PRACTICE EXAM 6 SIMULATION

1. The primary purpose of the capacitor (condenser) connected across the magneto breaker points is to:

A. Speed the collapse of the primary field and protect the points from arcing

B. Store the high-voltage spark for the next cylinder

C. Regulate the magneto's rotational speed

2. The function of the diffuser in a centrifugal compressor is to:

A. Burn the fuel-air mixture

B. Accelerate the air to high velocity

C. Convert high velocity into high pressure

3. The purpose of cooling fins on an air-cooled cylinder is to:

A. Strengthen the cylinder against combustion pressure

B. Increase the surface area for heat dissipation

C. Reduce the weight of the cylinder casting

4. The function of the oil pressure relief valve is to:

A. Regulate system oil pressure by bleeding off excess

B. Control oil temperature through the cooler

C. Scavenge oil from the sump to the tank

5. The purpose of a dynamic damper on the crankshaft is to:

A. Reduce torsional vibration from power impulses

B. Increase the engine's compression ratio

C. Time the valve opening to the crankshaft

6. The function of the impulse coupling is to:

A. Regulate alternator output voltage

B. Distribute the spark to the correct cylinder

C. Produce a hot, retarded spark at low cranking speed

7. The purpose of the wastegate in a turbocharger system is to:

A. Meter fuel to the cylinders

B. Control exhaust flow through the turbine to regulate boost

C. Regulate oil pressure to the bearings

8. The function of baffles and baffle seals in an air-cooled engine is to:

A. Reduce engine noise

B. Seal the exhaust system joints

C. Direct cooling air through the cylinder fins

9. The purpose of the scavenge pump in a dry-sump system is to:

A. Return oil from the engine sump to the tank

B. Pressurize oil to the bearings

C. Cool the oil before it enters the engine

10. The function of the thermostatic (thermal bypass) valve in the oil system is to:

A. Regulate oil pressure at high RPM

B. Control oil temperature by routing oil through or around the cooler

C. Return scavenged oil to the tank

11. The purpose of the full-flow oil filter bypass valve is to:

A. Allow oil to reach the engine if the filter clogs

B. Lower oil pressure during cold starts

C. Return excess oil to the sump

12. The function of a sodium-filled exhaust valve stem is to:

A. Increase the valve face hardness

B. Transfer heat from the valve head to the stem

C. Reduce combustion pressure

13. The purpose of the venturi in a carburetor is to:

A. Heat the induction air to vaporize fuel

B. Filter contaminants from the air

C. Create a low-pressure area that draws fuel into the airstream

14. The function of the mixture control on a carbureted engine is to:

A. Adjust fuel flow to maintain the proper ratio as air density changes

B. Control the engine RPM directly

C. Regulate the oil temperature

15. The purpose of the float and needle valve in a float-type carburetor is to:

A. Atomize the fuel into the venturi

B. Adjust the idle speed

C. Maintain a constant fuel level in the bowl

16. The function of the fuel manifold (flow divider) in a continuous-flow injection system is to:

A. Distribute metered fuel evenly to the cylinder nozzles

B. Pressurize fuel from the tank

C. Indicate fuel flow on the gauge

17. The purpose of the auxiliary (boost) fuel pump is to:

A. Provide pressure for starting, backup, and vapor-lock prevention

B. Regulate the fuel-air mixture automatically

C. Cool the fuel before it reaches the engine

18. The function of carburetor heat is to:

A. Increase engine power output

B. Cool the induction air for denser charge

C. Melt or prevent carburetor ice using exhaust-warmed air

19. The purpose of the governor on a constant-speed propeller is to:

A. Maintain a selected RPM by changing blade angle

B. Regulate the fuel flow to the engine

C. Time the ignition to the crankshaft

20. The function of feathering a propeller is to:

A. Provide reverse thrust during landing

B. Increase the RPM of a failed engine

C. Minimize the drag of a failed engine

21. The purpose of a bonding strap between the engine and airframe is to:

A. Support part of the engine weight

B. Carry oil between the sump and cooler

C. Provide electrical continuity and control static interference

22. The function of the voltage regulator in the electrical system is to:

A. Convert AC to DC

B. Hold output voltage constant by varying field current

C. Increase engine RPM as load rises

23. The purpose of a starter-generator on a turbine engine is to:

A. Provide ignition during start only

B. Serve as the starter during start and the generator afterward

C. Regulate the fuel control schedule

24. The function of the diffuser section just before a turbine combustor is to:

A. Slow the air to its lowest velocity and highest pressure for combustion

B. Accelerate the gas to produce thrust

C. Extract energy to drive the compressor

25. The purpose of the secondary (cooling) airflow in a turbine combustor is to:

A. Provide the only air that burns with fuel

B. Cool the liner and dilute the gases for the turbine

C. Bypass the engine entirely as thrust

26. The function of variable stator vanes in a turbine compressor is to:

A. Increase the bypass ratio at cruise

B. Maintain smooth airflow and prevent compressor stall across the speed range

C. Reduce exhaust noise on takeoff

27. The purpose of the exhaust nozzle on a turbojet is to:

A. Accelerate the gas to produce thrust

B. Slow the gas to recover pressure

C. Extract energy to drive the accessories

28. The function of a thrust reverser is to:

A. Increase takeoff thrust

B. Feather the engine fan

C. Redirect thrust forward to help decelerate on landing

29. The purpose of the ignition exciter in a turbine engine is to:

A. Meter fuel to the combustor

B. Produce the high-energy pulses for the igniter plugs

C. Regulate the compressor bleed valves

30. The function of an igniter plug in a turbine engine is to:

A. Fire continuously throughout engine operation

B. Ignite the fuel during starting and relight

C. Sense the exhaust gas temperature

31. The purpose of dehydrator plugs during engine preservation is to:

A. Pressurize the cylinders against moisture

B. Lubricate the cylinder walls

C. Indicate internal humidity by changing color

32. The function of a corrosion-preventive compound during preservation is to:

A. Coat internal surfaces to protect against corrosion

B. Increase the engine's compression

C. Speed the next engine start

33. The purpose of the differential compression test is to:

A. Measure the engine's oil pressure

B. Time the magneto to the engine

C. Assess cylinder sealing by measuring air leakage

34. The function of a borescope in turbine maintenance is to:

A. Magnetize ferrous parts for inspection

B. Measure cylinder taper

C. Inspect internal sections without disassembly

35. The purpose of blending a turbine blade nick is to:

A. Add material to restore the original profile

B. Remove the sharp stress riser that could start a crack

C. Increase the blade's length

36. The function of the table of limits in an overhaul manual is to:

A. List the aircraft's weight and balance data

B. Provide acceptable dimensions for accepting or rejecting parts

C. Record the engine's flight hours

37. The purpose of an Airworthiness Directive is to:

A. Recommend optional improvements to operators

B. Record a major repair on the aircraft

C. Correct an unsafe condition through mandatory action

38. The function of FAA Form 337 is to:

A. Document a major repair or major alteration

B. Record routine oil changes

C. List the engine's type certificate data

39. The purpose of the Type Certificate Data Sheet is to:

A. Authorize a one-time field modification

B. Define an engine's approved configuration and limitations

C. Record AD compliance for the operator

40. The function of straight mineral oil during engine break-in is to:

A. Allow the new piston rings to seat properly

B. Suspend contaminants for the filter

C. Provide high-temperature stability for turbines

41. The purpose of ashless dispersant additives in engine oil is to:

A. Increase the oil's viscosity at high temperature

B. Suspend contaminants and burn without harmful ash

C. Lower the oil's pour point only

42. The function of spectrometric oil analysis is to:

A. Measure the oil's viscosity index

B. Trend wear metals over time to predict and localize wear

C. Determine the oil's flash point

43. The purpose of cowl flaps on a piston aircraft is to:

A. Regulate the volume of cooling air over the engine

B. Reverse the propeller on landing

C. Filter the induction air

44. The function of an alternate air source in the induction system is to:

A. Increase manifold pressure at altitude

B. Supply air when the primary intake or filter is blocked

C. Lean the mixture automatically

45. The purpose of an APU on a transport aircraft is to:

A. Provide primary cruise thrust

B. Drive the landing gear hydraulics only

C. Supply electrical power and bleed air independent of the main engines

46. The function of bleed air tapped from the compressor is to:

A. Generate the ignition spark

B. Lubricate the turbine bearings

C. Supply pressurization, anti-ice, and pneumatic systems

47. The purpose of a continuous-loop fire detection system is to:

A. Sense fire only at discrete points

B. Detect a fire anywhere along its length

C. Extinguish the fire automatically

48. The function of a thermocouple fire detection system is to:

A. Sense smoke particles in the airflow

B. Respond to a fixed absolute temperature

C. Respond to a rapid rate of temperature rise

49. The purpose of weighing a fire extinguisher agent bottle is to:

A. Determine its hydrostatic test interval

B. Verify the agent charge independent of temperature

C. Measure the cartridge service life

50. The function of a photoelectric smoke detector is to:

A. Measure the duct air pressure

B. Sense a rise in compartment temperature

C. Detect smoke particles by the light they scatter

51. The purpose of an overheat detection system is to:

A. Warn of an abnormally high temperature, such as a bleed-air leak, before a fire

B. Extinguish an engine fire automatically

C. Measure the engine oil temperature

52. The function of the primary airflow in a turbine combustor is to:

A. Mix with fuel and burn

B. Cool the combustor liner only

C. Bypass the engine for thrust

53. The purpose of a free turbine (power turbine) arrangement is to:

A. Eliminate the need for a combustor

B. Drive the compressor directly only

C. Allow the output shaft to turn independently of the gas generator

54. The function of a reduction gearbox on a turboprop is to:

A. Increase the turbine inlet temperature

B. Regulate the bleed air supply

C. Reduce the high turbine speed to a usable propeller speed

55. The purpose of the P-lead on a magneto is to:

A. Carry the high-voltage spark to the distributor

B. Ground the magneto so it can be switched off

C. Time the magneto internally

56. The function of internal timing on a magneto is to:

A. Set the magneto's spark relative to the crankshaft

B. Distribute the spark to each cylinder

C. Align points-opening with the E-gap for the hottest spark

57. The purpose of dual ignition in a reciprocating engine is to:

A. Provide redundancy and improve combustion

B. Lower the required fuel octane

C. Reduce the cranking speed needed

58. The function of the distributor in a magneto is to:

A. Route the high-voltage spark to the correct cylinder in firing order

B. Generate the primary current

C. Regulate the oil pressure

59. The purpose of a shielded ignition harness is to:

A. Increase the spark voltage

B. Cool the spark plugs

C. Contain electromagnetic interference that would disrupt radios

60. The function of an oil cooler is to:

A. Pressurize the oil to the bearings

B. Scavenge oil from the sump

C. Remove heat from the oil

61. The purpose of a centrifugal twisting moment on a propeller blade is described as a force that tends to:

A. Move the blade toward higher pitch

B. Move the blade toward lower (flat) pitch

C. Feather the blade automatically

62. The function of blade tracking on a propeller is to ensure:

A. The blades are statically balanced only

B. The fuel is metered evenly

C. All blade tips follow the same path of rotation

63. The purpose of synchronization on a multi-engine aircraft is to:

A. Feather a failed engine automatically

B. Reverse the propellers on landing

C. Set all propellers to exactly the same RPM

64. The function of synchrophasing, beyond synchronization, is to:

A. Increase engine power output

B. Control the blade phase relationship between engines to reduce noise

C. Lubricate the propeller hub

65. The purpose of the accelerator/enrichment function during high-power operation is to provide a mixture that is:

A. Leaner for economy

B. Richer for best power and cooling

C. Exactly stoichiometric

66. The function of an oil scraper (wiper) ring on a piston is to:

A. Regulate the cylinder oil film thickness

B. Seal the combustion gases

C. Transfer heat from the piston crown

67. The purpose of a compression ring on a piston is to:

A. Meter oil onto the cylinder wall

B. Seal the combustion chamber against blow-by

C. Cushion the piston pin

68. The function of the camshaft in a reciprocating engine is to:

A. Time and operate the valves at half crankshaft speed

B. Generate the ignition voltage

C. Pressurize the lubrication system

69. The purpose of counterweights on a crankshaft is to:

A. Increase the engine's displacement

B. Balance the rotating and reciprocating masses

C. Distribute the spark to the cylinders

70. The function of the connecting rod is to:

A. Time the valve opening

B. Drive the camshaft directly

C. Transmit piston force to the crankshaft

71. The purpose of nitriding a cylinder barrel is to:

A. Harden the bore surface to resist wear

B. Reduce the cylinder's weight

C. Improve the cylinder's heat conduction only

72. The function of a hydraulic valve lifter is to:

A. Increase valve spring tension

B. Generate the spark for ignition

C. Automatically maintain zero valve clearance

73. The purpose of the E-gap position in a magneto is to:

A. Distribute the spark to the cylinders

B. Open the points at the moment of maximum flux change

C. Regulate the magneto's output voltage

74. The function of a pressure-injection carburetor compared to a float type is to:

A. Increase the float chamber capacity

B. Meter fuel by pressure differential, resisting ice and any-attitude operation

C. Eliminate the need for a mixture control

75. The purpose of the primary winding in a magneto is to:

A. Carry the high-voltage spark to the plugs

B. Distribute current to each cylinder

C. Build a magnetic field that collapses to induce high voltage

76. The function of the secondary winding in a magneto is to:

A. Operate the breaker points

B. Produce the high voltage delivered to the spark plugs

C. Ground the magneto when switched off

77. The purpose of a fir-tree root on a turbine blade is to:

A. Increase the blade's surface area for cooling

B. Provide an airflow passage for film cooling

C. Secure the blade to the disk while allowing thermal expansion

78. The function of film cooling on a turbine blade is to:

A. Form a protective layer of cooler air over the blade surface

B. Circulate oil through the blade

C. Increase the blade's centrifugal load

79. The purpose of the inlet (air inlet duct) on a turbine engine is to:

A. Extract energy from the exhaust gas

B. Burn the fuel-air mixture

C. Deliver air to the compressor with minimal turbulence and pressure loss

80. The function of a can-annular combustor is to:

A. Provide a single ring chamber with no liners

B. Combine individual liners within a common annular housing

C. Eliminate the combustion section entirely

81. The purpose of a turbine engine's exhaust cone (tail cone) is to:

A. Accelerate the gas to supersonic speed

B. Smooth the gas flow behind the turbine

C. Drive the compressor section

82. The function of EGT trend monitoring is to:

A. Predict hot-section deterioration before a limit is reached

B. Measure the engine's oil consumption

C. Time the fuel injection pulses

83. The purpose of the compressor bleed valve (bleed band) is to:

A. Dump excess air at low speed to prevent front-stage compressor stall

B. Increase the bypass ratio at cruise

C. Regulate the oil pressure

84. The function of a free-power-turbine in a turboshaft engine is to:

A. Drive only the high-pressure compressor

B. Burn the fuel directly

C. Drive the output shaft independently of the gas generator

85. The purpose of the gas-generator section of a turbine engine is to:

A. Produce the high-energy gas stream that drives downstream turbines or thrust

B. Reduce the propeller speed

C. Cool the cabin air

86. The function of the impeller in a centrifugal compressor is to:

A. Convert velocity into pressure

B. Throw the air outward by centrifugal force

C. Burn the fuel-air mixture

87. The purpose of a rotor (rotating) blade row in an axial compressor is to:

A. Convert velocity into pressure and straighten the flow

B. Burn the fuel

C. Add energy (velocity) to the air

88. The function of a stator (stationary) vane row in an axial compressor is to:

A. Add energy to the air

B. Convert velocity into pressure and straighten the flow

C. Cool the combustor liner

89. The purpose of the turbine nozzle (guide) vanes ahead of the turbine blades is to:

A. Accelerate and direct the gas onto the rotating blades

B. Compress the incoming air

C. Filter the combustion gases

90. The function of the turbine section is to:

A. Extract energy from the gas to drive the compressor and accessories

B. Compress the incoming air

C. Atomize the fuel for combustion

91. The purpose of an exhaust gas temperature (EGT) indication on a piston engine is to:

A. Measure the oil temperature

B. Indicate manifold pressure

C. Aid in leaning the fuel-air mixture

92. The function of a cylinder head temperature (CHT) gauge is to:

A. Measure the engine RPM

B. Indicate the oil pressure

C. Warn of cylinder overheating

93. The purpose of a manifold pressure gauge is to:

A. Indicate the engine RPM directly

B. Indicate the pressure of air delivered to the cylinders

C. Measure the oil temperature

94. The function of a tachometer is to:

A. Indicate the engine's rotational speed

B. Measure the fuel flow

C. Indicate the cylinder head temperature

95. The purpose of the N1 indication on a turbine engine is to:

A. Show the low-pressure spool or fan rotational speed

B. Indicate the exhaust gas temperature

C. Display the engine pressure ratio

96. The function of an EPR gauge is to:

A. Indicate the high-pressure spool speed

B. Provide a thrust indication from a pressure ratio

C. Measure the oil temperature

97. The purpose of a thermocouple in a temperature instrument is to:

A. Generate a voltage from the junction of two dissimilar metals

B. Measure pressure differences

C. Regulate the engine RPM

98. The function of the oil pump in the lubrication system is to:

A. Cool the oil before it enters the engine

B. Deliver oil under pressure to the system

C. Indicate the oil temperature

99. The purpose of the exhaust valve in a reciprocating engine is to:

A. Expel the burned gases from the cylinder

B. Admit the air-fuel mixture

C. Seal the combustion chamber permanently

100. The function of the intake valve in a reciprocating engine is to:

A. Admit the air-fuel mixture into the cylinder

B. Expel the burned gases

C. Time the ignition spark

Answer Key & Full Answer Explanations

1. A — Speed the collapse of the primary field and protect the points from arcing. The capacitor absorbs the energy that would otherwise arc across the opening points, causing the primary field to collapse rapidly, which raises the secondary voltage. It does not store a spark for later use.

2. C — Convert high velocity into high pressure. The diffuser slows the high-velocity air leaving the impeller, converting that velocity into pressure; it neither accelerates the air nor burns fuel.

3. B — Increase the surface area for heat dissipation. Cooling fins enlarge the area exposed to cooling air, essential because most aircraft piston engines are air-cooled.

4. A — Regulate system oil pressure by bleeding off excess. The relief valve bleeds excess oil when pressure exceeds its setting, keeping oil pressure within limits; temperature is controlled separately by the cooler.

5. A — Reduce torsional vibration from power impulses. A dynamic damper is a pendulum counterweight that swings to counteract the twisting vibrations of each firing impulse, protecting the crankshaft from resonance.

6. C — Produce a hot, retarded spark at low cranking speed. The impulse coupling delays and then snaps the magneto through the E-gap, giving a strong spark at cranking speed while retarding timing to prevent kickback.

7. B — Control exhaust flow through the turbine to regulate boost. The wastegate routes exhaust through or around the turbocharger turbine to control its speed and boost, preventing damaging overboost.

8. C — Direct cooling air through the cylinder fins. Baffles and baffle seals form a pressure barrier that forces cooling air down through the hot fins; damaged baffling causes localized overheating.

9. A — Return oil from the engine sump to the tank. In a dry-sump system the scavenge pump removes oil collecting in the sump and returns it to the tank; the pressure pump feeds the engine.

10. B — Control oil temperature by routing oil through or around the cooler. The thermostatic valve sends oil through the cooler when hot and bypasses it when cold, holding oil at proper operating temperature.

11. A — Allow oil to reach the engine if the filter clogs. The bypass valve ensures unfiltered oil can still flow when the filter is blocked, because oil starvation is far more harmful than temporarily unfiltered oil.

12. B — Transfer heat from the valve head to the stem. Metallic sodium in the hollow stem melts and sloshes, carrying heat from the hot valve head to the cooler stem and guide.

13. C — Create a low-pressure area that draws fuel into the airstream. Air speeding through the venturi drops in pressure, and ambient pressure on the fuel pushes it out the discharge nozzle into the airstream.

14. A — Adjust fuel flow to maintain the proper ratio as air density changes. The mixture control leans the fuel flow as air density decreases with altitude, keeping the fuel-air ratio correct.

15. C — Maintain a constant fuel level in the bowl. The float rides on the fuel surface and operates the needle valve to admit fuel as the level drops, maintaining a constant level.

16. A — Distribute metered fuel evenly to the cylinder nozzles. The fuel manifold or flow divider splits the metered fuel evenly among the individual cylinder discharge nozzles.

17. A — Provide pressure for starting, backup, and vapor-lock prevention. The electric boost pump supplies pressure for start, serves as a backup to the engine-driven pump, and prevents vapor lock at altitude or high temperature.

18. C — Melt or prevent carburetor ice using exhaust-warmed air. Carburetor heat routes exhaust-warmed air into the carburetor to melt or prevent ice; the warm air reduces power and richens the mixture.

19. A — Maintain a selected RPM by changing blade angle. The constant-speed governor holds the selected RPM by automatically adjusting blade angle, coarsening on overspeed and fining on underspeed.

20. C — Minimize the drag of a failed engine. Feathering turns the blades edge-on to the airflow to stop windmilling and greatly reduce the drag of a dead engine on a multi-engine aircraft.

21. C — Provide electrical continuity and control static interference. The bonding strap is a flexible braided conductor giving a low-resistance path between engine and airframe, controlling static and electrical interference.

22. B — Hold output voltage constant by varying field current. The voltage regulator adjusts the field current to keep output voltage steady as engine speed and electrical load change.

23. B — Serve as the starter during start and the generator afterward. A starter-generator is one machine that cranks the engine for starting and is then driven by the engine to generate power, saving weight.

24. A — Slow the air to its lowest velocity and highest pressure for combustion. The diffuser before the combustor slows the air to its lowest velocity and highest pressure, since fuel cannot burn stably in a high-velocity airstream.

25. B — Cool the liner and dilute the gases for the turbine. Secondary air cools the combustor liner and dilutes the combustion gases to a temperature the turbine can tolerate; only the primary air burns.

26. B — Maintain smooth airflow and prevent compressor stall across the speed range. Variable stator vanes adjust airflow angle at different speeds to keep the compressor from stalling during acceleration and low-speed operation.

27. A — Accelerate the gas to produce thrust. The exhaust nozzle accelerates the gas leaving the turbine, increasing its velocity to produce thrust.

28. C — Redirect thrust forward to help decelerate on landing. A thrust reverser redirects engine exhaust or fan airflow forward during the landing roll to slow the aircraft and reduce brake wear.

29. B — Produce the high-energy pulses for the igniter plugs. The ignition exciter transforms low input voltage into the high-energy, high-voltage pulses delivered to the turbine igniter plugs.

30. B — Ignite the fuel during starting and relight. Turbine combustion is self-sustaining once lit, so the igniter plugs fire only during starting and relight, then are switched off.

31. C — Indicate internal humidity by changing color. Color-indicating dehydrator plugs shift from blue to pink as they absorb moisture, giving a visual indication of internal humidity during preservation.

32. A — Coat internal surfaces to protect against corrosion. Corrosion-preventive compound coats the engine's internal surfaces to guard against corrosion, the principal enemy of an idle engine.

33. C — Assess cylinder sealing by measuring air leakage. The differential compression test applies a regulated 80 psi and reads the held pressure as a fraction, assessing how well the cylinder seals.

34. C — Inspect internal sections without disassembly. The borescope is inserted through access ports to inspect the compressor, combustor, and turbine of an assembled engine without teardown.

35. B — Remove the sharp stress riser that could start a crack. Blending a nick smooths out the sharp stress concentration that could initiate a fatigue crack; it removes material rather than adding it.

36. B — Provide acceptable dimensions for accepting or rejecting parts. The table of limits lists the new-parts and service-limit dimensions used during overhaul to decide whether each part is reused, reworked, or replaced.

37. C — Correct an unsafe condition through mandatory action. An Airworthiness Directive is a legally enforceable regulation issued by the FAA to correct an unsafe condition; compliance is mandatory.

38. A — Document a major repair or major alteration. FAA Form 337 records the details and approved data of a major repair or major alteration.

39. B — Define an engine's approved configuration and limitations. The Type Certificate Data Sheet is the authoritative document defining an engine's approved model designations, fuel and oil specs, and operating limitations.

40. A — Allow the new piston rings to seat properly. Straight mineral oil lacks deposit-forming additives, allowing the new rings to seat during break-in; ashless dispersant oil can prevent seating.

41. B — Suspend contaminants and burn without harmful ash. Ashless dispersant additives hold contaminants and carbon in suspension so they reach the filter, and they burn without leaving harmful ash.

42. B — Trend wear metals over time to predict and localize wear. Spectrometric oil analysis measures metal concentrations across samples to trend and localize internal wear, a predictive maintenance tool.

43. A — Regulate the volume of cooling air over the engine. Cowl flaps are adjustable openings controlling cooling airflow—opened for more cooling in climb, closed to reduce cooling and drag in cruise.

44. B — Supply air when the primary intake or filter is blocked. The alternate air source provides warm, unfiltered engine-compartment air when the primary intake or filter becomes blocked, keeping the engine breathing.

45. C — Supply electrical power and bleed air independent of the main engines. The APU is a small gas turbine that supplies electrical power and bleed air independently of the main engines, chiefly on the ground and for main-engine starting.

46. C — Supply pressurization, anti-ice, and pneumatic systems. Bleed air tapped from the compressor is hot, high-pressure air used for cabin pressurization, anti-ice, pneumatic starting, and pneumatic systems.

47. B — Detect a fire anywhere along its length. A continuous-loop system uses a sensing element running throughout the fire zone, detecting fire anywhere along its length rather than only at points.

48. C — Respond to a rapid rate of temperature rise. A thermocouple fire detection system triggers on a fast temperature increase, ignoring slow normal heating, which makes it resistant to false alarms.

49. B — Verify the agent charge independent of temperature. Weighing the bottle confirms the actual mass of agent, which does not change with temperature, unlike the indicated pressure.

50. C — Detect smoke particles by the light they scatter. A photoelectric smoke detector senses smoke particles by the way they scatter light onto a photocell within the detector chamber.

51. A — Warn of an abnormally high temperature, such as a bleed-air leak, before a fire. An overheat detection system gives earlier warning of an abnormally high temperature, like a bleed-air leak, that is not yet a fire.

52. A — Mix with fuel and burn. Primary air is the portion of compressor air that mixes with fuel and burns in the combustor; secondary air cools and dilutes.

53. C — Allow the output shaft to turn independently of the gas generator. A free turbine is not mechanically tied to the compressor, so the output shaft and its load can turn independently of the gas generator.

54. C — Reduce the high turbine speed to a usable propeller speed. A reduction gearbox steps down the very high turbine speed to a speed at which a propeller can operate efficiently.

55. B — Ground the magneto so it can be switched off. The P-lead connects the magneto primary to the ignition switch; grounding it through the switch stops the spark, shutting the magneto off.

56. C — Align points-opening with the E-gap for the hottest spark. Internal timing sets the breaker points to open at the E-gap position—the point of maximum flux change—so the magneto produces its strongest spark. (External timing, by contrast, sets the spark relative to the crankshaft.)

57. A — Provide redundancy and improve combustion. Dual ignition gives a backup if one system fails and creates two flame fronts for faster, more complete burning and slightly more power.

58. A — Route the high-voltage spark to the correct cylinder in firing order. The distributor directs the magneto's high-voltage output to the proper spark plug in the engine's firing order.

59. C — Contain electromagnetic interference that would disrupt radios. The shielded harness encloses the high-voltage leads in metal braid to contain the electromagnetic interference that would otherwise disrupt radio and navigation equipment.

60. C — Remove heat from the oil. The oil cooler is a heat exchanger that removes heat from the oil; pressurizing and scavenging are the jobs of the pumps.

61. B — Move the blade toward lower (flat) pitch. The centrifugal twisting moment tends to rotate the blade toward low (flat) pitch, opposite the aerodynamic twisting moment, which tends toward high pitch.

62. C — All blade tips follow the same path of rotation. Blade tracking ensures the tips of all blades follow the same path within tolerance; out-of-track blades cause vibration.

63. C — Set all propellers to exactly the same RPM. Synchronization sets all propellers to the same RPM, eliminating the throbbing beat noise produced by slightly different RPMs.

64. B — Control the blade phase relationship between engines to reduce noise. Synchrophasing goes beyond synchronization by controlling the angular phase relationship of the blades between engines to minimize cabin noise and vibration.

65. B — Richer for best power and cooling. High-power operation uses a mixture richer than stoichiometric for best power, with the extra fuel also providing cooling.

66. A — Regulate the cylinder oil film thickness. The oil scraper (wiper) ring regulates the thickness of the oil film on the cylinder wall, scraping excess oil back down.

67. B — Seal the combustion chamber against blow-by. The compression ring seals the combustion gases, preventing them from leaking past the piston into the crankcase as blow-by.

68. A — Time and operate the valves at half crankshaft speed. The camshaft, turning at half crankshaft speed, lifts the cam followers to open and close the valves at the correct times in the cycle.

69. B — Balance the rotating and reciprocating masses. Counterweights on the crankshaft balance the rotating and reciprocating masses, reducing vibration.

70. C — Transmit piston force to the crankshaft. The connecting rod links the piston to the crankshaft, transmitting the piston's force and converting linear motion into rotation.

71. A — Harden the bore surface to resist wear. Nitriding exposes the steel cylinder wall to ammonia at high temperature, forming a hard, wear-resistant surface without distortion.

72. C — Automatically maintain zero valve clearance. A hydraulic valve lifter automatically maintains zero clearance, eliminating periodic valve adjustment and quieting valve-train operation.

73. B — Open the points at the moment of maximum flux change. The E-gap is the magnet position of greatest flux change; opening the points there interrupts primary current for the strongest possible spark.

74. B — Meter fuel by pressure differential, resisting ice and any-attitude operation. A pressure-injection carburetor meters fuel using pressure differentials rather than a float, resisting icing and working in any attitude.

75. C — Build a magnetic field that collapses to induce high voltage. The primary winding carries current that builds a magnetic field; when the points open, the field's collapse induces the high voltage in the secondary.

76. B — Produce the high voltage delivered to the spark plugs. The secondary winding, with many fine turns, develops the high voltage from the collapsing primary field and delivers it to the plugs.

77. C — Secure the blade to the disk while allowing thermal expansion. The fir-tree root secures the turbine blade against centrifugal load while allowing for thermal expansion.

78. A — Form a protective layer of cooler air over the blade surface. Film cooling routes cooling air through the blade to exit tiny holes, forming a protective film of cooler air over the surface.

79. C — Deliver air to the compressor with minimal turbulence and pressure loss. The inlet conditions the incoming air, delivering it to the compressor face with as little turbulence and pressure loss as possible.

80. B — Combine individual liners within a common annular housing. A can-annular combustor places individual liners inside a single annular housing, blending features of can-type and annular designs.

81. B — Smooth the gas flow behind the turbine. The exhaust cone (tail cone) smooths the gas flow behind the turbine before it reaches the nozzle.

82. A — Predict hot-section deterioration before a limit is reached. EGT trend monitoring records the parameter over time so a slow climb reveals hot-section deterioration before a limit is exceeded.

83. A — Dump excess air at low speed to prevent front-stage compressor stall. The compressor bleed valve dumps excess air during low-speed operation and acceleration to prevent the front stages from stalling.

84. C — Drive the output shaft independently of the gas generator. In a turboshaft, the free power turbine drives the output shaft independently of the gas generator, which runs the compressor.

85. A — Produce the high-energy gas stream that drives downstream turbines or thrust. The gas generator (compressor, combustor, and its driving turbine) produces the high-energy gas stream that drives downstream turbines or produces thrust.

86. B — Throw the air outward by centrifugal force. The impeller of a centrifugal compressor flings the air outward by centrifugal force into the diffuser, which then converts velocity into pressure.

87. C — Add energy (velocity) to the air. In an axial compressor the rotating rotor blades add energy and velocity to the air, which the stators then convert to pressure.

88. B — Convert velocity into pressure and straighten the flow. The stationary stator vanes convert the velocity added by the rotor into pressure and straighten the flow for the next stage.

89. A — Accelerate and direct the gas onto the rotating blades. The turbine nozzle guide vanes accelerate and direct the hot gas onto the rotating turbine blades at the proper angle.

90. A — Extract energy from the gas to drive the compressor and accessories. The turbine section extracts energy from the hot gas to drive the compressor, fan, or output shaft and the accessories.

91. C — Aid in leaning the fuel-air mixture. On a piston engine, EGT is used to lean the mixture; peak EGT indicates the chemically correct mixture point.

92. C — Warn of cylinder overheating. The CHT gauge measures the hottest cylinder head's temperature, providing a key warning of cylinder overheating.

93. B — Indicate the pressure of air delivered to the cylinders. The manifold pressure gauge indicates intake manifold absolute pressure, a measure of power and boost; RPM is shown by the tachometer.

94. A — Indicate the engine's rotational speed. The tachometer indicates engine RPM, the rotational speed of the crankshaft.

95. A — Show the low-pressure spool or fan rotational speed. N1 displays the rotational speed of the low-pressure spool or fan as a percentage of maximum RPM.

96. B — Provide a thrust indication from a pressure ratio. The EPR gauge displays the ratio of turbine discharge to inlet pressure, serving as a thrust indication.

97. A — Generate a voltage from the junction of two dissimilar metals. A thermocouple produces a small voltage proportional to the temperature at the junction of two dissimilar metals, needing no external power.

98. B — Deliver oil under pressure to the system. The oil pump, typically a gear-type positive-displacement pump, draws oil from the supply and delivers it under pressure to the system.

99. A — Expel the burned gases from the cylinder. The exhaust valve opens to let the burned combustion gases out of the cylinder during the exhaust stroke.

100. A — Admit the air-fuel mixture into the cylinder. The intake valve opens during the intake stroke to admit the air-fuel mixture (or air, in injected engines) into the cylinder.