

ROUND 6

TOSS-UP

1) CHEMISTRY *Multiple Choice* The reaction of hydrocarbons with oxygen to produce carbon dioxide, water and heat is called:

- W) fission
- X) fusion
- Y) endothermic
- Z) combustion

ANSWER: Z) COMBUSTION

BONUS

1) CHEMISTRY *Short Answer* What is the only known substance for which there is no triple point:

ANSWER: HELIUM

TOSS-UP

2) PHYSICS *Short Answer* What is the name of the device that is made by combining two basic types of solid state rectifiers allowing the device to both rectify and amplify a current?

ANSWER: TRANSISTOR

BONUS

2) PHYSICS *Multiple Choice* Which of the following was one of the first direct indications that the speed of light could not be exceeded:

- W) Faraday's law of induction
- X) Einstein's theory of Special Relativity
- Y) the Lorentz-Fitzgerald contraction
- Z) Planck's constant

ANSWER: Y) THE LORENTZ-FITZGERALD CONTRACTION

TOSS-UP

3) **BIOLOGY** *Multiple Choice* An example of negative feedback control is when:

- W) the end product of a metabolic pathway inhibits an earlier reaction
- X) the initial enzyme of a metabolic pathway inhibits a later reaction
- Y) the end product of a metabolic pathway stimulates an earlier reaction
- Z) the initial product of a metabolic pathway inhibits the next reaction

ANSWER: W) THE END PRODUCT OF A METABOLIC PATHWAY INHIBITS AN EARLIER REACTION

BONUS

3) **BIOLOGY** *Short Answer* What is the name of the inner surface of the myocardium that is lined with a layer of endothelial cells?

ANSWER: ENDOCARDIUM

TOSS-UP

4) **ASTRONOMY** *Multiple Choice* The hydrogen envelope that surrounds the comet's nucleus derives its hydrogen most directly from:

- W) gases escaping from the melting comet's ice
- X) hydrogen captured from interstellar space
- Y) breakdown of water by ultraviolet light
- Z) hydrogen in the solar winds

ANSWER: Y) BREAKDOWN OF WATER BY ULTRAVIOLET LIGHT

BONUS

4) **ASTRONOMY** *Short Answer* What do Astronomers call the point in the sky that is directly overhead?

ANSWER: ZENITH

TOSS-UP

5) MATH *Multiple Choice* Which of the following does NOT yield a periodic non-terminating decimal:

- W) $5/6$
- X) $1/27$
- Y) $1/18$
- Z) $7/8$

ANSWER: Z) $7/8$

BONUS

5) MATH *Short Answer* What 3 consecutive numbers add up to 45?

ANSWER: 14, 15, AND 16

TOSS-UP

6) EARTH SCIENCE *Multiple Choice* Which is the best reason for proposing that a boulder lying in an area that was once glaciated is an erratic:

- W) it is of a different composition than the underlying rock
- X) it is rounded and worn
- Y) it is larger than any surrounding rocks
- Z) it is located near a glacial lake

ANSWER: W) IT IS OF A DIFFERENT COMPOSITION THAN THE UNDERLYING ROCK

BONUS

6) EARTH SCIENCE *Short Answer* What is the term for groundwater emerging naturally at the ground surface, where the water table intersects the surface:

ANSWER: SPRING (ACCEPT: SEEP)

TOSS-UP

7) GENERAL SCIENCE *Multiple Choice* Which of the following is most specifically designed to measure low temperatures:

- W) alcohol thermometer
- X) pyrometer
- Y) cryometer
- Z) mercury thermometer

ANSWER: Y) CRYOMETER

BONUS

7) GENERAL SCIENCE *Short Answer* Who was the first president of the International Psychoanalysis Association who theorized that the shadow archetype consists of animal instincts:

ANSWER: CARL JUNG (Pronounced: KARL YOUNG)

TOSS-UP

8) GENERAL SCIENCE *Multiple Choice* Which of the following would be a measurement of a typical printer's resolution:

- W) 0.25 millimeters
- X) 300 dpi
- Y) 640 X 480 (pronounced: 640 BY 480)
- Z) 200 RSU

ANSWER: X) 300 dpi

BONUS

8) GENERAL SCIENCE *Multiple Choice* The ARPANET was an example of a:

- W) telephone network
- X) LAN
- Y) WAN
- Z) email address

ANSWER: Y) WAN

TOSS-UP

9) CHEMISTRY *Multiple Choice* The ideal fuel for fuel cell use is:

- W) compressed natural gas
- X) reformulated gasoline
- Y) hydrogen
- Z) methanol

ANSWER: Y) HYDROGEN

BONUS

9) CHEMISTRY *Short Answer* What is the branch of chemistry that deals with the relationship between electricity and chemical reactions?

ANSWER: ELECTROCHEMISTRY

TOSS-UP

10) PHYSICS *Multiple Choice* Which of the following is NOT a consequence of the theory of electromagnetic radiation as formulated by J. C. Maxwell:

- W) electric fields can cause magnetic disturbance
- X) electromagnetic radiation consists of an electric and magnetic wave
- Y) light is a form of electromagnetic radiation
- Z) bright red light ejects no electrons from a metallic surface whereas dim violet light can

ANSWER: Z) BRIGHT RED LIGHT EJECTS NO ELECTRONS FROM A METALLIC SURFACE WHEREAS DIM VIOLET LIGHT CAN

BONUS

10) PHYSICS *Short Answer* All elements with an atomic number greater than what number are unstable?

ANSWER: 83

TOSS-UP

11) BIOLOGY *Short Answer* Mendel did most of his original experimentation using this type of plant:

ANSWER: PEA

BONUS

11) BIOLOGY *Short Answer* Order the following from the part of the digestive tract nearest to the beginning to the part nearest to the end: jejunum, ileum, esophagus, duodenum

ANSWER: ESOPHAGUS, DUODENUM, JEJUNUM, ILEUM

TOSS-UP

12) ASTRONOMY *Short Answer* A meteor that reaches the surface of the Earth is more accurately called a:

ANSWER: METEORITE

BONUS

12) ASTRONOMY *Multiple Choice* At a location half-way from the Equator to the North Pole, which of the following correctly describes the stars apparent motion:

- W) they move in circles parallel with the horizon
- X) they rise and set vertically
- Y) they remain stationary
- Z) they rise and set at an angle to the horizon

ANSWER: Z) THEY RISE AND SET AT AN ANGLE TO THE HORIZON

TOSS-UP

13) MATH *Multiple Choice* In a simple random sample:

- W) response bias will be small
- X) non-response bias will be small
- Y) any two samples of the same size will have the same chance of being drawn
- Z) each subject is asked every question and random responses are allowed

ANSWER: Y) ANY TWO SAMPLES OF THE SAME SIZE WILL HAVE THE SAME CHANCE OF BEING DRAWN

BONUS

13) MATH *Short Answer* Every even integer greater than 2 can be written as the sum of two primes. Give the respective two pairs of prime numbers that when added give 8 and 12:

ANSWER: 5 AND 3 FOR THE NUMBER 8; AND 7 AND 5 FOR THE NUMBER 12

[Note: 11 and 1 is not an acceptable answer; 1 is not a prime number]

TOSS-UP

14) EARTH SCIENCE *Short Answer* What is the professional name for the person who studies fossils?

ANSWER: PALEONTOLOGIST (pronounced: pale-ee-on-TALL-o-gist)

BONUS

14) EARTH SCIENCE *Multiple Choice* Which of the following latitudes and dates would coincide with the longest duration of insolation:

- W) $23\frac{1}{2}^{\circ}$ South on September 21
- X) 50° North on June 21
- Y) 50° South on March 21
- Z) 0° on June 21

ANSWER: X) 50° NORTH ON JUNE 21

(Solution: W=12 hrs; X=15 hrs; Y= 12 hrs; Z=12 hrs)

TOSS-UP

15) GENERAL SCIENCE *Multiple Choice* In the tempering of steel tools, the process of rapidly cooling the tool is called:

- W) quickening
- X) quenching
- Y) drawing
- Z) case hardening

ANSWER: X) QUENCHING

BONUS

15) GENERAL SCIENCE *Short Answer* What is the general name of the unusual infectious agents that causes spongiform (pronounced: SPONGE-ih-form) encephalopathy (pronounced: EN-seff-a-lop-o-thee)?

ANSWER: PRIONS

TOSS-UP

16) GENERAL SCIENCE *Multiple Choice* A double sided, double layered DVD designed under today's specifications, has a top storage capacity of:

- W) less than 6 gigabytes
- X) greater than 16 gigabytes
- Y) 8 to 10 gigabytes
- Z) 12-14 gigabytes

ANSWER: X) GREATER THAN 16 GIGABYTE

BONUS

16) GENERAL SCIENCE *Short Answer* In optical resolution terminology, dpi is often used. What does dpi stand for?

ANSWER: DOTS PER INCH

TOSS-UP

17) CHEMISTRY *Multiple Choice* Out of the following choices, which is the correct name for N_2O_3 :

- W) dinitrogen oxide
- X) dinitrogen dioxide
- Y) dinitrogen trioxide
- Z) dinitrogen tetroxide

ANSWER: Y) DINITROGEN TRIOXIDE

BONUS

17) CHEMISTRY *Short Answer* Convert 673 Kelvin into degrees centigrade:

ANSWER: 400°C

(Solution: $673 - 273 = 400$)

TOSS-UP

18) PHYSICS *Multiple Choice* In stars, the fusion of hydrogen typically releases energy as:

- W) photons and friction
- X) photons and neutrinos
- Y) photons and mesons
- Z) photons and gravitons

ANSWER: X) PHOTONS AND NEUTRINOS

BONUS

18) PHYSICS *Short Answer* Assuming friction is negligible, if a lever has a mechanical advantage of 5, how much effort in newtons is needed to lift a 10 newton load?

ANSWER: 2 NEWTONS

(Solution: Force = resistance / mechanical advantage)

TOSS-UP

19) **BIOLOGY** *Multiple Choice* Which of the following is the term for when a segment of a chromosome rotates 180 degrees and rejoins the same chromosome:

- W) deletion
- X) inversion
- Y) translocation
- Z) duplication

ANSWER: X) INVERSION

BONUS

19) **BIOLOGY** *Short Answer* Germs that cause fever usually act on this section of the brain, which is sometimes referred to as the body's thermostat:

ANSWER: HYPOTHALAMUS

TOSS-UP

20) **ASTRONOMY** *Multiple Choice* Light from distant galaxies comes mostly from which of the following:

- W) low mass stars
- X) high mass stars
- Y) ionized hydrogen nebula
- Z) large globular clusters of stars

ANSWER: X) HIGH MASS STARS

BONUS

20) **ASTRONOMY** *Short Answer* Which planet in our solar system has the most circular orbit?

ANSWER: VENUS

TOSS-UP

21) MATH *Short Answer* In 1700 AD, this person showed that a series of 0's and 1's could be used to denote a number:

ANSWER: GOTTFRIED LIEBNIZ

BONUS

21) MATH *Short Answer* If perfect numbers, except 6, can be expressed by the sum of the cubes of an unbroken sequence of consecutive odd integers, what are the consecutive odd integers which, when cubed, give the perfect number 28?

ANSWER: $1^3 + 3^3$

(Solution: $1^3 + 3^3 = 28$)

TOSS-UP

22) GENERAL SCIENCE *Multiple Choice* Which of the following is responsible for the changing of the seasons in North America:

- W) the Earth's orbit is elliptical
- X) the Sun moves through space
- Y) the Earth's axis is not perpendicular to the ecliptic
- Z) the Earth's axis precesses

ANSWER: Y) THE EARTH'S AXIS IS NOT PERPENDICULAR TO THE ECLIPTIC

BONUS

22) GENERAL SCIENCE *Multiple Choice* Which of the following most closely approximates the weight of a 1999 United States nickel:

- W) 1.9 grams
- X) 2.9 grams
- Y) 5.9 grams
- Z) 8.9 grams

ANSWER: Y) 5.9 GRAMS

TOSS-UP

23) CHEMISTRY *Multiple Choice* Which of the following is an example of a buffer system:

- W) H_2CO_3 and water
- X) H_2CO_3 and NaHCO_3
- Y) NH_3 and N_2
- Z) NaCl and KCl

ANSWER: X) H_2CO_3 AND NaHCO_3

BONUS

23) CHEMISTRY *Short Answer* Convert -40°F into Centigrade:

ANSWER: -40°C

TOSS-UP

24) PHYSICS *Multiple Choice* Which of the following particles has not yet been observed but is generally theorized to exist:

- W) mesons
- X) gluons
- Y) fermionic hadrons
- Z) gravitons

ANSWER: Z) GRAVITONS

BONUS

24) PHYSICS *Short Answer* With regard to the speed at which sound travels in a specific medium, at standard temperature and pressure, order the following materials from the SLOWEST to the FASTEST: steel, wood, air, water.

ANSWER: AIR, WATER, WOOD, STEEL

(Solution: air~331ft/sec; water~500ft/sec; wood~4300ft/sec; steel~5000ft/sec)

TOSS-UP

25) **BIOLOGY** *Multiple Choice* A newborn baby's immunity, which is acquired from the mother, is often referred to as:

- W) active immunity
- X) passive immunity
- Y) bystander immunity
- Z) physical immunity

ANSWER: X) PASSIVE IMMUNITY

BONUS

25) **BIOLOGY** *Short Answer* Parkinson's disease is caused by a lack of this neurotransmitter in the brain:

ANSWER: DOPAMINE