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This exam contains 92 questions.

1. The kinetic energy of an object is the extra energy which it possesses due to its...

a. heat gained during its development.
b. motion.
c. weight.

2. A turbo prop engine gives...

a. a large acceleration to a small mass of air.
b. a large acceleration to a large weight of air.
c. a small acceleration to a large mass of air.

3. Name the modules (parts) of a jet engine from front to rear .

a. Air compressor, combustion chamber, turbine wheel, and exhaust duct.
b. Air compressor, combustion chamber, cylinders and exhaust duct.
c. Turbine wheel, compressor and combustion chamber.

4. Which engine has a better stall characteristic?

a. Both answers are correct.
b. Single spool axial flow engine.
c. Multi spool axial flow engine.

5. The basic equation for thrust is...

a. thrust = force · acceleration.
b. thrust = mass · acceleration.
c. thrust = mass · velocity.

6. The conditions affecting the weight of a given volume of air are: pressure, temperature and humidity, therefore:

a. Density increases as temperature increases.
b. Density decreases as temperature decreases.
c. Density decreases as temperature increases.

7. When all factors are combined, it is found that the jet aircraft performs most efficiently at...

a. high speeds and high altitudes.
b. high speeds and low altitudes.
c. low speeds and high altitudes.

8. The engine data and engine assembly identification plates are attached to the engine.

What data do these plates provide?

a. Engine specification as designed by the manufacturer.
b. Engine specification as designed by the manufacturer for the aircraft configuration.
c. Aircraft specification as designed by the manufacturer for the engine to be installed.

9. What happens to the thrust if temperature increases?

The thrust...

a. increases.
b. does not change except during extremely low temperature (-40 degrees Celsius).
c. decreases.

10. When an aircraft is in flight, what accompanies the increase of air speed?

a. temperature.
b. altitude.
c. ram effect.

11. How is the effectiveness expressed for an engine intake?

a. Pressure recovery.
b. Engine power.
c. Mass airflow.

12. Why are methods like diverter, fence and bleed used?

a. To increase the efficiency of the intake at low (subsonic) speeds.
b. To avoid boundary layer effect in the intake.
c. To restrict the amount of airflow at supersonic speeds.

13. What shape does a bifurcated intake have?

a. Convergent from front to rear.
b. First divergent, then convergent towards the rear.

c. Divergent from front to rear.

14. What type of anti-icing system is generally installed on turboprop engines?

a. Pneumatic anti-ice
b. Electrical anti-ice
c. Hot air anti-ice

15. On an engine with hot air anti-icing, where does the air come from?

a. From the opposite engine.
b. From the aircraft air system.
c. From the engine itself.

16. What is the disadvantage of a centrifugal compressor?

a. Large frontal areas for a given mass flow.
b. Weight.
c. Low overall compression ratio.

17. Many aircraft APU's use a centrifugal hardware configuration because of its...

a. compact size.
b. high overall compression ratio.
c. high power development and ability to support varies support system.

18. Fan blades are normally...

a. replaceable in moment weighted pairs.
b. not replaced on installed engine.
c. cleaned after each flight to maintain efficiency.

19. The relative angle of attack of the compressor blade is a result of...

a. inlet air velocity and compressor temperature.
b. compressor rpm and temperature.
c. inlet air velocity and compressor rpm.

20. A compressor stall is best explained as...

a. the smooth rearwards flow of air comes to a stop.
b. air stops flowing smoothly rearwards on engine shutdown.

c. trust reverser.

21. The purpose of the variable inlet guide vanes is to direct the incoming air into the...

a. turbine at the correct angle so as to achieve the optimum angle of flow to the first stage.
b. combustion chamber at the correct angle so as to achieve the optimum angle of attack.
c. compressor at the correct angle so as to achieve the optimum angle of attack of the first stage rotor blades.

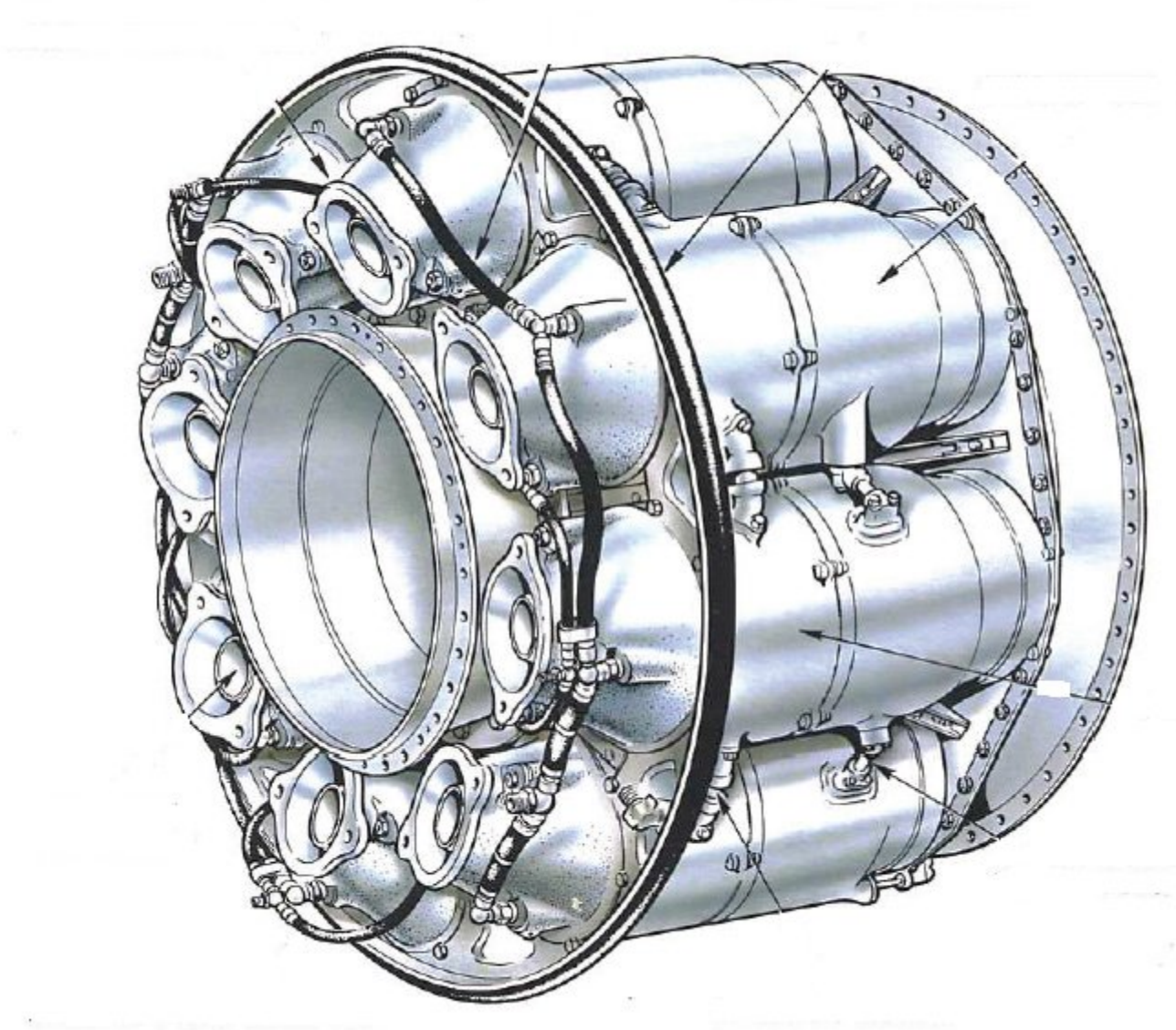
22. One of the primary limiting factors on pressure ratio in modern designs is that the:

a. air cools down as it is compressed.
b. air heats up as it it compressed.
c. location that the temperature is taken.

23. Where does air coming from the compressor spread out and is provided additional space?

a. S duct.
b. diffuser.
c. nozzle inlet guide vane position.

24. What kind of combustion system is shown in the picture?



a. Can type combustion chamber.
b. Multiple combustion chamber.
c. Annular combustion chamber.

25. In what zone of the combustion section is the highest temperature?

a. Dilution zone.
b. Primary zone.
c. Intermediate zone.

26. The nozzle area in a reaction type turbine is....

a. convergent.
b. divergent.
c. constant flow.

27. Are nozzle guide vanes hollow? If yes, why?

a. No
b. Yes, to make them lighter and stronger
c. Yes, to allow cooling air to pass through them

28. How is turbine blade creep at a constant rate called?

a. Tertiary creep.
b. Static creep.
c. Secondary creep.

29. What is the main effect of creep on a blade?

The blade gets...

a. stretched.
b. thinner.
c. smaller.

30. What is the function of the inner exhaust cone at the rear face of the turbine disc?

The cone....

a. decreases the exhaust area to the rear and maximizes the gas velocity.
b. increases the exhaust area to the rear and lowers the gas velocity.
c. decreases the exhaust area to the rear and lowers the gas velocity.

31. On commercial gas turbine engines the exhaust duct is....

a. convergent.
b. convergent / divergent.
c. divergent.

32. In a low bypass engine the bypass flow is mixed after the...

a. last stage of compression to reduce noise inside the compressor.
b. lower pressure turbine to reduce noise.

c. last stage of the turbine.

33. Labyrinth Seals are supported with engine...

a. oil pressure.
b. air pressure.
c. springs.

34. Why do bearing assemblies often contain a cage?

a. To keep the rollers or balls in place.
b. To transmit forces to the raceway.
c. To make sure lubrication is 100%.

35. Engine bearing cavities are sealed with labyrinth seals and are supported....

a. with engine oil pressure
b. with engine air pressure.
c. in a powder substance to insure longer life support.

36. At extreme cold starting conditions the prime limiting factor for fuel is:

a. Viscosity.
b. Smoke point.
c. Flashpoint.

37. A fuel system icing inhibitor is a fuel additive that prevents....

a. the water in the fuel from freezing.
b. the water and fuel from freezing.
c. the fuel from freezing.

38. Why are fuel additives added to fuel?

Additives are added to improve....

a. the smell.
b. the properties.
c. the price.

39. Increasing the flashpoint will make fuel safer but....

a. a hot start will become more difficult.
b. a cold start will become more difficult.
c. the fuel consumption will increase drastically.

40. Why is it required to wait five minutes after engine shut down before removing the oil filter cap?

a. That all oil can drain back to the gearbox.
b. It allows the tank pressure to bleed off.
c. So that all the oil looses its air through the breather and foaming of oil is reduced.

41. When the electronic engine control has to be replaced, what happens with the programming plug?

The programming plug must....

a. remain with the engine.
b. be reprogrammed for the new electronic engine control.
c. be renewed.

42. What is the purpose of an engine oil system?

a. Bearing lubrication and heating fuel.
b. Bearing cooling, lubrication and heating fuel.
c. Bearing cooling, lubrication and cooling fuel.

43. A cleanable filter is made of....

a. paper mesh.
b. plastic mesh.
c. woven wire.

44. The fuel control is an engine driven accessory. It can operate by mechanical, hydraulic, electrical, or pneumatic forces in various combinations.

What is the purpose of the fuel control?

a. Control the fuel flow from the aircraft fuel booster pumps.
b. Maintain a correct combustion air-to fuel mixture.
c. Limit the amount of fuel to the combustion chamber.

45. When on the EICAS the fuel bypass message is indicated, where does the signal come from?

a. Low pressure fuel pump bypass valve.
b. Main pressure fuel pump bypass valve.
c. Differential pressure switch.

46. The fuel flow transmitter (FFT) uses electromagnetic pulses...

a. generated by the fuel booster pumps.
b. to control the amount of fuel sent to the fuel control unit.
c. to measure the rate of fuel flow.

47. What is the purpose of the L.P. pump?

To ensure...

a. that the fuel nozzles get the correct fuel pressure.
b. that enough fuel flow is delivered to the high pressure pump.
c. rapid acceleration when the trottle is opened.

48. What is the function of linear variable differential transformers (LVDT)?

a. Feedback signals.
b. Warning signals.
c. Control signals.

49. Thrust lever position is transmitted to the EEC via a thrust lever resolver, as Thrust Lever....

a. solenoid energized in a series.
b. angle.
c. cables.

50. What is the purpose of the accessory cooling system?

The purpose of the accessory cooling system is...

a. to avoid that engine oil exceeds 653 degrees celsius.
b. to reduce excessive heat on components, thereby extending life and increasing engine efficiency.
c. allowing engine components to heat up to operating temperature.

51. The cooling air ducts are used to supply air from the high pressure compressor to the high pressure turbine (HPT) area for cooling of...

a. exhaust cone.
b. internal engine surfaces.
c. inlet nozzle vane to the turbine.

52. The compressor bleed control is provided for....

a. to cool the accessories on the engine.
b. improved starting and surge protection.
c. overpressure in the engine.

53. The exact sequence of the starting procedure is important since there must be...

a. oil pressure before rotation of the engine high speed compressor.
b. sufficient air flow through the engine to support combustion.
c. indication before you can get fuel flow to the engine.

54. If the starter were cut off below the self-accelerating speed, the engine could?

a. Catch fire externally.
b. This is not a problem because the starter would re-engage to continue the starting process.
c. Fail to accelerate to idle speed.

55. The ignition power supply includes two independent ignition exciters installed on the engine.

Each ignition exciter is...

a. of the capacitive-discharge type, converting 115-volt ac to 24-kilovolts dc (nominal).
b. an independent battery device, storing its own power.
c. converting 115-volt ac to 24-kilovolts ac (nominal).

56. When will continuous ignition be selected?

a. Only for start-up.
b. After take-off.
c. For flight in bad weather conditions.

57. Why is it required to ground the cable terminal of an ignition system after detaching the cable from the igniter plug?

a. To dissipate the energy stored in the system
b. To prevent an open in the ignition cable

c. To prevent a short in the cable.

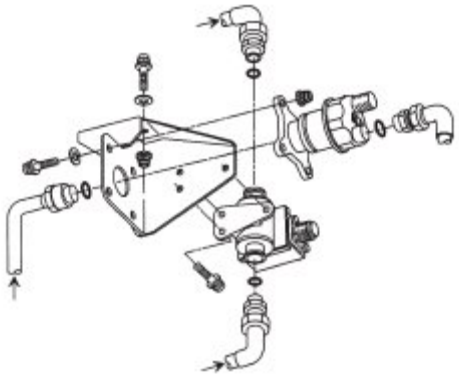
58. Why is the EGT indication very important?

a. It gives a direct relationship to engine power.
b. It is the only engine condition monitoring parameter.
c. It gives information about the heaviest loaded part, the turbine.

59. What does engine pressure ratio on a modern turbofan engine indicate?

a. The air pressure produced by the compressor.
b. The air pressure at the exhaust.
c. The pressure ratio across the fan.

60. The oil pressure transmitter senses the difference between pressure pump delivery pressure and...



a. the ISA parameters.
b. the gear box pressure.
c. the FCOC (Fuel Cooled Oil Cooler).

61. The sensors are induction-type tachometers. The tip on each sensor has a permanent magnet with three coil assemblies.

This best describes?

a. Fuel pump pressure indication system.
b. Engine tachometer system.
c. AVM (airborn vibration system).

62. Which indication component is using a permanent magnet with three coil assemblies?

a. The engine tachometer system.
b. The airborn vibration system signal conditioner pick up points.
c. The fuel pump pressure indication system.

63. Adverse conditions, as far as the engine is concerned, is operation in high ambient temperature and/or high altitude. These are adverse conditions.

Which two systems are available to overcome these conditions?

a. Remove the throttle stops for more thrust.
b. Water injection and water / methanol injection
c. Turbine case cooling and bleed air control.

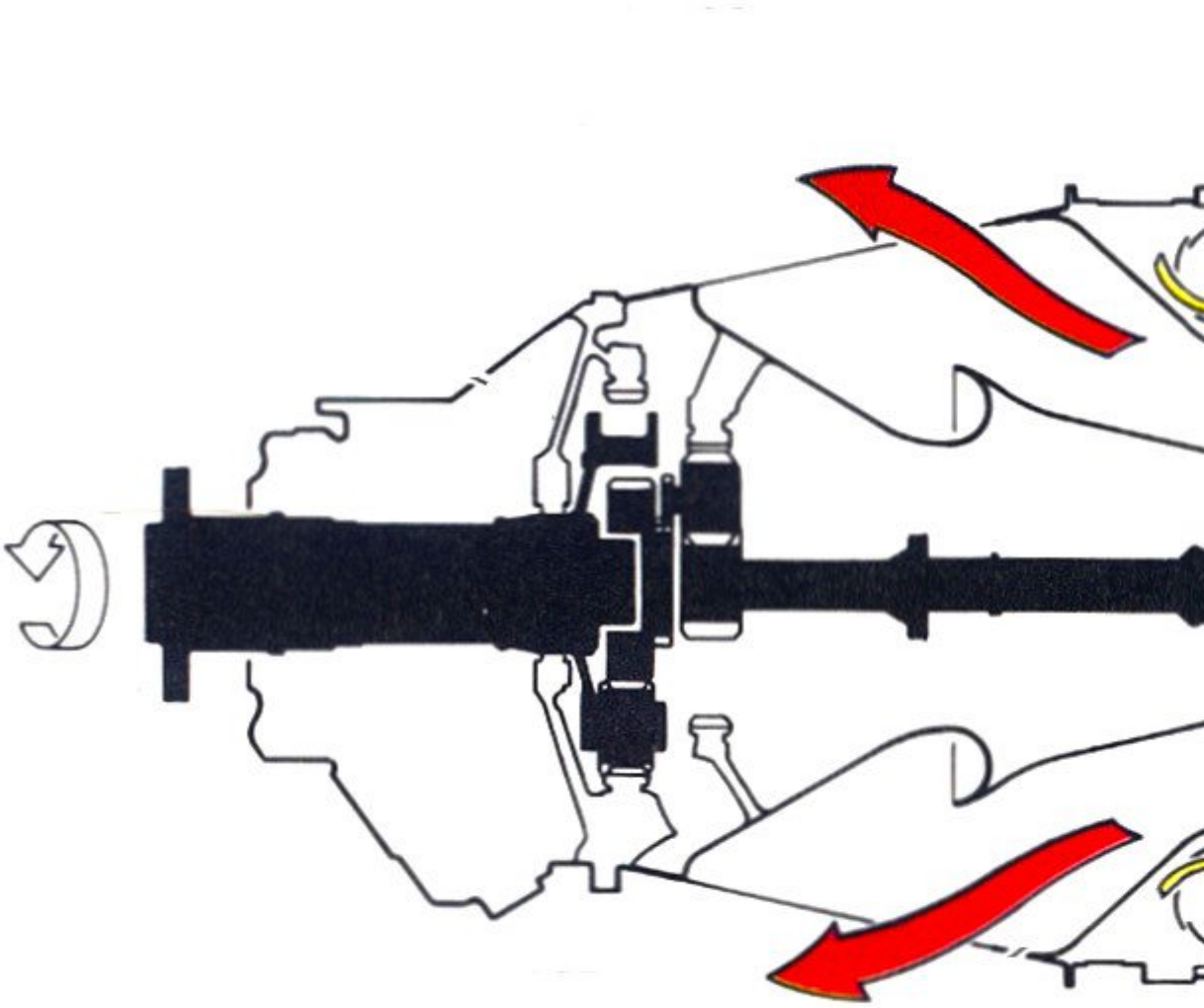
64. Injection of water into the engine inlet will cool the inlet air and hence its density will...

a. increase.
b. decrease.
c. get thinner.

65. The increased thrust is obtained by injecting and burning large quantities of fuel in the specially shaped engine exhaust system. This is referred to as....

a. hot shot ignition
b. rocket pressure outlet nozzle
c. after burner

66. What kind of engine is shown in the next picture?



a. Fixed turbine type.
b. Triple shaft type.
c. Free turbine type.

67. Which description is the best for: "Epicyclic Planetary Gear Type Reduction Gear"?

a. Mechanically simple and therefore relatively cheap to manufacture.
b. Reduction gear with a rack and pinion.

c. Gear is composed of a central input (sun) gear driving two or more spider mounted planet gears.

68. On a typical free turbine turboprop engine the propeller control lever is connected to the...

a. constant speed fuel mixing unit.
b. propeller governor.
c. fuel control unit.

69. An turboprop overspeed governor is a backup for the...

a. fly weights.
b. radial governor.
c. propeller governor.

70. The parallel spur gear type and the epicyclic type describe...

a. excitation gear systems.
b. eccentric gear systems.
c. reduction gear systems.

71. The most commonly used turbo-shaft engines today are from the...

a. single shaft type.
b. free-turbine type.
c. fixed-turbine type.

72. The most commonly used freewheeling unit on helicopters is the...

a. sprague clutch.
b. wet sink clutch assembly.
c. centrifugal clutch.

73. The drive shaft and flexible coupling system for a helicopter consist of...

a. a shaft with two flexible couplings attached at each end.
b. a direct shaft that can only withstand heavy loads at low RPM.
c. a direct chain drive with coupling, that can only withstand heavy loads at low RPM.

74. The APU fuel system receives fuel from...

a. ground support system.

b. the airplane wing tanks through a shrouded line.
c. external fuel source during operation.

75. There are two separate APU protective shutdown systems in the ECU.

They are...

a. discrete and digital.
b. analog and digital.
c. analog and discrete.

76. What type of compressor and combustion chamber is used in the power section of an APU?

a. Axial flow compressor to save space and annular combustion chamber.
b. Axial flow compressor to save space and can combustion chamber.
c. Centrifugal compressor with a reverse flow annular combustion chamber.

77. A small turbine engine, known as the power section, driving a load compressor to produce pneumatic power.

What does the load compressor also drive?

a. An accessory gearbox providing an attach point for a generator.
b. An accessory gearbox providing an attach point for an air compressor.
c. A single shaft to a DC generator.

78. What causes the majority of outside noise in a high-bypass engine?

a. Core Engine.
b. LP fan.
c. HP fan.

79. When you need no overhead crane or other external hoist devices to change an engine.

This is a...

a. Single hoist equipment.
b. Chain hoist equipment.
c. Bootstrap equipment.

80. The fan cowl panels open to provide access to components on the...

a. engine combustion chamber
b. engine fan case

c. inlet cowling

81. On very large engines the cowlings and access panels can be so heavy that it will require assistance to open.

How is this performed?

a. Hydraulic or mechanical assistance.
b. It is not required to have access because designers took this into consideration.
c. Simply by the use of more people to raise or lower the section.

82. Extinguishing agent is discharged through a...

a. pipeline system
b. solid state generator the a pipeline system is too heavy for large airplanes.
c. solid material that melts on heat contact.

83. Turbine case cooling is used to....

a. reduce turbine rotor vane clearences and improve engine efficiency.
b. improve gasturbine starting characteristics at high altitude.
c. improve service life of the high pressure compressor.

84. The fire extinguishing system includes...

a. a cockpit control switch, fire extinguishing agent containers, and an agent distribution system
b. a cockpit control switch, fire extinguishing agent containers in the flight deck and an agent distribution system at the wing tip.
c. only protection function

85. This fire detector consists of a sensor and a responder. The sensor tube contains a gas charged core material and helium under pressure.

What system is this?

a. Fenwall.
b. Systron-Donner
c. Kidde

86. Engine areas should be inspected for loose articles and debris before starting the engine.

What areas are they?

a. Only the area directly behind the engine exhaust
b. A distance of 30 meters around the inlet
c. Air intakes and exhaust

87. What is the most important engine instrument indication to monitor during a start of a turbine engine?

a. Exhaust gas temperature.
b. Engine oil temperature.
c. Oil pressure.

88. Routine checks are made to compare the current performance of the engine with its test-cell performance.

Why?

a. This trend monitoring is a system of continuous in flight comparison of engine performance parameters with a base line of these same parameters.
b. It is strictly a management tool to ensure personnel are doing their job.
c. Monitoring is a system of annual requirement to compare engine performance parameters with a base line of these same parameters.

89. One procedure that has improved efficiency is the built-in provision for inspecting the inside of the engine without disassembling it.

How is this performed?

a. With borescope or with one of its modern counterparts.
b. Access ports to visually monitor the engine in service.
c. Annual inspection.

90. To clean the gas path, washing with pure water is to recover the...

a. EGT margin.
b. low EPR output.
c. gas path through the exhaust.

91. The procedures for preserving and depreserving gas turbine engines vary depending upon...

a. the length of inactivity, the type of preservative used, and whether or not the engine may be rotated during the inactive period.

b. age of the engine, the type of preservative used.
c. humidity local conditions.

92. Engines which have been removed from aircraft to storage, or uninstalled engines which are being returned for repair or overhaul, should be protected internally and...

a. sealed in moisture vapor proof (MVP) envelopes.
b. stored in a moisture free container.
c. wiped clean of foreign object material.