

The following sample questions for flight engineer tests are suitable study questions for the Flight Engineer Turbojet Airman Knowledge Test (FEX). The full FEX test is 80 questions. Please note that the FEX and Flight Engineer Turbojet Added Rating (FEJ) tests share many questions. Students for the FEX or FEJ would do well to study both sets of questions.

The FAA computer-assisted testing system is supported by a series of supplement publications. These publications, available through several aviation publishers, include the graphics, legends, and maps that are needed to successfully respond to certain test items. Use the following URL to download a complete list of associated supplement books: http://www.faa.gov/training_testing/testing/airmen/test_questions/

The Learning Statement Reference Guide for Airman Knowledge Testing contains listings of learning statements with their associated codes. It can be located at: http://www.faa.gov/training_testing/testing/airmen/media/LearningStatementReferenceGuide.pdf

SAMPLE FEX EXAM:

PLT315

1. The speed at which the airflow over the wing first reaches the speed of sound is known as the
 - A. Reynolds number.
 - B. transonic index.
 - C. critical Mach number.

PLT315

2. Mach number is commonly defined as the
 - A. ratio of true airspeed to the speed of sound.
 - B. ratio of equivalent airspeed to the speed of sound.
 - C. speed of sound under conditions of standard pressure and temperature.

PLT242

3. Compared to a no-wind condition, what effect would a 20 knot headwind component have on takeoff performance?
 - A. The effect of wind on initial acceleration will result in a longer takeoff roll.
 - B. The airplane will reach critical engine failure indicated airspeed at a lower groundspeed.
 - C. Critical engine failure speed and actual groundspeed will be the same as in a zero-wind condition.

PLT244

4. When will power applications cause the greatest change in airplane trim and stability?
 - A. When on a power approach at low airspeeds.
 - B. Operation at high gross weight and low airspeed.
 - C. When power is applied simultaneously with a configuration change.

PLT214

5. Shock-induced separation of airflow occurring symmetrically near the wing root of a sweptback wing may result in
 - A. severe porpoising due to an attempt to recover control while under reverse command.
 - B. a high-speed stall and sudden pitchup due to the center of pressure moving forward on the wing.
 - C. a severe diving moment, due to the center of pressure moving aft on the wing and a decrease of downwash on the horizontal tail.

PLT237

6. What effect will decreasing air density have on lift and drag?

- A. Lift and drag will decrease.
- B. Lift will increase and drag will decrease.
- C. Lift will decrease and drag will increase.

PLT303

7. The angle of attack which produces the highest L/D ratio
- A. increases as weight or altitude is increased.
 - B. remains constant regardless of weight or altitude.
 - C. remains constant as altitude is changed, but decreases as weight is reduced.

PLT480

8. An airplane is in equilibrium when
- A. there are no accelerations and the airplane continues in steady flight.
 - B. the airplane is disturbed from its flightpath and it will return without control use.
 - C. the airplane has neither the tendency to continue or return from disturbance displacement.

PLT168

9. During flight with zero angle of attack, the pressure along the upper surface of the wing will be
- A. equal to atmospheric pressure.
 - B. less than atmospheric pressure.
 - C. greater than the pressure below the wing.

PLT244

10. The purpose of airplane wing dihedral angle is to
- A. increase lateral stability.
 - B. increase longitudinal stability.
 - C. increase lift coefficient of the wing.

PLT244

11. What is the primary source of directional stability for an airplane?
- A. CG position.
 - B. Vertical tail.
 - C. Horizontal tail.

PLT124

12. An airplane is climbing at Mach .78. The true airspeed will
- A. increase with altitude.
 - B. increase as pressure decreases.
 - C. decrease as the temperature decreases.

PLT011

13. (Refer to figure 2.) Compute the V speeds for the following conditions.

Gross weight	250,000 lb
Pressure altitude	428 ft
OAT	+80 °F
Flaps	25°
Tailwind	5 kts
Airport	SEA RWY 34

- A. V1 118, VR 132, V2 145.
- B. V1 117, VR 133, V2 144.
- C. V1 121, VR 133, V2 144.

PLT135

14. To which elevation should the cabin altitude be set for the following landing conditions?

Altimeter	30.12
Field elev	6172 ft

Airplane cabin depressurized 500 ft AGL
Cabin pressure controller calibrated to 29.92

- A. 6,472 feet.
- B. 6,672 feet.
- C. 6,792 feet.

PLT188

15. (Refer to figure 6.) Which is the lowest cabin altitude that can be maintained at FL 320 with a pressure differential of 14.2 inches Hg?

- A. -1,000 feet.
- B. +1,000 feet.
- C. +8,000 feet.

PLT135

16. To which elevation should the cabin altitude be set for the following landing conditions?

Altimeter 30.12
Field elev 1295 ft
Airplane cabin pressurized to 200 ft below field elev
Cabin barometric pressure reference setting 29.92

- A. 895 feet.
- B. 1,295 feet.
- C. 1,595 feet.

PLT007

17. (Refer to figure 13.) Determine the go-around EPR's for these conditions.

Pressure altitude 1,000 ft
TAT 0 °C
A/C bleeds No. 2 and 3 ON
No. 1 OFF
Anti-ice Eng. ON

- A. Eng. 1, 2.12; Eng. 2, 2.15; Eng. 3, 2.12.
- B. Eng. 1, 2.16; Eng. 2, 2.11; Eng. 3, 2.16.
- C. Eng. 1, 2.16; Eng. 2, 2.08; Eng. 3, 2.12.

PLT011

18. (Refer to figures 14 and 15.) Determine the maximum takeoff power settings.

Pressure altitude Sea Level
OAT +15 °C
A/C bleed No. 1 and 2 OFF
No. 3 ON
Eng. anti-ice OFF
No. 2 Eng. EPR gauge Inoperative

- A. Eng. 1, 2.12; Eng. 2, 98.2; Eng. 3, 2.10.
- B. Eng. 1, 2.10; Eng. 2, 92.7; Eng. 3, 2.14.
- C. Eng. 1, 2.14; Eng. 2, 96.9; Eng. 3, 2.10.

PLT011

19. (Refer to figure 6.) The maximum temperature limitation for takeoff is ISA +34 °C. Which is the highest temperature that will allow a takeoff from a 7,000-foot pressure altitude airport?

- A. +87 °F.
- B. +91 °F.
- C. +94 °F.

PLT016

20. How many minutes of dump time would be required to reach maximum landing weight at touchdown under the following conditions?

Number of engines	3
Cruise weight	171,000 lb
Max. landing weight	142,500 lb
Average fuel flow during dumping and descent to touchdown	3,170 lb/hr/eng
Time from start dump to landing	19 min
Fuel dump rate	2,300 lb/min

- A. 7.7 minutes.
- B. 11.1 minutes.
- C. 12.4 minutes.

PLT012

21. (Refer to figure 26.) How much fuel remains after dumping under operating conditions No. 1?

- A. 4,540 pounds.
- B. 4,980 pounds.
- C. 5,100 pounds.

PLT012

22. An airplane has been cruising for 2 hours and 15 minutes at a speed of Mach .82. Total fuel consumed during this period has been 27,250 pounds. If Mach 1.0 is 595 knots, what has been the NM per 1,000 pounds of fuel?

- A. 40.3 NM/1,000 pounds.
- B. 43.7 NM/1,000 pounds.
- C. 46.4 NM/1,000 pounds.

PLT117

23. Which is a reason for heating cockpit windows?

- A. Deicing.
- B. Anti-icing.
- C. Prevent thermal shock.

PLT263

24. A turbojet aircraft is equipped with heated inlet ducts and airfoil leading edges. When is this type of anti-icing system usually activated during flight?

- A. It is operated continuously while in flight.
- B. At all times when the OAT is below freezing.
- C. Whenever icing conditions are first encountered or are expected to occur.

PLT108

25. In an electrically heated windshield system, what maintains normal windshield temperature?

- A. Thermistors.
- B. Electronic amplifiers.
- C. Thermal overheat switches.

PLT108

26. What will cause the EPR indication to decrease falsely if the Pt probe at the engine nose dome is iced closed?

- A. The Pt probe vent will act as a Ps probe.
- B. Anti-ice air will pressurize the nose dome and the vent hole causing a decrease in EPR.
- C. The reduced inlet area causes pressure to increase, and magnifies the influence of ram air pressure.

PLT109

27. Why is it necessary to periodically completely discharge and recharge a nickel-cadmium battery?

- A. To restore electrolyte levels.

- B. To eliminate cell imbalance and loss of capacity.
- C. To dissolve nickel oxide formations on positive cells to restore capacity.

PLT207

28. What is the function of the circuit breaker in the instrument lighting system?
- A. Protects the lights from too much current.
 - B. Protects the wiring from too much current.
 - C. Prevents excessive voltage from reaching the wiring.

PLT207

29. Aircraft fuse capacities are rated in
- A. volts.
 - B. watts.
 - C. amperes.

PLT207

30. What is an advantage of using 115 volts, 400-Hz alternating current?
- A. High voltage and low current reduces wire size and weight requirements.
 - B. Commutators may be used with ac motors to decrease repair intervals and costs.
 - C. The ac single-phase induction motors are self-starting, making it possible to use lightweight motors.

PLT326

31. Why must oxygen not be permitted to come in contact with oil, grease, or solvents?
- A. Oxygen is highly flammable and will cause petroleum products to burn or explode.
 - B. Oxygen contact with petroleum products can cause spontaneous fires or explosions.
 - C. Gaseous oxygen is chemically unstable and will combine with petroleum to form a highly explosive mixture.

PLT326

32. What is an advantage of a chemical over a gaseous oxygen system?
- A. Fire hazards are reduced by eliminating oxygen lines.
 - B. Chemical systems may be shutoff at any time after they are activated.
 - C. Reliability is improved by interconnecting individual chemical units.

PLT326

33. What type of oxygen system is used for passengers?
- A. Demand.
 - B. Constant-flow.
 - C. Diluter-demand.

PLT326

34. Which position should be selected on the diluter-demand oxygen regulator if there is smoke in the cockpit?
- A. Normal.
 - B. Emergency.
 - C. 100 percent.

PLT137

35. Which components make up the basic air-cycle cooling system?
- A. Heaters, coolers, and compressor.
 - B. Ram air source, compressors, and engine bleeds.
 - C. A source of compressed air, heat exchangers, and a turbine.

PLT366

36. The purpose of a control tab is to

- A. move the flight controls in the event of manual reversion.
- B. reduce control forces by deflecting in the proper direction to move a primary flight control.
- C. prevent a control surface from moving to a full deflection position due to aerodynamic forces.

PLT346

37. Which direction from the primary control surface does an antiservo tab move?

- A. Same direction.
- B. Opposite direction.
- C. Remains fixed for all positions.

PLT473

38. A purpose of ground spoilers is to

- A. reduce the wing's lift upon landing.
- B. aid in rolling an airplane into a turn.
- C. increase the rate of descent without gaining airspeed.

PLT499

39. Total air temperature is equal to

- A. OAT corrected for altitude.
- B. ambient temperature minus the ram rise from adiabatic compression of the boundary layer.
- C. ram air temperature when the recovery factor of the temperature sensor is equal to 100 percent.

PLT342

40. Which is a means of controlling the fuel temperature on turbojet-powered airplanes?

- A. Electrically heated fuel filters.
- B. Engine bleed air routed to a heat exchanger.
- C. Fuel filters heated by engine lubricating oil.

PLT342

41. Oil extracts the most heat from which turbine engine components?

- A. Turbine bearings.
- B. Compressor bearings.
- C. Accessory drive bearings.

PLT251

42. What is the difference between Jet A and Jet B fuel?

- A. Jet A is colorless and Jet B is straw colored.
- B. Jet A has a freeze point of -40°C and Jet B has a freeze point of -47°C .
- C. Jet B is a blend of gasoline and kerosene made for operating at extremely low temperatures.

PLT273

43. One purpose of a hydraulic accumulator is to

- A. compress hydraulic fluid.
- B. absorb sudden pressure surges.
- C. store hydraulic fluid from small system leaks.

PLT273

44. What is the significance of the pop-out indicator on some hydraulic filters?

- A. Confirmation of fluid thermal expansion in the gear, flaps, or other systems.
- B. Evidence that contaminants may prevent components such as check valves from operating.
- C. Indication of overfilling and the fluid level of the hydraulic reservoir should be checked.

PLT273

45. What should be used to remove Skydrol from your skin?

- A. Solvent.

- B. Soap and water.
- C. Trichlorethylene.

PLT273

46. What should hydraulic flexible hose be inspected for on preflight?

- A. Slack between fittings.
- B. Hose supports at least every eighteen inches.
- C. Layline identification marks spiral clockwise.

PLT273

47. Why should synthetic hydraulic fluid be stored in an airtight container?

- A. High evaporation rate.
- B. Vapor is extremely toxic.
- C. Atmospheric moisture contamination.

PLT110

48. What item of the antiskid system enables full braking action during taxi and parking?

- A. The locked-wheel arming circuit is inoperative at taxi speeds.
- B. The antiskid switch is manually disarmed on the afterlanding checklist.
- C. The wheel-speed sensors automatically disarm the antiskid system at speeds below about 20 miles per hour.

PLT138

49. The purpose of chines on tires is to

- A. increase traction on snow or ice covered runways.
- B. reduce the tendency to hydroplane on wet runways.
- C. deflect water or slush away from the engine intakes.

PLT138

50. The purpose of fusible plugs in aircraft wheels is to

- A. prevent tire blowouts.
- B. quickly deflate tires for repair.
- C. protect the antiskid electrical system.

PLT139

51. When will the landing gear position warning system provide a warning in the cockpit?

- A. When the power levers are retarded and the gear is in transit.
- B. When the power levers are advanced and the speed brakes are not retracted.
- C. When one power lever is retarded below cruise and the gear is down and locked.

PLT337

52. During the walkaround inspection, you observe covers over the pitot probes. Which items will be affected if the covers are not removed?

- A. Airspeed, altimeter, and autopilot.
- B. Flight recorder, airspeed, and autopilot.
- C. Flight recorder, autopilot, instantaneous vertical speed indicator, and airspeed.

PLT041

53. What will result if the instrument static pressure line becomes disconnected inside a pressurized cabin during cruise flight?

- A. The altimeter and airspeed indicator will both read low.
- B. The altimeter and airspeed indicator will both read high.
- C. The altimeter will read low and the airspeed indicator will read high.

PLT342

54. What condition will cause a high EGT, Wf, and RPM with a normal EPR indication, at all power settings?

- A. FOD.
- B. Bleed valve stuck open.
- C. Ice in the inlet pressure lines.

PLT477

55. What recovery would be appropriate in the event of compressor stall?

- A. Reduce the thrust lever and then rapidly advance the thrust lever to decrease the angle of attack on the compressor blades, creating more airflow.
- B. Reduce the thrust lever and then slowly advance the thrust lever again to decrease the angle of attack on one or more compressor blades.
- C. Advance the thrust lever slowly to increase airflow and decrease the angle of attack on one or more compressor blades.

PLT499

56. Which engine instrument is most likely to show an elevated reading if the turbine wheel is damaged?

- A. N2.
- B. EPR.
- C. EGT or TIT.

PLT479

57. It is important to monitor the EGT when starting the engines to prevent

- A. hot section burnout or metal distortion.
- B. compressor temperature limits from being exceeded.
- C. dangerous gas temperatures and velocities when accelerating to idle from injuring personnel or damaging the engine.

PLT479

58. Which action should be completed immediately during the start sequence if the ITT attempts to exceed the temperature limit? Shut off the

- A. fuel.
- B. starter.
- C. ignition.

PLT499

59. The purpose of the diffuser section in a turbine engine is to

- A. convert pressure to velocity.
- B. increase pressure and reduce velocity.
- C. reduce pressure and increase velocity.

PLT499

60. (Refer to figure 7.) The internal engine pressure will be the lowest at which location?

- A. Location 4.
- B. Location 5.
- C. Location 6.

PLT479

61. If a turbine engine catches fire internally during the start cycle, what initial action should be taken?

- A. Secure all switches and leave the airplane.
- B. Shut off the fuel and continue motoring the starter.
- C. Discharge CO2 into the inlet duct while continuing to motor the engine.

PLT108

62. The purpose of diluting ethylene glycol deicing fluid with water in nonprecipitation conditions is to
- A. raise the eutectic point.
 - B. decrease the freeze point.
 - C. increase the minimum freeze point (onset of crystallization).

PLT108

63. Deicing fluid should be dispensed at what temperature?
- A. Cold.
 - B. Heated.
 - C. Ambient.

PLT108

64. Anti-icing fluid should provide freezing point protection to
- A. -20 °F ambient temperature.
 - B. +32 °F outside temperature or below.
 - C. a freezing point no greater than 20 °F below the ambient or airplane surface temperature.

PLT108

65. Type 2 deicing/anti-icing fluids have a significantly
- A. longer holdover period than type 1 fluids.
 - B. shorter holdover period than type 1 fluids.
 - C. lower viscosity than type 1 fluids.

PLT208

66. Which frequency is preferred to declare an emergency to ATC?
- A. 121.5 Mhz VHF.
 - B. 243.0 Mhz UHF.
 - C. The one in use.

PLT497

67. Which transponder code means the airplane is being forced to a new destination?
- A. 7500.
 - B. 7600.
 - C. 7700.

PLT212

68. What identifies a fire extinguisher used for brake fires?
- A. A square with the letter B.
 - B. A circle with the letter C.
 - C. A star with the letter D.

PLT440

69. Which flight crewmember nonessential conversation is allowed below 10,000 feet?
- A. Discussing stock market reports during taxi.
 - B. None.
 - C. Confirming airplane logbook entries during climb when clear of the airport traffic area.

PLT409

70. What is the flight time limitation for flag operations that requires two pilots and at least one additional flight crewmember?
- A. 100 hours during any 30-day period.
 - B. 300 hours during any 3 calendar months.
 - C. 1,000 hours during any 12 calendar-month period.

PLT451

71. Which requirement must be met by all flight engineers every 6 months before they can serve on an air carrier flight under 14 CFR part 121?
- A. Line check or route check.
 - B. Recurrent flight and ground training.
 - C. 50 hours of flight time or a flight check.

PLT409

72. Duty and rest period rules for domestic air carrier operations require that a flight crewmember
- A. not be assigned to any duty with the air carrier during a required rest period.
 - B. be relieved of all duty for at least 48 hours during any 7 consecutive days.
 - C. not be assigned to any duty for a period of at least 18 hours if the flight crewmember had been on duty aloft for 9 hours.

PLT438

73. How much supplemental oxygen must pressurized air carrier transport airplanes carry for each flight crewmember on flight deck duty when operating at flight altitudes above 10,000 feet?
- A. A minimum of 1 hours' supply.
 - B. A minimum of 2 hours' supply.
 - C. A minimum of 30 minutes' supply.

PLT439

74. Which maintenance task may a flight engineer perform while operating under 14 CFR part 125?
- A. Landing light replacement if there is no certificated mechanic available.
 - B. Remove, inspect, and replace a chip detector if the malfunction occurs in a remote area.
 - C. Replenish hydraulic fluid in accordance with applicable regulations and the certificate holder's manuals.

PLT386

75. If a person has lost their flight engineer certificate, the privileges of that certificate may be exercised until a duplicate is received, after obtaining a
- A. confirming telegram from the FAA which is valid for 30 days.
 - B. FAX from the Airman Certification Branch in Oklahoma City which is valid for 60 days.
 - C. temporary certificate issued by a Flight Standards District Office which is valid for 90 days.

PLT203

76. Which is true concerning the troposphere?
- A. It extends to a uniform height at all latitudes.
 - B. It is thicker over the Equator than over the poles.
 - C. It is the dividing line between the stratosphere and the atmosphere.

PLT274

77. An in-flight condition necessary for structural icing to form is
- A. visible water such as supercooled rain or cloud droplets.
 - B. aerodynamic cooling of an airfoil to 0 degrees C.
 - C. the temperature at the point where moisture strikes the aircraft must be 0 degrees F or colder.

PLT021

78. (Refer to figure 52.) What is the maximum payload under operating conditions No. 1?
- A. 20,500 pounds.
 - B. 21,500 pounds.
 - C. 25,500 pounds.

PLT021

79. (Refer to figure 34.) What is the new CG after adding weight under operating conditions No. 1?

- A. 20.9 percent.
- B. 25.8 percent.
- C. 27.9 percent.

PLT003

80. Before a cargo change is made, the following information is known about an airplane.

Aircraft weight	175,000 lb
CG	29.5 percent of MAC
Length of MAC	860.2 to 1040.9 in

If 6,500 pounds of cargo is removed from an average location of Station 1170.0, what is the new CG relative to MAC?

- A. 24.0 percent.
- B. 26.8 percent.
- C. 27.6 percent.