° - 324° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 875           | <p>You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°W. The variation is 8°W. Find the deviation on a gyro heading of 058°.</p> <table border="0"> <tr> <td>HEADING</td> <td>HEADING</td> <td>HEADING</td> </tr> <tr> <td>PSC PGC</td> <td>PSC PGC</td> <td>PSC PGC</td> </tr> <tr> <td>358.5° - 354°</td> <td>122.5° - 114°</td> <td>239.5° - 234°</td> </tr> <tr> <td>030.5° - 024°</td> <td>152.0° - 144°</td> <td>269.0° - 264°</td> </tr> <tr> <td>061.5° - 054°</td> <td>181.0° - 174°</td> <td>298.0° - 294°</td> </tr> <tr> <td>092.0° - 084°</td> <td>210.0° - 204°</td> <td>327.5° - 324°</td> </tr> </table>             | HEADING       | HEADING  | HEADING  | PSC PGC  | PSC PGC       | PSC PGC | 358.5° - 354° | 122.5° - 114° | 239.5° - 234° | 030.5° - 024° | 152.0° - 144° | 269.0° - 264° | 061.5° - 054° | 181.0° - 174° | 298.0° - 294° | 092.0° - 084° | 210.0° - 204° | 327.5° - 324° | 1.5°W | 1.0°W | 1.0°E | 0.5°W |  |
| HEADING       | HEADING  | HEADING       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| PSC PGC       | PSC PGC  | PSC PGC       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 358.5° - 354° | 122.5° - 114°  | 239.5° - 234° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 030.5° - 024° | 152.0° - 144°  | 269.0° - 264° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 061.5° - 054° | 181.0° - 174°  | 298.0° - 294° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 092.0° - 084° | 210.0° - 204°  | 327.5° - 324° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 876           | <p>You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°W. The variation is 8°W. Find the deviation on a magnetic compass heading of 004°.</p> <table border="0"> <tr> <td>HEADING</td> <td>HEADING</td> <td>HEADING</td> </tr> <tr> <td>PSC PGC</td> <td>PSC PGC</td> <td>PSC PGC</td> </tr> <tr> <td>358.5° - 354°</td> <td>122.5° - 114°</td> <td>239.5° - 234°</td> </tr> <tr> <td>030.5° - 024°</td> <td>152.0° - 144°</td> <td>269.0° - 264°</td> </tr> <tr> <td>061.5° - 054°</td> <td>181.0° - 174°</td> <td>298.0° - 294°</td> </tr> <tr> <td>092.0° - 084°</td> <td>210.0° - 204°</td> <td>327.5° - 324°</td> </tr> </table> | HEADING       | HEADING  | HEADING  | PSC PGC  | PSC PGC       | PSC PGC | 358.5° - 354° | 122.5° - 114° | 239.5° - 234° | 030.5° - 024° | 152.0° - 144° | 269.0° - 264° | 061.5° - 054° | 181.0° - 174° | 298.0° - 294° | 092.0° - 084° | 210.0° - 204° | 327.5° - 324° | 1.5°W | 0.5°W | 0.0°  | 1.0°E |  |
| HEADING       | HEADING  | HEADING       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| PSC PGC       | PSC PGC  | PSC PGC       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 358.5° - 354° | 122.5° - 114°  | 239.5° - 234° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 030.5° - 024° | 152.0° - 144°  | 269.0° - 264° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 061.5° - 054° | 181.0° - 174°  | 298.0° - 294° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 092.0° - 084° | 210.0° - 204°  | 327.5° - 324° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |

| ID #          | Question   | Choice A      | Choice B | Choice C | Choice D | Illustrations |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
|---------------|--|---------------|----------|----------|----------|---------------|---------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------|-------|-------|-------|--|
| 877           | <p>You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°W. The variation is 8°W. Find the deviation on a magnetic compass heading of 022°.</p> <table border="0"> <tr> <td>HEADING</td> <td>HEADING</td> <td>HEADING</td> </tr> <tr> <td>PSC PGC</td> <td>PSC PGC</td> <td>PSC PGC</td> </tr> <tr> <td>358.5° - 354°</td> <td>122.5° - 114°</td> <td>239.5° - 234°</td> </tr> <tr> <td>030.5° - 024°</td> <td>152.0° - 144°</td> <td>269.0° - 264°</td> </tr> <tr> <td>061.5° - 054°</td> <td>181.0° - 174°</td> <td>298.0° - 294°</td> </tr> <tr> <td>092.0° - 084°</td> <td>210.0° - 204°</td> <td>327.5° - 324°</td> </tr> </table> | HEADING       | HEADING  | HEADING  | PSC PGC  | PSC PGC       | PSC PGC | 358.5° - 354° | 122.5° - 114° | 239.5° - 234° | 030.5° - 024° | 152.0° - 144° | 269.0° - 264° | 061.5° - 054° | 181.0° - 174° | 298.0° - 294° | 092.0° - 084° | 210.0° - 204° | 327.5° - 324° | 1.5°E | 0.5°E | 0.0°  | 0.5°W |  |
| HEADING       | HEADING  | HEADING       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| PSC PGC       | PSC PGC  | PSC PGC       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 358.5° - 354° | 122.5° - 114°  | 239.5° - 234° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 030.5° - 024° | 152.0° - 144°  | 269.0° - 264° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 061.5° - 054° | 181.0° - 174°  | 298.0° - 294° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 092.0° - 084° | 210.0° - 204°  | 327.5° - 324° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 878           | <p>You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°W. The variation is 8°W. Find the deviation on a magnetic compass heading of 166°.</p> <table border="0"> <tr> <td>HEADING</td> <td>HEADING</td> <td>HEADING</td> </tr> <tr> <td>PSC PGC</td> <td>PSC PGC</td> <td>PSC PGC</td> </tr> <tr> <td>358.5° - 354°</td> <td>122.5° - 114°</td> <td>239.5° - 234°</td> </tr> <tr> <td>030.5° - 024°</td> <td>152.0° - 144°</td> <td>269.0° - 264°</td> </tr> <tr> <td>061.5° - 054°</td> <td>181.0° - 174°</td> <td>298.0° - 294°</td> </tr> <tr> <td>092.0° - 084°</td> <td>210.0° - 204°</td> <td>327.5° - 324°</td> </tr> </table> | HEADING       | HEADING  | HEADING  | PSC PGC  | PSC PGC       | PSC PGC | 358.5° - 354° | 122.5° - 114° | 239.5° - 234° | 030.5° - 024° | 152.0° - 144° | 269.0° - 264° | 061.5° - 054° | 181.0° - 174° | 298.0° - 294° | 092.0° - 084° | 210.0° - 204° | 327.5° - 324° | 2.0°W | 1.5°W | 1.0°W | 0.5°W |  |
| HEADING       | HEADING  | HEADING       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| PSC PGC       | PSC PGC  | PSC PGC       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 358.5° - 354° | 122.5° - 114°  | 239.5° - 234° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 030.5° - 024° | 152.0° - 144°  | 269.0° - 264° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 061.5° - 054° | 181.0° - 174°  | 298.0° - 294° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 092.0° - 084° | 210.0° - 204°  | 327.5° - 324° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 879           | <p>You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°W. The variation is 8°W. Find the deviation on a magnetic compass heading of 210°.</p> <table border="0"> <tr> <td>HEADING</td> <td>HEADING</td> <td>HEADING</td> </tr> <tr> <td>PSC PGC</td> <td>PSC PGC</td> <td>PSC PGC</td> </tr> <tr> <td>358.5° - 354°</td> <td>122.5° - 114°</td> <td>239.5° - 234°</td> </tr> <tr> <td>030.5° - 024°</td> <td>152.0° - 144°</td> <td>269.0° - 264°</td> </tr> <tr> <td>061.5° - 054°</td> <td>181.0° - 174°</td> <td>298.0° - 294°</td> </tr> <tr> <td>092.0° - 084°</td> <td>210.0° - 204°</td> <td>327.5° - 324°</td> </tr> </table> | HEADING       | HEADING  | HEADING  | PSC PGC  | PSC PGC       | PSC PGC | 358.5° - 354° | 122.5° - 114° | 239.5° - 234° | 030.5° - 024° | 152.0° - 144° | 269.0° - 264° | 061.5° - 054° | 181.0° - 174° | 298.0° - 294° | 092.0° - 084° | 210.0° - 204° | 327.5° - 324° | 0.0°  | 0.5°W | 0.5°E | 1.0°E |  |
| HEADING       | HEADING  | HEADING       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| PSC PGC       | PSC PGC  | PSC PGC       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 358.5° - 354° | 122.5° - 114°  | 239.5° - 234° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 030.5° - 024° | 152.0° - 144°  | 269.0° - 264° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 061.5° - 054° | 181.0° - 174°  | 298.0° - 294° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 092.0° - 084° | 210.0° - 204°  | 327.5° - 324° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 880           | <p>You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°W. The variation is 8°W. Find the deviation on a true heading of 157°.</p> <table border="0"> <tr> <td>HEADING</td> <td>HEADING</td> <td>HEADING</td> </tr> <tr> <td>PSC PGC</td> <td>PSC PGC</td> <td>PSC PGC</td> </tr> <tr> <td>358.5° - 354°</td> <td>122.5° - 114°</td> <td>239.5° - 234°</td> </tr> <tr> <td>030.5° - 024°</td> <td>152.0° - 144°</td> <td>269.0° - 264°</td> </tr> <tr> <td>061.5° - 054°</td> <td>181.0° - 174°</td> <td>298.0° - 294°</td> </tr> <tr> <td>092.0° - 084°</td> <td>210.0° - 204°</td> <td>327.5° - 324°</td> </tr> </table>             | HEADING       | HEADING  | HEADING  | PSC PGC  | PSC PGC       | PSC PGC | 358.5° - 354° | 122.5° - 114° | 239.5° - 234° | 030.5° - 024° | 152.0° - 144° | 269.0° - 264° | 061.5° - 054° | 181.0° - 174° | 298.0° - 294° | 092.0° - 084° | 210.0° - 204° | 327.5° - 324° | 2.0°W | 1.5°W | 1.0°W | 0.0°  |  |
| HEADING       | HEADING  | HEADING       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| PSC PGC       | PSC PGC  | PSC PGC       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 358.5° - 354° | 122.5° - 114°  | 239.5° - 234° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 030.5° - 024° | 152.0° - 144°  | 269.0° - 264° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 061.5° - 054° | 181.0° - 174°  | 298.0° - 294° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 092.0° - 084° | 210.0° - 204°  | 327.5° - 324° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |

| ID #          | Question   | Choice A      | Choice B | Choice C | Choice D | Illustrations |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
|---------------|--|---------------|----------|----------|----------|---------------|---------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------|-------|-------|-------|--|
| 881           | <p>You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°W. The variation is 8°W. Find the deviation on a true heading of 236°.</p> <table border="0"> <tr> <td>HEADING</td> <td>HEADING</td> <td>HEADING</td> </tr> <tr> <td>PSC PGC</td> <td>PSC PGC</td> <td>PSC PGC</td> </tr> <tr> <td>358.5° - 354°</td> <td>122.5° - 114°</td> <td>239.5° - 234°</td> </tr> <tr> <td>030.5° - 024°</td> <td>152.0° - 144°</td> <td>269.0° - 264°</td> </tr> <tr> <td>061.5° - 054°</td> <td>181.0° - 174°</td> <td>298.0° - 294°</td> </tr> <tr> <td>092.0° - 084°</td> <td>210.0° - 204°</td> <td>327.5° - 324°</td> </tr> </table> | HEADING       | HEADING  | HEADING  | PSC PGC  | PSC PGC       | PSC PGC | 358.5° - 354° | 122.5° - 114° | 239.5° - 234° | 030.5° - 024° | 152.0° - 144° | 269.0° - 264° | 061.5° - 054° | 181.0° - 174° | 298.0° - 294° | 092.0° - 084° | 210.0° - 204° | 327.5° - 324° | 1.0°W | 0.5°E | 1.5°E | 0.0°  |  |
| HEADING       | HEADING  | HEADING       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| PSC PGC       | PSC PGC  | PSC PGC       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 358.5° - 354° | 122.5° - 114°  | 239.5° - 234° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 030.5° - 024° | 152.0° - 144°  | 269.0° - 264° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 061.5° - 054° | 181.0° - 174°  | 298.0° - 294° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 092.0° - 084° | 210.0° - 204°  | 327.5° - 324° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 882           | <p>You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°W. The variation is 8°W. Find the deviation on a true heading of 319°.</p> <table border="0"> <tr> <td>HEADING</td> <td>HEADING</td> <td>HEADING</td> </tr> <tr> <td>PSC PGC</td> <td>PSC PGC</td> <td>PSC PGC</td> </tr> <tr> <td>358.5° - 354°</td> <td>122.5° - 114°</td> <td>239.5° - 234°</td> </tr> <tr> <td>030.5° - 024°</td> <td>152.0° - 144°</td> <td>269.0° - 264°</td> </tr> <tr> <td>061.5° - 054°</td> <td>181.0° - 174°</td> <td>298.0° - 294°</td> </tr> <tr> <td>092.0° - 084°</td> <td>210.0° - 204°</td> <td>327.5° - 324°</td> </tr> </table> | HEADING       | HEADING  | HEADING  | PSC PGC  | PSC PGC       | PSC PGC | 358.5° - 354° | 122.5° - 114° | 239.5° - 234° | 030.5° - 024° | 152.0° - 144° | 269.0° - 264° | 061.5° - 054° | 181.0° - 174° | 298.0° - 294° | 092.0° - 084° | 210.0° - 204° | 327.5° - 324° | 0.5°E | 1.0°W | 2.5°E | 2.5°W |  |
| HEADING       | HEADING  | HEADING       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| PSC PGC       | PSC PGC  | PSC PGC       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 358.5° - 354° | 122.5° - 114°  | 239.5° - 234° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 030.5° - 024° | 152.0° - 144°  | 269.0° - 264° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 061.5° - 054° | 181.0° - 174°  | 298.0° - 294° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 092.0° - 084° | 210.0° - 204°  | 327.5° - 324° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 883           | <p>You swung ship and compared the magnetic compass against the gyro compass to find deviation. Gyro error is 2°E. The variation is 8°W. Find the deviation on a true heading of 187°.</p> <table border="0"> <tr> <td>HEADING</td> <td>HEADING</td> <td>HEADING</td> </tr> <tr> <td>PSC PGC</td> <td>PSC PGC</td> <td>PSC PGC</td> </tr> <tr> <td>358.5° - 350°</td> <td>122.5° - 110°</td> <td>239.5° - 230°</td> </tr> <tr> <td>030.5° - 020°</td> <td>152.0° - 140°</td> <td>269.0° - 260°</td> </tr> <tr> <td>061.5° - 050°</td> <td>181.0° - 170°</td> <td>298.0° - 290°</td> </tr> <tr> <td>092.0° - 080°</td> <td>210.0° - 200°</td> <td>327.5° - 320°</td> </tr> </table> | HEADING       | HEADING  | HEADING  | PSC PGC  | PSC PGC       | PSC PGC | 358.5° - 350° | 122.5° - 110° | 239.5° - 230° | 030.5° - 020° | 152.0° - 140° | 269.0° - 260° | 061.5° - 050° | 181.0° - 170° | 298.0° - 290° | 092.0° - 080° | 210.0° - 200° | 327.5° - 320° | 1.5°W | 0.5°W | 0.0°  | 1.0°E |  |
| HEADING       | HEADING  | HEADING       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| PSC PGC       | PSC PGC  | PSC PGC       |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 358.5° - 350° | 122.5° - 110°  | 239.5° - 230° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 030.5° - 020° | 152.0° - 140°  | 269.0° - 260° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 061.5° - 050° | 181.0° - 170°  | 298.0° - 290° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 092.0° - 080° | 210.0° - 200°  | 327.5° - 320° |          |          |          |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |
| 884           | <p>You want to make good a true course of 137°. A north-northeast wind produces a 3° leeway. The variation is 11° west, deviation is 5° east, and gyrocompass error is 2° east. What course must you steer per gyrocompass to make the true course good?</p>   | 132°pgc       | 134°pgc  | 136°pgc  | 138°pgc  |               |         |               |               |               |               |               |               |               |               |               |               |               |               |       |       |       |       |  |

| ID # | Question  | Choice A   | Choice B   | Choice C   | Choice D   | Illustrations |
|------|---|------------|------------|------------|------------|---------------|
| 885  | You wish to check the deviation of your standard magnetic compass. You find a natural range that you steer for and note that the gyrocompass heading is 034°, and the heading by standard magnetic compass is 026°. The gyro error is 1°W. Variation is 9°E. What is the deviation for that heading?  | 2°W        | 0°         | 2°E        | 9°E        |               |
| 886  | You wish to make good a course of 035°T while turning for an engine speed of 12 knots. The set is 340°T, and the drift is 2 knots. What course should you steer?  | 027°T      | 037°T      | 044°T      | 054°T      |               |
| 887  | You wish to make good a course of 035°T while turning for an engine speed of 12 knots. The set is 340°T, and the drift is 2 knots. What speed will you make good along the track line?  | 12.2 knots | 12.7 knots | 13.0 knots | 13.3 knots |               |
| 888  | You wish to make good a course of 053°T while turning for an engine speed of 16 knots. The set is 345°T, and the drift is 2.4 knots. What speed will you make good along the track line?  | 14.1 knots | 15.2 knots | 16.1 knots | 16.8 knots |               |
| 889  | You wish to make good a course of 230°T while turning for an engine speed of 12.5 knots. The set is 180°T, and the drift is 1.7 knots. What course should you steer?  | 244°T      | 236°T      | 231°T      | 222°T      |               |
| 890  | You wish to make good a course of 230°T while turning for an engine speed of 12.5 knots. The set is 180°T, and the drift is 1.7 knots. What speed will you make good along the track line?  | 11.5 knots | 12.5 knots | 13.6 knots | 14.0 knots |               |
| 891  | You wish to make good a course of 258°T, allowing 4° leeway for northerly winds. The variation is 21°W. What should you steer per standard magnetic compass to make good 258°T?<br>DEVIATION TABLE<br>MAGNETIC HDG      DEVIATION<br>285°                  5°E<br>270°                  3°E<br>255°                  1°E<br>240°                  1°W | 242°psc    | 271°psc    | 278°psc    | 288°psc    |               |
| 892  | You wish to make good a course of 300°T while turning for an engine speed of 11 knots. The set is 350°T, and the drift is 2.1 knots. Which course should you steer?   | 278°T      | 288°T      | 292°T      | 308°T      |               |

| ID # | Question  | Choice A                             | Choice B                      | Choice C                      | Choice D                      | Illustrations |
|------|---|--------------------------------------|-------------------------------|-------------------------------|-------------------------------|---------------|
| 893  | You wish to make good a course of 350°T while turning for an engine speed of 10 knots. The set is 070°T, and the drift is 1.5 knots. What course should you steer?  | 332°T                                | <b>341°T</b>                  | 345°T                         | 359°T                         |               |
| 894  | Your 0000 zone time position on 13 June is LAT 24°35'N, LONG 142°26'E. Your vessel is on course 245°T, speed is 13.5 knots. What is the zone time of sunrise?   | 0440                                 | <b>0445</b>                   | 0503                          | 0528                          |               |
| 895  | Your 0745 ZT 15 July position is LAT 29°04.0'N, LONG 71°17.5'W. You are on course 165°T, and your speed is 8.0 knots. You observed 3 morning sun lines. Determine the latitude and longitude of your 1130 running fix?  | <b>LAT 28°35.0'N, LONG 71°08.5'W</b> | LAT 28°39.8'N, LONG 71°04.0'W | LAT 28°40.5'N, LONG 71°13.0'W | LAT 28°43.3'N, LONG 71°02.5'W | NP-0003       |
| 896  | Your 0830 DR position is LAT 27°33'S, LONG 79°17'E. Your vessel is on a course of 066°T, at a speed of 19.5 knots. Determine the time of LAN on 10 December.  | <b>1131</b>                          | 1136                          | 1153                          | 1215                          |               |
| 897  | Your 0900 DR position is LAT 23°16'N, LONG 146°12'E. Your vessel is on a course of 286°T, at a speed of 14.5 knots. Determine the zone time of LAN on 14 March.   | 1151                                 | 1209                          | 1223                          | <b>1228</b>                   |               |
| 898  | You are on course 317°T at 13 knots. A light is bearing 22.5° relative at 0640. At 0659 the same light is bearing 45° relative. At what time should the light be abeam?   | 0709                                 | <b>0712</b>                   | 0718                          | 0721                          |               |
| 899  | Your ship is entering port from sea, and you sight a pair of range lights. When in line, they bear 315° per standard magnetic compass. The chart shows that the range bearing is 312°T, and that variation is 6°W. What is the deviation of your compass at the time of the sighting? | <b>3°E</b>                           | 3°W                           | 9°E                           | 9°W                           |               |
| 900  | Your vessel arrives in port with sufficient fuel to steam 1175 miles at 19 knots. If you are unable to take on bunkers, at what speed must you proceed to reach your next port, 1341 miles distant?   | 16.7 knots                           | 17.3 knots                    | <b>17.8 knots</b>             | 19.4 knots                    |               |
| 901  | Your vessel arrives in port with sufficient fuel to steam 595 miles at 14 knots. If you are unable to take on bunkers, at what speed must you proceed to reach your next port, 707 miles distant?   | 12.2 knots                           | 12.5 knots                    | <b>12.8 knots</b>             | 14.4 knots                    |               |

| ID # | Question  | Choice A          | Choice B          | Choice C        | Choice D        | Illustrations |
|------|---|-------------------|-------------------|-----------------|-----------------|---------------|
| 902  | Your vessel arrives in port with sufficient fuel to steam 726 miles at 16 knots. If you are unable to take on bunkers, at what speed must you proceed to reach your next port, 873 miles distant? | <b>14.6 knots</b> | 15.1 knots        | 16.3 knots      | 16.8 knots      |               |
| 903  | Your vessel arrives in port with sufficient fuel to steam 775 miles at 17 knots. If you are unable to take on bunkers, at what speed must you proceed to reach your next port, 977 miles distant? | <b>15.1 knots</b> | 15.8 knots        | 17.2 knots      | 17.7 knots      |               |
| 904  | Your vessel arrives in port with sufficient fuel to steam 812 miles at 15 knots. If you are unable to take on bunkers, at what speed must you proceed to reach your next port, 928 miles distant? | 13.6 knots        | <b>14.0 knots</b> | 15.3 knots      | 15.7 knots      |               |
| 905  | Your vessel consumes 156 barrels of fuel per day at a speed of 13.0 knots. What will be the fuel consumption of your vessel at 16.0 knots?  | 192 bbls          | 236 bbls          | <b>291 bbls</b> | 315 bbls        |               |
| 906  | Your vessel consumes 178 barrels of fuel per day at a speed of 13.5 knots. What will be the fuel consumption of your vessel at 15.0 knots?  | 172 bbls          | 198 bbls          | 219 bbls        | <b>244 bbls</b> |               |
| 907  | Your vessel consumes 199 barrels of fuel per day at a speed of 14.5 knots. What will be the fuel consumption of your vessel at 10.0 knots?  | <b>65 bbls</b>    | 95 bbls           | 137 bbls        | 148 bbls        |               |
| 908  | Your vessel consumes 215 barrels of fuel per day at a speed of 18.0 knots. What will be the fuel consumption of your vessel at 14.0 knots?  | 67 bbls           | <b>101 bbls</b>   | 130 bbls        | 167 bbls        |               |
| 909  | Your vessel consumes 216 barrels of fuel per day at a speed of 15.0 knots. What will be the fuel consumption of your vessel at 17.5 knots?  | 232 bbls          | 252 bbls          | 294 bbls        | <b>343 bbls</b> |               |
| 910  | Your vessel consumes 236 barrels of fuel per day at a speed of 16.5 knots. What will be the fuel consumption of your vessel at 13.0 knots?  | 102 bbls          | <b>115 bbls</b>   | 147 bbls        | 186 bbls        |               |
| 911  | Your vessel consumes 268 barrels of fuel per day at a speed of 19.0 knots. What will be the fuel consumption of your vessel at 15.0 knots?  | <b>132 bbls</b>   | 167 bbls          | 212 bbls        | 243 bbls        |               |
| 912  | Your vessel consumes 274 barrels of fuel per day at a speed of 17.5 knots. What will be the fuel consumption of your vessel at 13.5 knots?  | <b>126 bbls</b>   | 163 bbls          | 211 bbls        | 253 bbls        |               |

| ID # | Question  | Choice A            | Choice B              | Choice C                 | Choice D               | Illustrations |
|------|---|---------------------|-----------------------|--------------------------|------------------------|---------------|
| 913  | Your vessel departs Arkhangel'sk, from position LAT 64°32'N, LONG 40°31'E at 0236 zone time, on 19 August. It is bound for New York, at position LAT 40°42'N, LONG 74°01'W. The distance is determined to be 4,216 miles, and you estimate that you will average 13.0 knots. What is your estimated zone time of arrival? | 1155, 31 August     | 1755, 31 August       | <b>0655, 1 September</b> | 1155, 1 September      |               |
| 914  | Your vessel departs LAT 32°45'N, LONG 79°50'W, and is bound for LAT 34°21'S, LONG 18°29'E. Determine the distance by Mercator sailing.  | 5,021 miles         | <b>6,884 miles</b>    | 6,954 miles              | 7,002 miles            |               |
| 915  | Your vessel departs Montevideo, Uruguay, LAT 34°40.3'S, LONG 54°09.1'W (ZD +4), at 1800 zone time, on 15 October. It is bound for New York, LAT 40°27.5'N, LONG 73°49.9'W (ZD +5). The distance is 5,749 miles, and you expect to average 20 knots. What is your estimated zone time of arrival?                          | 0427, 26 October    | 1627, 26 October      | <b>1627, 27 October</b>  | 0427, 27 October       |               |
| 916  | Your vessel departs Seattle at 1010 zone time (ZD +8), on 28 May, bound for Apra, Guam (ZD -10). The distance by great circle is 4,948 miles, and you estimate that you will average 18.5 knots. What is your estimated zone time of arrival?   | <b>0737, 9 June</b> | 1737, 9 June          | 1937, 9 June             | 0737, 10 June          |               |
| 917  | Your vessel departs Yokohama from position LAT 35°27.0'N, LONG 139°39.0'E (ZD -9), at 1330 ZT, on 23 July, bound for Seattle at position LAT 47°36.0'N, LONG 122°22.0'W (ZD +8). The distance by great circle is 4,245 miles, and you estimate that you will average 13.6 knots. What is your estimated ZT of arrival?    | 0438, 4 August      | <b>2038, 4 August</b> | 0438, 5 August           | 1238, 5 August         |               |
| 918  | Your vessel has consumed 1087 bbls of fuel after steaming 2210 miles at a speed of 10.75 kts. What is the maximum speed you can steam for the last 1000 miles of the voyage on the remaining 725 bbls, if you estimate 3% of the fuel is not usable?  | 11.43 knots         | 11.76 knots           | <b>12.84 knots</b>       | 15.33 knots            |               |
| 919  | Your vessel is on a course of 034°T at 17 knots. At 0551 a light bears 056.5°T, and at 0623 the light bears 079°T. At what time and at what distance off will your vessel be when abeam of the light?   | 0636, 5.9 miles     | 0646, 5.9 miles       | 0636, 6.4 miles          | <b>0646, 6.4 miles</b> |               |



| ID # | Question   | Choice A        | Choice B               | Choice C               | Choice D               | Illustrations |
|------|--|-----------------|------------------------|------------------------|------------------------|---------------|
| 920  | Your vessel is on a course of 052°T at 16 knots. At 0916 a light bears 078.5°T, and at 0927 the light bears 097°T.<br>At what time and at what distance off will your vessel be when abeam of the light? | 0929, 2.0 miles | 0932, 2.3 miles        | 0935, 2.6 miles        | <b>0938, 2.9 miles</b> |               |
| 921  | Your vessel is on a course of 079°T at 11 knots. At 0152 a light bears 105.5°T, and at 0209 the light bears 124°T.<br>At what time and at what distance off will your vessel be when abeam of the light? | 0219, 2.3 miles | <b>0226, 3.1 miles</b> | 0233, 3.9 miles        | 0242, 4.7 miles        |               |
| 922  | Your vessel is on a course of 082°T at 19 knots. At 0255 a light bears 059.5°T, and at 0312 the light bears 037°T.<br>At what time and at what distance off will your vessel be when abeam of the light? | 0333, 5.1 miles | 0321, 4.7 miles        | 0327, 4.3 miles        | <b>0324, 3.8 miles</b> |               |
| 923  | Your vessel is on a course of 103°T at 14 knots. At 1918 a light bears 129.5°T, and at 1937 the light bears 148°T.<br>At what time and at what distance off will your vessel be when abeam of the light? | 1947, 2.8 miles | 1950, 3.2 miles        | 1953, 3.8 miles        | <b>1956, 4.4 miles</b> |               |
| 924  | Your vessel is on a course of 107°T at 16 knots. At 0403 a light bears 129.5°T, and at 0426 the light bears 152°T. At what time and at what distance off will your vessel be when abeam of the light?    | 0434, 3.2 miles | <b>0442, 4.3 miles</b> | 0434, 4.3 miles        | 0442, 3.4 miles        |               |
| 925  | Your vessel is on a course of 126°T at 17 knots. At 0251 a light bears 099.5°T, and at 0313 the light bears 081°T. At what time and at what distance off will your vessel be when abeam of the light?    | 0327, 4.4 miles | <b>0335, 6.2 miles</b> | 0345, 6.8 miles        | 0351, 7.4 miles        |               |
| 926  | Your vessel is on a course of 129°T at 13 knots. At 1937 a light bears 151.5°T. At 2003 the light bears 174°T. At which time and distance off will your vessel be when abeam of this light?              | 2016, 2.8 miles | 2016, 3.9 miles        | <b>2021, 3.9 miles</b> | 2021, 2.8 miles        |               |
| 927  | Your vessel is on a course of 144°T at 16 knots. At 0126 a light bears 166.5°T, and at 0152 the light bears 189°T.<br>At what time and at what distance off will your vessel be when abeam of the light? | 0205, 4.1 miles | <b>0210, 4.8 miles</b> | 0215, 6.0 miles        | 0220, 6.4 miles        |               |
| 928  | Your vessel is on a course of 144°T at 20 knots. At 0022 a light bears 117.5°T, and at 0035 the light bears 099°T.<br>At what time and at what distance off will your vessel be when abeam of the light? | 0044, 3.2 miles | <b>0048, 4.3 miles</b> | 0052, 5.1 miles        | 0056, 6.0 miles        |               |

| ID # | Question  | Choice A               | Choice B        | Choice C               | Choice D               | Illustrations |
|------|---|------------------------|-----------------|------------------------|------------------------|---------------|
| 929  | Your vessel is on a course of 196°T at 17 knots. At 0417 a light bears 218.5°T, and at 0442 the light bears 241°T. At what time and at what distance off will your vessel be when abeam of the light?   | <b>0500, 5.0 miles</b> | 0504, 6.2 miles | 0500, 6.2 miles        | 0504, 5.0 miles        |               |
| 930  | Your vessel is on a course of 207°T at 13 knots. At 0539 a light bears 180.5°T, and at 0620 the light bears 162°T. At what time and at what distance off will your vessel be when abeam of the light?   | 0633, 5.9 miles        | 0641, 6.5 miles | 0653, 7.6 miles        | <b>0701, 8.9 miles</b> |               |
| 931  | Your vessel is on a course of 221°T at 15 knots. At 0319 a light bears 198.5°T, and at 0353 the light bears 176°T. At what time and at what distance off will your vessel be when abeam of the light?   | 0407, 4.3 miles        | 0410, 5.2 miles | <b>0417, 6.0 miles</b> | 0427, 7.4 miles        |               |
| 932  | Your vessel is on a course of 223°T at 17 knots. At 1323 a lighthouse bears 318° relative. At 1341 the same lighthouse bears 287° relative. What is your distance off the lighthouse at 1341?   | 4.3 miles              | 5.1 miles       | <b>6.6 miles</b>       | 7.8 miles              |               |
| 933  | Your vessel is on a course of 237°T at 18 knots. At 0404 a light bears 263.5°T, and at 0430 the light bears 282°T. At what time and at what distance off will your vessel be when abeam of the light?   | 0448, 6.8 miles        | 0452, 7.2 miles | <b>0456, 7.8 miles</b> | 0500, 8.4 miles        |               |
| 934  | Your vessel is on a course of 253°T at 18 knots. At 2027 a light bears 275.5°T, and at 2055 the light bears 298°T. At what time and at what distance off will your vessel be when abeam of the light?   | <b>2115, 5.9 miles</b> | 2109, 6.4 miles | 2123, 7.3 miles        | 2104, 7.7 miles        |               |
| 935  | Your vessel is on a course of 255°T, at 14 knots. At 2116 a lighthouse is sighted dead ahead at a distance of 11 miles. You change course at this time to pass the lighthouse 3 miles abeam to port. What will be your ETA at this position off the lighthouse? | 2149                   | <b>2201</b>     | 2212                   | 2228                   |               |
| 936  | Your vessel is on a course of 255°T, at 14 knots. At 2126 a lighthouse is sighted dead ahead at a distance of 11 miles. You change course at this time to pass the lighthouse 3 miles abeam to port. What will be your ETA at this position off the lighthouse? | 2149                   | 2201            | <b>2211</b>            | 2228                   |               |

| ID # | Question   | Choice A               | Choice B               | Choice C               | Choice D         | Illustrations |
|------|--|------------------------|------------------------|------------------------|------------------|---------------|
| 937  | Your vessel is on a course of 272°T at 15 knots. At 2113 a light bears 245.5°T, and at 2120 the light bears 227°T.<br>At what time and at what distance off will your vessel be when abeam of the light? | 2124, 1.3 miles        | <b>2127, 1.8 miles</b> | 2131, 2.3 miles        | 2135, 2.7 miles  |               |
| 938  | Your vessel is on a course of 297°T at 11 knots. At 0019 a light bears 274.5°T, and at 0048 the light bears 252°T.<br>At what time and at what distance off will your vessel be when abeam of the light? | 0102, 2.6 miles        | <b>0108, 3.7 miles</b> | 0057, 4.6 miles        | 0117, 5.0 miles  |               |
| 939  | Your vessel is on a course of 307°T at 20 knots. At 0914 a light bears 284.5°T, and at 0937 the light bears 262°T.<br>At what time and at what distance off will your vessel be when abeam of the light? | 0950, 4.4 miles        | <b>0953, 5.4 miles</b> | 0957, 6.6 miles        | 1002, 7.1 miles  |               |
| 940  | Your vessel is on a course of 311°T at 21 knots. At 1957 a light bears 337.5°T, and at 2018 the light bears 356°T. At what time and at what distance off will your vessel be when abeam of the light?    | 2027, 5.2 miles        | 2033, 6.8 miles        | <b>2039, 7.4 miles</b> | 2043, 10.3 miles |               |
| 941  | Your vessel is on a course of 316°T at 12 knots. At 2326 a light bears 289.5°T, and at 2354 the light bears 271°T. At what time and at what distance off will your vessel be when abeam of the light?    | 0014, 4.8 miles        | 0018, 5.2 miles        | <b>0022, 5.6 miles</b> | 0026, 6.4 miles  |               |
| 942  | Your vessel is on a course of 343°T at 14 knots. At 2156 a light bears 320.5°T, and at 2217 the light bears 298°T. At what time and at what distance off will your vessel be when abeam of the light?    | <b>2232, 3.4 miles</b> | 2235, 4.3 miles        | 2228, 4.9 miles        | 2241, 6.9 miles  |               |
| 943  | Your vessel is on a course of 358°T at 19 knots. At 0316 a light bears 024.5°T, and at 0334 the light bears 043°T.<br>At what time and at what distance off will your vessel be when abeam of the light? | <b>0352, 5.7 miles</b> | 0355, 6.2 miles        | 0359, 7.1 miles        | 0403, 8.0 miles  |               |
| 944  | Your vessel is on course 093°T at 15 knots. At 1835 a light bears 136°T, and at 1857 the same light bears 170°T. What was your distance off the light at 1857?   | 6.0 miles              | 6.4 miles              | <b>6.8 miles</b>       | 7.2 miles        |               |
| 945  | Your vessel is on course 312°pgc and you sight a lighthouse dead ahead at a range of 10 miles. The gyro error is 3°E. What course would you steer to leave the lighthouse 1.5 miles abeam to starboard?  | 309°pgc                | <b>304°pgc</b>         | 309°T                  | 304°T            |               |

| ID # | Question  | Choice A | Choice B | Choice C | Choice D | Illustrations |
|------|---|----------|----------|----------|----------|---------------|
| 946  | Your vessel is proceeding down a channel, and you see a pair of range lights that are in line dead ahead. The chart indicates that the direction of this pair of lights is 229°T, and variation is 6°W. If the heading of your vessel at the time of the sighting is 232° per standard magnetic compass, what is the deviation?       | 3°E      | 9°E      | 3°W      | 9°W      |               |
| 947  | Your vessel is proceeding up a channel steering on a pair of range lights that are in line ahead. The chart indicates that the direction of this pair of lights is 249°T, and the variation is 14°E. If the heading of your vessel at the time of the sighting is 226° per standard magnetic compass, what is the correct deviation?  | 5°E      | 5°W      | 9°E      | 9°W      |               |
| 948  | Your vessel is proceeding up a channel, and you see a pair of range lights that are in line ahead. The chart indicates that the direction of this pair of lights is 014°T, and the variation is 11°E. If the heading of your vessel at the time of the sighting is 009° per standard magnetic compass, what is the correct deviation? | 5°E      | 5°W      | 6°E      | 6°W      |               |
| 949  | Your vessel is proceeding up a channel, and you see a pair of range lights that are in line ahead. The chart indicates that the direction of this pair of lights is 064°T, and the variation is 17°W. If the heading of your vessel at the time of the sighting is 094° per standard magnetic compass, what is the correct deviation? | 4°E      | 4°W      | 13°E     | 13°W     |               |
| 950  | Your vessel is proceeding up a channel, and you see a pair of range lights that are in line ahead. The chart indicates that the direction of this pair of lights is 186°T, and the variation is 11°W. If the heading of your vessel at the time of the sighting is 193° per standard magnetic compass, what is the correct deviation? | 4°E      | 4°W      | 7°E      | 7°W      |               |
| 951  | Your vessel is proceeding up a channel, and you see a pair of range lights that are in line ahead. The chart indicates that the direction of this pair of lights is 212°T, and the variation is 7°W. If the heading of your vessel at the time of the sighting is 208° per standard magnetic compass, what is the correct deviation?  | 4°E      | 4°W      | 11°E     | 11°W     |               |

| ID # | Question  | Choice A | Choice B | Choice C | Choice D | Illustrations |
|------|---|----------|----------|----------|----------|---------------|
| 952  | Your vessel is proceeding up a channel, and you see a pair of range lights that are in line ahead. The chart indicates that the direction of this pair of lights is 311°T, and the variation is 8°E. If the heading of your vessel at the time of the sighting is 305° per standard magnetic compass, what is the correct deviation?          | 2°E      | 2°W      | 6°E      | 6°W      |               |
| 953  | Your vessel is proceeding up a channel, and you see a pair of range lights that are in line ahead. The chart indicates that the direction of this pair of lights is 352°T, and the variation is 4°W. If the heading of your vessel at the time of the sighting is 359° per standard magnetic compass, what is the correct deviation?          | 3°W      | 7°E      | 11°E     | 11°W     |               |
| 954  | Your vessel is proceeding up a channel, and you see a pair of range lights that are in line dead ahead. The chart indicates that the direction of this pair of lights is 093°T, and the variation is 6°E. If the heading of your vessel at the time of the sighting is 097° per standard magnetic compass, what is the correct deviation?     | 5°E      | 5°W      | 10°E     | 10°W     |               |
| 955  | Your vessel is proceeding up a channel, and you see a pair of range lights that are in line dead ahead. The chart indicates that the direction of this pair of lights is 178°T, and the variation is 9°W. If the heading of your vessel at the time of the sighting is 180° per standard magnetic compass, what is the deviation?             | 2°E      | 2°W      | 7°E      | 7°W      |               |
| 956  | Your vessel is proceeding up a channel, and you see a pair of range lights that are in line dead ahead. The chart indicates that the direction of this pair of lights is 343°T, and the variation is 5° west. If the heading of your vessel at the time of the sighting is 344° per standard magnetic compass, what is the correct deviation? | 1°E      | 1°W      | 4°E      | 4°W      |               |
| 957  | Your vessel is proceeding up a channel, and you see a pair of range lights that are in line ahead. The chart indicates that the direction of this pair of lights is 147°T, and the variation is 5°E. If the heading of your vessel at the time of the sighting is 148° per standard magnetic compass, what is the correct deviation?          | 1°E      | 1°W      | 6°E      | 6°W      |               |

| ID # | Question  | Choice A            | Choice B            | Choice C            | Choice D            | Illustrations |
|------|---|---------------------|---------------------|---------------------|---------------------|---------------|
| 958  | Your vessel is proceeding up a channel, and you see a pair of range lights that are in line ahead. The chart indicates that the direction of this pair of lights is $196^{\circ}\text{T}$ , and the variation is $7^{\circ}\text{E}$ . If the heading of your vessel at the time of the sighting is $192^{\circ}$ per standard magnetic compass, what is the deviation? | $3^{\circ}\text{E}$ | $3^{\circ}\text{W}$ | $4^{\circ}\text{E}$ | $4^{\circ}\text{W}$ |               |
| 959  | Your vessel is proceeding up a channel, and you see a pair of range lights that are in line dead ahead. The chart indicates that the direction of this pair of lights is $283^{\circ}\text{T}$ , and the variation is $13^{\circ}\text{E}$ . If the heading of your vessel at the time of the sighting is $278^{\circ}$ per standard compass, what is the deviation?    | $5^{\circ}\text{E}$ | $5^{\circ}\text{W}$ | $8^{\circ}\text{E}$ | $8^{\circ}\text{W}$ |               |
| 960  | Your vessel is steaming on a course of $140^{\circ}\text{T}$ at 15 knots. At 1530 a lighthouse bears $200^{\circ}\text{T}$ . At 1550 it bears $249^{\circ}\text{T}$ . What is your distance from the lighthouse at 1550?  | 1.15 miles          | 4.60 miles          | 5.45 miles          | <b>5.75 miles</b>   |               |
| 961  | Your vessel is steering $049^{\circ}\text{T}$ at 15 knots. At 1914 a light bears $078^{\circ}\text{T}$ , and at 1951 the same light bears $116^{\circ}\text{T}$ . What will be your distance off abeam?   | <b>6.7 miles</b>    | 7.1 miles           | 7.5 miles           | 8.3 miles           |               |
| 962  | Your vessel is steering $074^{\circ}\text{T}$ at 12 knots. At 0214 a light bears $115^{\circ}\text{T}$ , and at 0223 the same light bears $135^{\circ}\text{T}$ . What will be your distance off abeam?   | 2.4 miles           | <b>3.0 miles</b>    | 3.5 miles           | 4.2 miles           |               |
| 963  | Your vessel is steering $096^{\circ}\text{T}$ at 17 knots. At 1847 a light bears $057^{\circ}\text{T}$ , and at 1916 the same light bears $033^{\circ}\text{T}$ . What will be your distance off abeam?   | 9.9 miles           | 10.7 miles          | <b>11.4 miles</b>   | 11.9 miles          |               |
| 964  | Your vessel is steering $143^{\circ}\text{T}$ at 16 knots. At 2147 a light bears $106^{\circ}\text{T}$ , and at 2206 the same light bears $078^{\circ}\text{T}$ . What will be your distance off abeam?   | 5.1 miles           | 5.4 miles           | <b>5.9 miles</b>    | 6.5 miles           |               |
| 965  | Your vessel is steering $157^{\circ}\text{T}$ at 18 knots. At 2018 a light bears $208^{\circ}\text{T}$ . At 2044 the same light bears $232^{\circ}\text{T}$ . What will be your distance off when abeam?  | 12.8 miles          | <b>14.4 miles</b>   | 15.2 miles          | 16.7 miles          |               |
| 966  | Your vessel is steering $194^{\circ}\text{T}$ at 13 knots. At 0116 a light bears $243^{\circ}\text{T}$ , and at 0147 the same light bears $267^{\circ}\text{T}$ . What will be your distance off abeam?   | 11.2 miles          | 11.6 miles          | <b>12.0 miles</b>   | 12.5 miles          |               |

| ID # | Question  | Choice A   | Choice B   | Choice C   | Choice D   | Illustrations |
|------|---|------------|------------|------------|------------|---------------|
| 967  | Your vessel is steering 195° per standard magnetic compass. Variation for the area is 13°W, and the deviation is 4°E. The wind is from the west-southwest, producing a 2° leeway. Which true course are you making good?          | 178°T      | 180°T      | 182°T      | 184°T      |               |
| 968  | Your vessel is steering 218°T at 19 knots. At 2223 a light bears 261°T, and at 2234 the same light bears 289°T. What will be your distance off abeam?   | 4.5 miles  | 4.9 miles  | 5.3 miles  | 5.7 miles  |               |
| 969  | Your vessel is steering 238°T at 11 knots. At 2304 a light bears 176°T, and at 2323 the same light bears 155°T. What will be your distance off abeam?   | 7.5 miles  | 8.0 miles  | 8.5 miles  | 9.0 miles  |               |
| 970  | Your vessel is steering 263°T at 22 knots. At 0413 a light bears 294°T, and at 0421 the same light bears 312°T. What will be your distance off abeam?   | 3.4 miles  | 3.7 miles  | 4.3 miles  | 4.9 miles  |               |
| 971  | Your vessel is steering 283°T at 10 knots. At 0538 a light bears 350°T, and at 0552 the same light bears 002°T. What will be your distance off abeam?   | 9.6 miles  | 10.3 miles | 10.7 miles | 11.3 miles |               |
| 972  | Your vessel is steering 354°T at 14 knots. At 0317 a light bears 049°T, and at 0342 the same light bears 071°T. What will be your distance off abeam?   | 12.4 miles | 12.7 miles | 13.0 miles | 13.3 miles |               |
| 973  | Your vessel is steering a course of 337°psc. Variation for the area is 13°W, and deviation is 4°E. The wind is from the south, producing a 3° leeway. Which true course are you making good?                                      | 325°T      | 328°T      | 331°T      | 349°T      |               |
| 974  | Your vessel is steering course 027° per standard magnetic compass (psc), variation for the area is 19°W, and deviation is 2°E. The wind is from the north-northwest, producing a 5° leeway. What true course are you making good? | 005°T      | 015°T      | 044°T      | 049°T      |               |
| 975  | Your vessel is steering course 073°psc, variation for the area is 15°E, and deviation is 4°E. The wind is from the southeast, producing a 4° leeway. Which true course are you making good?                                       | 050°T      | 058°T      | 088°T      | 096°T      |               |

| ID # | Question  | Choice A | Choice B | Choice C | Choice D | Illustrations |
|------|---|----------|----------|----------|----------|---------------|
| 976  | Your vessel is steering course 111°psc, variation for the area is 5°E, and deviation is 3°W. The wind is from the northwest, producing a 1° leeway. What true course are you making good?                       | 108°T    | 110°T    | 112°T    | 114°T    |               |
| 977  | Your vessel is steering course 149°psc, variation for the area is 13°E, and deviation is 4°E. The wind is from the northeast, producing a 4° leeway. What true course are you making good?                      | 128°T    | 136°T    | 162°T    | 170°T    |               |
| 978  | Your vessel is steering course 166°psc, variation for the area is 8°W, and deviation is 3°W. The wind is from the west-southwest, producing a 2° leeway. What true course are you making good?                  | 153°T    | 157°T    | 175°T    | 179°T    |               |
| 979  | Your vessel is steering course 197°psc, variation for the area is 7°E, and deviation is 4°W. The wind is from the west, producing a 2° leeway. Which true course are you making good?                           | 192°T    | 196°T    | 198°T    | 202°T    |               |
| 980  | Your vessel is steering course 216° per standard magnetic compass, variation for the area is 9°W, and deviation is 2°E. The wind is from the east, producing a 5° leeway. What true course are you making good? | 204°T    | 214°T    | 223°T    | 227°T    |               |
| 981  | Your vessel is steering course 243°psc. Variation for the area is 5°E, and deviation is 2°W. The wind is from the south-southeast, producing a 2° leeway. What true course are you making good?                 | 242°T    | 244°T    | 246°T    | 248°T    |               |
| 982  | Your vessel is steering course 284°psc, variation for the area is 6°W, and deviation is 3°E. The wind is from the north-northeast, producing a 3° leeway. What true course are you making good?                 | 275°T    | 278°T    | 284°T    | 290°T    |               |
| 983  | Your vessel is steering course 299°psc, variation for the area is 7°W, and deviation is 4°W. The wind is from the southwest, producing a 3° leeway. What true course are you making good?                       | 291°T    | 296°T    | 299°T    | 313°T    |               |
| 984  | Your vessel is steering course 352°psc, variation for the area is 11°E, and deviation is 9°W. The wind is from the northeast, producing a 1° leeway. What true course are you making good?                      | 349°T    | 351°T    | 353°T    | 355°T    |               |



| ID # | Question   | Choice A                  | Choice B           | Choice C           | Choice D           | Illustrations |
|------|--|---------------------------|--------------------|--------------------|--------------------|---------------|
| 985  | Your vessel is underway on a course of 115°T at 18 knots. At 1850 a lighthouse bears 137.5°T. At 1920, the same lighthouse bears 160°T. What time will the lighthouse pass abeam to starboard?   | 1929                      | <b>1941</b>        | 1949               | 1955               |               |
| 986  | Your vessel is underway on a course of 323.5°T at a speed of 16 knots. At 1945° a light bears 350°T. At 2010 the light bears 008.5°T. What will be your distance off when abeam of the light?  | 3.3 miles                 | 4.8 miles          | <b>6.7 miles</b>   | 8.7 miles          |               |
| 987  | Your vessel receives a distress call from a vessel reporting her position as LAT 35°01.0'S, LONG 18°51.0'W. Your position is LAT 35°01.0'S, LONG 21°42.0'W. Determine the true course and distance from your vessel to the vessel in distress by parallel sailing.                                     | <b>090°T, 140.0 miles</b> | 090°T, 189.2 miles | 270°T, 140.0 miles | 270°T, 189.2 miles |               |
| 988  | Your vessel receives a distress call from a vessel reporting her position as LAT 35°01'S, LONG 18°51'W. Your position is LAT 30°18'S, LONG 21°42'W. Determine the true course from your vessel to the vessel in distress by Mercator sailing.  | 135°T                     | 149°T              | <b>153°T</b>       | 160°T              |               |
| 989  | Your vessel receives a distress call from a vessel reporting her position at LAT 5°24'N, LONG 31°16'W. Your position is LAT 2°39'S, LONG 39°24'W. Determine the distance from your vessel to the vessel in distress by Mercator sailing.   | 669.3 miles               | <b>688.7 miles</b> | 699.2 miles        | 712.9 miles        |               |
| 990  | Your vessel will sail from a position in LAT 8°51.0'N, LONG 81°31.0'W to a position at LAT 33°51.5'S, LONG 151°13.0'E. The distance by great circle is 7,635 miles, and you estimate an average speed of 15.0 knots. What is your estimated zone time of arrival if you depart at 1510 ZT, on 23 July? | <b>1110, 14 August</b>    | 0110, 14 August    | 1110, 13 August    | 1510, 13 August    |               |
| 991  | Your vessel's propeller has a pitch of 22'06". From 0530, 19 March, to 1930, 20 March, the average RPM was 82. The distance run by observation was 721.5 miles. What was the slip?   | +4%                       | <b>-4%</b>         | +7%                | -7%                |               |

| ID # | Question  | Choice A   | Choice B  | Choice C   | Choice D   | Illustrations |
|------|---|--|---|--|--|---------------|
| 992  | Your voyage commences off Cape May, NJ, at LAT 38°40'N, LONG 74°00'W, for LAT 44°00'N, LONG 10°00'W. Sea ice is north of 45°N and west of 45°W. Extensive naval exercises will be conducted within a 150-mile radius of LAT 50°00'N, LONG 35°00'W. Which statement about a direct great circle route is TRUE? (Use gnomonic tracking chart WOXZC 5274.) | The latitude of the great circle vertex is above 50°N. | <b>You must plot a composite sailing to remain south of the ice limits.</b> | The naval exercises will interfere with the direct great circle route. | The shifting shoals northwest of Sable Island will be a navigational hazard on the track line. |               |