PRACTICE EXAM 10 SIMULATION

1. A four-stroke engine completes one full operating cycle in:

A. One crankshaft revolution

B. Four crankshaft revolutions

C. Two crankshaft revolutions

2. During a differential compression test, air escaping at the engine breather indicates:

A. A leaking exhaust valve

B. Worn or broken piston rings

C. A leaking intake valve

3. A turbine engine's highest gas temperature occurs at the:

A. Compressor inlet

B. Turbine inlet

C. Exhaust nozzle

4. A cylinder with a 90-cubic-inch BDC volume and a 15-cubic-inch TDC volume has a compression ratio of:

A. 8:1

B. 9:1

C. 6:1

5. A magneto's defining advantage is that it is:

A. Driven by the aircraft battery

B. Independent of the aircraft electrical system

C. Free of any internal timing

6. A cylinder has a 112-cubic-inch BDC volume and a 14-cubic-inch TDC volume. The compression ratio is:

A. 8:1

B. 7:1

C. 6:1

7. A magneto's high voltage is induced when the breaker points:

A. Close, building the primary field

B. Are held closed continuously

C. Open and the primary field collapses

8. A turbofan produces most of its thrust from the:

A. Core exhaust gas only

B. Propeller driven by the turbine

C. Bypass (fan) airflow

9. Bleed air in a turbine engine is extracted from the:

A. Exhaust section

B. Compressor section

C. Turbine discharge cone

10. A life-limited turbine disk that reaches its published limit must be:

A. Removed from service and discarded

B. Returned to service if it appears serviceable

C. Overhauled and reinstalled

11. A reciprocating engine is broken in using:

A. Straight mineral oil

B. Ashless dispersant oil

C. Synthetic turbine oil

12. A dry-sump system's scavenge pump has greater capacity than the pressure pump because the scavenged oil is:

A. Cooler and denser

B. Hot, foamy, and aerated

C. Filtered and pressurized

13. A constant-speed propeller maintains its selected RPM by changing the:

A. Blade angle

B. Fuel flow

C. Magneto timing

14. A four-stroke engine operating at 2,800 RPM has a camshaft turning at:

A. 1,400 RPM

B. 2,800 RPM

C. 5,600 RPM

15. An annual inspection may be approved for return to service only by:

A. Any certificated A&P mechanic

B. A mechanic holding an Inspection Authorization

C. The aircraft owner

16. Carburetor ice can form on warm days primarily because of:

A. Excessive engine power only

B. Outside air below freezing only

C. The cooling from fuel vaporization and the venturi pressure drop

17. Detonation is best described as:

A. Uncontrolled burning of the mixture after the spark

B. Smooth progressive burning of the mixture

C. Ignition before the spark by a hot spot

18. A turbocharger differs from a supercharger in that it is driven by:

A. Exhaust gas energy

B. A gear connection to the crankshaft

C. The aircraft alternator

19. Magnetic particle inspection can be used only on materials that are:

A. Nonmagnetic and nonporous

B. Electrically nonconductive

C. Ferromagnetic

20. An engine producing 350 lb-ft of torque at 2,250 RPM develops a brake horsepower of approximately:

A. 150 horsepower

B. 200 horsepower

C. 285 horsepower

21. A turbine engine's bypass ratio is the ratio of:

A. Fuel flow to airflow

B. Bypass air mass to core air mass

C. Turbine discharge pressure to inlet pressure

22. Oil pressure in the lubrication system is regulated by the:

A. Thermostatic bypass valve

B. Scavenge pump

C. Oil pressure relief valve

23. A turbine hot-section inspection most commonly finds:

A. Compressor blade erosion

B. Cracking

C. Bearing spalling

24. Feathering a propeller on a multi-engine aircraft serves to:

A. Provide reverse thrust on landing

B. Minimize the drag of a failed engine

C. Increase the dead engine's RPM

25. A single cylinder with a 5.25-inch bore and a 4.0-inch stroke displaces approximately:

A. 87 cubic inches

B. 110 cubic inches

C. 65 cubic inches

26. An Airworthiness Directive is:

A. Advisory for Part 91 operators

B. Applicable only to commercial aircraft

C. Mandatory and a condition of airworthiness

27. A "hot" spark plug is one that:

A. Dissipates heat slowly and runs hotter

B. Produces a higher-voltage spark

C. Is used only in turbocharged engines

28. A reciprocating engine's spark is timed to fire:

A. Exactly at top dead center

B. Before top dead center on the compression stroke

C. After top dead center on the exhaust stroke

29. A turbine engine "hung start" is characterized by the engine:

A. Lighting off but failing to accelerate to idle

B. Exceeding maximum EGT during start

C. Overspeeding past redline

30. Liquid penetrant inspection detects defects that are:

A. Located deep within the part

B. Present only in ferrous materials

C. Open to the surface of the part

31. A turbine engine's exhaust noise is reduced in a high-bypass turbofan because:

A. The combustor burns cleaner

B. The slower bypass air reduces the jet velocity difference

C. The oil cooler is larger

32. A full-flow oil filter includes a bypass valve so that:

A. Excess oil returns to the tank

B. Oil pressure drops at high RPM

C. Oil still reaches the engine if the filter clogs

33. A propeller blade is twisted so that the blade angle is:

A. Equal from root to tip

B. Greatest at the root and least at the tip

C. Greatest at the tip

34. A differential compression test reading of 60/80 represents a leakage of:

A. 10%

B. 20%

C. 25%

35. A turbine engine's net thrust in flight is less than its gross static thrust because:

A. The compressor consumes more power in flight

B. The exhaust velocity drops to zero

C. The incoming air already has velocity, reducing the velocity change

36. A turbine engine with a turbine discharge pressure of 45 and an inlet pressure of 15 has an EPR of:

A. 3.0

B. 2.5

C. 4.5

37. A sodium-filled exhaust valve uses the sodium to:

A. Increase the valve face hardness

B. Reduce combustion pressure

C. Transfer heat from the valve head to the stem

38. A 100-hour inspection may be performed and approved for return to service by:

A. A certificated A&P mechanic

B. An IA holder only

C. A repair station only

39. An anti-ice system differs from a de-ice system in that anti-ice:

A. Removes ice after it forms

B. Prevents ice from forming

C. Operates only on the ground

40. A reciprocating engine's mixture becomes richer with altitude because:

A. The fuel pump increases pressure

B. The exhaust back pressure rises

C. The air becomes less dense while fuel metering stays similar

41. A turbine engine is cooled largely by:

A. A liquid coolant jacket

B. Engine oil circulating through the blades

C. Secondary airflow and internal/film cooling of the blades

42. An exhaust system crack in the heat-exchanger area can introduce into the cabin:

A. Carbon monoxide

B. Excess bleed air

C. Raw fuel only

43. A differential compression test reading of 76/80 represents a leakage of:

A. 5%

B. 20%

C. 25%

44. A turbine engine's primary thrust-indicating instrument that compares two pressures is the:

A. Tachometer

B. EPR gauge

C. Fuel flow indicator

45. A high-bypass turbofan moving 102 units of fan air with 17 units through the core has a bypass ratio of:

A. 6:1

B. 17:1

C. 3:1

46. A reciprocating engine's oil temperature is regulated by the:

A. Pressure relief valve

B. Oil cooler and thermostatic valve

C. Scavenge pump pickup

47. A turbine engine's life-limited parts are often tracked in cycles because each cycle:

A. Is easier to count than hours

B. Is recorded automatically

C. Imposes a full thermal-stress load driving fatigue

48. A turbine engine's bleed air is used for all of the following EXCEPT:

A. Cabin pressurization

B. Generating the ignition spark

C. Thermal anti-icing

49. A turbine engine static on the ground moves 42 lb of air per second and accelerates it to 1,610 ft/s. The gross thrust is approximately:

A. 2,100 pounds

B. 1,450 pounds

C. 3,200 pounds

50. Pre-ignition is caused by:

A. A hot spot in the combustion chamber

B. Fuel of too high an octane rating

C. An overly rich mixture only

51. A turbine engine's compressor uses variable stator vanes and bleed valves to:

A. Increase the bypass ratio at cruise

B. Prevent compressor stall across the speed range

C. Reduce exhaust noise on takeoff

52. A reciprocating engine's full-flow oil filter is cut open at every oil change to:

A. Reduce oil pressure

B. Improve oil flow

C. Inspect for metal particles indicating wear

53. A magneto with a broken P-lead results in a condition where the:

A. Magneto produces no spark

B. Engine cannot be started

C. Magneto cannot be turned off (hot magneto)

54. An engine producing 280 indicated horsepower and 238 brake horsepower has a mechanical efficiency of:

A. 85%

B. 118%

C. 76%

55. A reciprocating engine's dual ignition provides redundancy and:

A. Improved combustion from two flame fronts

B. A lower octane requirement

C. Reduced cranking speed

56. A turbine engine's highest pressure occurs at the:

A. Turbine inlet

B. Diffuser

C. Exhaust nozzle

57. A continuous-loop fire detection system has the advantage of:

A. Detecting a fire anywhere along the loop

B. Sensing fire only at discrete points

C. Requiring no electrical power

58. A reciprocating engine's compression ratio increases when the:

A. Bore is reduced

B. Stroke is shortened

C. Combustion chamber (clearance) volume is reduced

59. A fire extinguisher agent bottle is checked for proper charge primarily by:

A. Reading the pressure gauge only

B. Weighing it against the specified charged weight

C. Listening for leaks

60. A high-bypass turbofan moving 96 units of fan air with 16 units through the core has a bypass ratio of:

A. 16:1

B. 4:1

C. 6:1

61. A reciprocating engine's camshaft turns at:

A. One-half crankshaft speed

B. The same speed as the crankshaft

C. Twice crankshaft speed

62. A turbine engine's blades are attached to the disk by a root that allows thermal expansion, called the:

A. Dovetail weld

B. Single through-bolt

C. Fir-tree root

63. A reciprocating engine's induction filter blocked by impact ice is bypassed by:

A. A leaner mixture automatically

B. Higher manifold pressure

C. An alternate air source

64. A turbine engine's free turbine arrangement allows the:

A. Compressor to stop while the engine runs

B. Output shaft to turn independently of the gas generator

C. Exhaust to bypass the turbine entirely

65. A reciprocating engine designation "TSIO-520" indicates the engine is:

A. Turbocharged, supercharged, fuel-injected, opposed, ~520 cubic inches

B. Twin-spool, inline, of 520 horsepower

C. Turbine, single-stage, injected, of 520 cubic inches

66. An engine develops 300 indicated horsepower and 258 brake horsepower. The friction horsepower is:

A. 42 horsepower

B. 558 horsepower

C. 86 horsepower

67. A reciprocating engine's "time in service" is measured from:

A. Engine start to engine shutdown

B. When the aircraft leaves the ground until it touches down

C. Block-out to block-in at the gate

68. A turbine engine's igniters are used:

A. Only during starting and relight

B. Continuously while the engine runs

C. Only during the magneto check

69. A propeller's greatest force is:

A. Thrust bending force

B. Torque bending force

C. Centrifugal force

70. A four-stroke engine running at 2,600 RPM has a camshaft turning at:

A. 5,200 RPM

B. 1,300 RPM

C. 2,600 RPM

71. A reciprocating engine's baffles and baffle seals serve to:

A. Reduce engine noise

B. Seal the exhaust system

C. Direct cooling air through the cylinder fins

72. A major repair or major alteration must be documented on:

A. The aircraft registration certificate

B. The Type Certificate Data Sheet

C. FAA Form 337

73. A turbine engine's compressor stall during a rapid throttle advance reflects inadequate coordination of fuel with:

A. Compressor airflow and speed

B. Oil temperature

C. Cabin pressure

74. A reciprocating engine's exhaust valve operates at extreme temperature and may use a hollow stem filled with:

A. Metallic sodium

B. Mercury

C. Lead shot

75. A turbine engine's rising EGT trend at a constant power setting indicates:

A. An overfilled oil tank

B. A normal seasonal effect

C. Hot-section deterioration

76. A constant-speed propeller's governor senses engine speed using:

A. A manifold pressure diaphragm

B. Flyweights

C. An exhaust thermocouple

77. A reciprocating engine's cabin heat is supplied by:

A. Bleed air from the turbocharger

B. Air warmed by the exhaust system

C. Electrically heated elements only

78. A turbine engine's thrust reverser is interlocked to prevent:

A. In-flight deployment

B. Ground operation

C. Reverse at idle

79. A reciprocating engine's spark plug fouls rapidly in a cool-running engine. The likely cause is a plug that is:

A. Too cold a heat range for the engine

B. The correct heat range

C. A hot plug causing pre-ignition

80. A turbine engine's combustor that is a single continuous ring around the engine axis is a/an:

A. Can-type combustor

B. Annular combustor

C. Can-annular combustor

81. A reciprocating engine's manifold pressure gauge indicates the:

A. Crankshaft rotational speed

B. Oil pressure in the galleries

C. Pressure of air delivered to the cylinders

82. A turbine engine's compressor that throws air outward by an impeller is the:

A. Axial-flow type

B. Two-spool axial type

C. Centrifugal-flow type

83. A reciprocating engine's oil seals the piston rings against the cylinder wall. This is one of oil's functions, alongside:

A. Generating the ignition voltage

B. Cooling, cleaning, cushioning, lubricating, and protecting

C. Metering the fuel-air mixture

84. A turbine engine's life-limited rotating parts include:

A. The combustor liner only

B. Turbine disks, compressor disks, and shafts

C. The exhaust cone

85. A reciprocating engine's detonation is most likely under conditions of:

A. High power on a hot day with low-octane fuel

B. Idle with carburetor heat applied

C. Low power on a cold day with high-octane fuel

86. A turbine engine's diffuser, located before the combustor, is the point of:

A. Highest temperature

B. Lowest pressure

C. Highest pressure and lowest velocity

87. A reciprocating engine's voltage regulator controls output by varying the:

A. Engine RPM

B. Field current

C. Battery temperature

88. A turbine engine's FOD most commonly affects the:

A. Turbine disk bore

B. Cold-section fan and compressor blades

C. Exhaust cone

89. A reciprocating engine's compression test must place the piston at TDC on the:

A. Compression stroke

B. Exhaust stroke

C. Intake stroke

90. A turbine engine with a turbine discharge pressure of 60 and an inlet pressure of 15 has an EPR of:

A. 2.0

B. 3.0

C. 4.0

91. A reciprocating engine's dynamic damper reduces:

A. Centrifugal loading on the bearings

B. Torsional vibration from power impulses

C. Bending stress in the connecting rods

92. A turbine engine's exhaust gas temperature (EGT) is monitored over time through:

A. The fuel totalizer only

B. Oil pressure trending

C. Trend monitoring of engine condition

93. A reciprocating engine's best-power mixture is:

A. Leaner than stoichiometric

B. Richer than stoichiometric

C. Exactly stoichiometric

94. A turbine engine's APU primarily supplies:

A. Primary cruise thrust

B. Hydraulic pressure for the gear only

C. Electrical power and bleed air independent of the main engines

95. A reciprocating engine's full overhaul that splits the crankcase and inspects the crankshaft is a:

A. Major overhaul

B. Top overhaul

C. Field repair only

96. A turbine engine's cold section comprises the:

A. Combustor, turbine, and exhaust

B. Inlet, fan, and compressor

C. Turbine and exhaust only

97. A reciprocating engine's TBO for Part 91 operation is:

A. A manufacturer recommendation, not a legal limit

B. A mandatory legal limit

C. Established by the FAA

98. A turbine engine's igniter exciter is dangerous to service because it:

A. Stores high electrical energy that must bleed down

B. Contains pressurized fuel

C. Remains mechanically spinning

99. A reciprocating engine's oil pump is a positive-displacement gear type whose excess pressure is controlled by the:

A. Thermostatic bypass valve

B. Oil pressure relief valve

C. Scavenge pump

100. A turbine engine's creep is the:

A. Slow leakage of oil past the seals

B. Gradual reduction of EGT over time

C. Permanent elongation of turbine blades over time

Answer Key & Full Answer Explanations

1. C — Two crankshaft revolutions. A four-stroke engine performs intake, compression, power, and exhaust over two crankshaft revolutions (720°), producing one power impulse per cylinder per cycle.

2. B — Worn or broken piston rings. Air escaping at the breather has passed the rings into the crankcase as blow-by; air at the exhaust would indicate the exhaust valve and air at the intake the intake valve.

3. B — Turbine inlet. The turbine inlet sees the highest gas temperature in the engine, which is why turbine blades use heat-resisting alloys and internal cooling.

4. C — 6:1. Compression ratio is BDC volume divided by TDC volume: 90 ÷ 15 = 6:1.

5. B — Independent of the aircraft electrical system. A magneto generates its own ignition voltage, so the engine keeps running even with total battery and alternator failure.

6. A — 8:1. Compression ratio is BDC divided by TDC volume: 112 ÷ 14 = 8:1.

7. C — Open and the primary field collapses. Opening the points interrupts primary current, and the collapsing primary field induces the high secondary voltage that fires the plug.

8. C — Bypass (fan) airflow. In a high-bypass turbofan most air bypasses the core, and the fan provides the bulk of the thrust at lower velocity, more efficiently and quietly.

9. B — Compressor section. Bleed air is hot, high-pressure air tapped from the compressor for pressurization, anti-ice, and pneumatic systems.

10. A — Removed from service and discarded. A life-limited disk must be retired at its published limit regardless of apparent condition.

11. A — Straight mineral oil. Break-in uses straight mineral oil because its lack of deposit-forming additives lets the new rings seat; AD oil during break-in can prevent seating.

12. B — Hot, foamy, and aerated. Scavenged oil has expanded and contains air, occupying more volume, so scavenge capacity must exceed pressure capacity.

13. A — Blade angle. A constant-speed propeller holds the selected RPM by automatically changing blade angle through the governor.

14. A — 1,400 RPM. The four-stroke camshaft turns at half crankshaft speed: 2,800 ÷ 2 = 1,400 RPM.

15. B — A mechanic holding an Inspection Authorization. An annual may be approved only by an IA holder (or appropriately rated repair station or manufacturer), not a plain A&P or the owner.

16. C — The cooling from fuel vaporization and the venturi pressure drop. The combined cooling can drop carburetor temperature 30–40°F, freezing moisture even on warm, humid days.

17. A — Uncontrolled burning of the mixture after the spark. Detonation is the explosive self-ignition of the end gases after the normal spark, causing knocking and overheating.

18. A — Exhaust gas energy. A turbocharger is driven by a turbine spun by exhaust gas, recovering otherwise-wasted energy, while a supercharger is gear-driven.

19. C — Ferromagnetic. Magnetic particle inspection requires an iron-based, magnetizable material and cannot be used on aluminum or magnesium.

20. A — 150 horsepower. Brake horsepower is torque times RPM divided by 5,252: (350 × 2,250) ÷ 5,252 ≈ 150 horsepower.

21. B — Bypass air mass to core air mass. Bypass ratio is the ratio of the air bypassing the core to the air passing through it.

22. C — Oil pressure relief valve. The relief valve bleeds excess oil when pressure exceeds its setting; temperature is controlled separately by the cooler.

23. B — Cracking. Thermal stress and cycling make cracking the most common hot-section defect.

24. B — Minimize the drag of a failed engine. Feathering turns the blades edge-on to stop windmilling and greatly reduce the drag of a dead engine.

25. A — 87 cubic inches. Displacement is $\pi \times (2.625)^2 \times 4.0 \approx 86.6$ cubic inches for one cylinder.

26. C — Mandatory and a condition of airworthiness. An AD carries the force of regulation; an aircraft with an overdue AD is not airworthy.

27. A — Dissipates heat slowly and runs hotter. A hot plug has a long heat path and runs hotter, resisting fouling in cool engines; hot engines need cold plugs.

28. B — Before top dead center on the compression stroke. Ignition fires before TDC on compression because the mixture takes time to burn, so peak pressure arrives just after TDC.

29. A — Lighting off but failing to accelerate to idle. A hung start lights off but stagnates at low RPM below idle, typically from insufficient starter air or a fuel-control problem.

30. C — Open to the surface of the part. Liquid penetrant reveals only surface-breaking defects; it cannot find subsurface flaws.

31. B — The slower bypass air reduces the jet velocity difference. The large, slower bypass stream shrinks the velocity difference between exhaust and ambient air, lowering noise.

32. C — Oil still reaches the engine if the filter clogs. The bypass valve passes unfiltered oil when the filter is blocked, because oil starvation is far more harmful than dirty oil.

33. B — Greatest at the root and least at the tip. The blade is twisted so the faster-moving tip has a lower angle, keeping the angle of attack roughly uniform.

34. C — 25%. A reading of 60/80 means 20 psi lost of 80 applied: 20 ÷ 80 × 100 = 25% leakage.

35. C — The incoming air already has velocity, reducing the velocity change. Net thrust in flight is lower than gross static thrust because the air enters already moving, reducing the velocity change that produces thrust.

36. A — 3.0. EPR is turbine discharge pressure divided by inlet pressure: 45 ÷ 15 = 3.0.

37. C — Transfer heat from the valve head to the stem. The metallic sodium melts and sloshes within the hollow stem, carrying heat from the hot valve head to the cooler stem.

38. A — A certificated A&P mechanic. A 100-hour inspection may be performed and approved by an A&P without an Inspection Authorization, unlike the annual.

39. B — Prevents ice from forming. Anti-ice runs continuously to keep ice from forming, while de-ice removes ice after it has accumulated.

40. C — The air becomes less dense while fuel metering stays similar. As air density falls with altitude, the carburetor meters similar fuel for less actual air mass, richening the mixture.

41. C — Secondary airflow and internal/film cooling of the blades. Turbines are cooled by secondary airflow and the internal/film cooling of hollow blades, allowing gas temperatures above the metal's limit.

42. A — Carbon monoxide. Because cabin heat comes from exhaust-warmed air, a crack in the heat-exchanger area can carry colorless, odorless, deadly carbon monoxide into the cabin.

43. A — 5%. A reading of 76/80 means 4 psi lost of 80 applied: 4 ÷ 80 × 100 = 5% leakage, indicating excellent sealing.

44. B — EPR gauge. The EPR gauge compares turbine discharge to inlet pressure, serving as a primary thrust indication.

45. A — 6:1. Bypass ratio is fan air divided by core air: 102 ÷ 17 = 6:1.

46. B — Oil cooler and thermostatic valve. Oil temperature is regulated by the cooler and its thermostatic valve; the relief valve controls pressure.

47. C — Imposes a full thermal-stress load driving fatigue. Life limits are counted in cycles because each start-to-shutdown cycle imposes a full thermal-stress load that drives fatigue.

48. B — Generating the ignition spark. This is the EXCEPT answer: bleed air is used for pressurization and anti-ice, but the ignition spark is produced by the ignition exciter, not bleed air.

49. A — 2,100 pounds. Gross static thrust is mass flow times jet velocity: (42 ÷ 32.2) × 1,610 ≈ 2,100 pounds.

50. A — A hot spot in the combustion chamber. Pre-ignition is ignition before the normal spark, caused by a glowing hot spot such as a carbon deposit or overheated plug.

51. B — Prevent compressor stall across the speed range. Variable stator vanes and bleed valves adjust airflow at different speeds to keep the compressor from stalling.

52. C — Inspect for metal particles indicating wear. The filter is cut open to look for metal particles, an early warning of internal wear or impending failure.

53. C — Magneto cannot be turned off (hot magneto). The P-lead grounds the magneto to shut it off; if broken, the magneto stays hot and the propeller is dangerous to move.

54. A — 85%. Mechanical efficiency is brake divided by indicated horsepower: 238 ÷ 280 × 100 = 85%.

55. A — Improved combustion from two flame fronts. Beyond redundancy, the second plug creates two flame fronts for faster, more complete burning and slightly more power.

56. B — Diffuser. The highest pressure occurs at the diffuser, just after the compressor and before the combustor, where the air is slowed for combustion.

57. A — Detecting a fire anywhere along the loop. A continuous-loop element senses heat over its entire length, unlike spot detectors that sense only at points.

58. C — Combustion chamber (clearance) volume is reduced. Reducing the clearance volume raises the compression ratio, since the ratio is total volume divided by the smaller clearance volume.

59. B — Weighing it against the specified charged weight. Indicated pressure varies with temperature while the mass of agent does not, so weighing is the reliable check of charge.

60. C — 6:1. Bypass ratio is fan air divided by core air: 96 ÷ 16 = 6:1.

61. A — One-half crankshaft speed. The camshaft turns at half crankshaft speed because each valve opens once per two-revolution four-stroke cycle.

62. C — Fir-tree root. Turbine blades attach to the disk with a fir-tree-shaped root that secures them against centrifugal load while allowing for thermal expansion.

63. C — An alternate air source. When the induction filter or intake is blocked by impact ice, alternate air—warm, unfiltered engine-compartment air—keeps the engine breathing.

64. B — Output shaft to turn independently of the gas generator. A free turbine is not mechanically tied to the compressor, so the output shaft can turn independently of the gas generator.

65. A — Turbocharged, supercharged, fuel-injected, opposed, ~520 cubic inches. Decoding TSIO-520: T turbocharged, S supercharged, I injected, O opposed, 520 cubic inches displacement.

66. A — 42 horsepower. Friction horsepower is indicated minus brake: 300 − 258 = 42 horsepower.

67. B — When the aircraft leaves the ground until it touches down. Time in service is wheels-off to wheels-on, the basis for hour-based limits, distinct from engine or block time.

68. A — Only during starting and relight. Turbine combustion is self-sustaining once lit, so the igniters fire only during starting and relight, then are switched off.

69. C — Centrifugal force. Centrifugal force is by far the greatest force on a rotating propeller, trying to pull the blades from the hub.

70. B — 1,300 RPM. The four-stroke camshaft turns at half crankshaft speed: 2,600 ÷ 2 = 1,300 RPM.

71. C — Direct cooling air through the cylinder fins. Baffles and baffle seals force cooling air down through the hot fins; damaged baffling causes localized overheating.

72. C — FAA Form 337. Major repairs and major alterations are documented on FAA Form 337 using approved data.

73. A — Compressor airflow and speed. A rapid throttle advance can add fuel faster than the compressor airflow and speed can support, causing a stall the fuel control must coordinate against.

74. A — Metallic sodium. High-temperature exhaust valves use a hollow stem partially filled with metallic sodium, which carries heat from the head to the stem.

75. C — Hot-section deterioration. A rising EGT trend at constant power indicates hot-section deterioration, since the engine must run hotter to produce the same thrust.

76. B — Flyweights. The constant-speed governor senses engine speed with rotating flyweights, which meter oil pressure to the pitch-change mechanism.

77. B — Air warmed by the exhaust system. Cabin heat in most light aircraft comes from air warmed by passing over the exhaust through a heat muff.

78. A — In-flight deployment. Thrust reversers are interlocked against in-flight deployment, which would be catastrophic; they are used only on the landing roll.

79. A — Too cold a heat range for the engine. A cold plug in a cool-running engine dissipates heat too quickly and fouls rapidly; the remedy is a hotter plug matched to the engine.

80. B — Annular combustor. A single continuous ring-shaped combustion chamber surrounding the engine axis is an annular combustor.

81. C — Pressure of air delivered to the cylinders. Manifold pressure indicates intake manifold absolute pressure, a measure of power and boost; RPM is shown by the tachometer.

82. C — Centrifugal-flow type. A centrifugal compressor uses an impeller that throws air outward into a diffuser, unlike an axial compressor that moves air straight through.

83. B — Cooling, cleaning, cushioning, lubricating, and protecting. Sealing is one of oil's functions, alongside cooling, cleaning, cushioning, lubricating, and protecting.

84. B — Turbine disks, compressor disks, and shafts. The life-limited rotating parts of a turbine engine are typically the turbine disks, compressor disks, and shafts.

85. A — High power on a hot day with low-octane fuel. Detonation is most likely under high power on a hot day with fuel below the specified octane, since heat, pressure, and low octane all promote it.

86. C — Highest pressure and lowest velocity. The diffuser before the combustor is the point of highest pressure and lowest velocity, so combustion can be sustained.

87. B — Field current. A voltage regulator controls output by varying field current, holding voltage steady as RPM and load change.

88. B — Cold-section fan and compressor blades. Ingested objects strike the front first, so FOD most commonly damages the cold-section fan and compressor blades.

89. A — Compression stroke. A valid differential compression test places the piston at TDC on the compression stroke, with both valves closed, so the applied air is contained.

90. C — 4.0. EPR is turbine discharge pressure divided by inlet pressure: 60 ÷ 15 = 4.0.

91. B — Torsional vibration from power impulses. A dynamic damper is a pendulum counterweight that counteracts the twisting vibrations of each firing impulse, protecting the crankshaft.

92. C — Trend monitoring of engine condition. EGT is monitored over time through trend monitoring, which records the parameter to predict deterioration before a limit is reached.

93. B — Richer than stoichiometric. Best power occurs at a mixture slightly richer than stoichiometric (around 1:12 by weight), which also provides cooling.

94. C — Electrical power and bleed air independent of the main engines. An APU supplies electrical power and bleed air independently of the main engines, chiefly on the ground and for main-engine starting.

95. A — Major overhaul. A major overhaul splits the crankcase and inspects the crankshaft and bearings, unlike a top overhaul, which addresses only the cylinders.

96. B — Inlet, fan, and compressor. The cold section is everything ahead of the combustor—inlet, fan, and compressor—while the hot section is the combustor, turbine, and exhaust.

97. A — A manufacturer recommendation, not a legal limit. For most Part 91 operations, TBO is a manufacturer recommendation, and continued operation past it is based on condition.

98. A — Stores high electrical energy that must bleed down. A turbine ignition exciter stores dangerous high electrical energy even after power is removed, so it must bleed down before service.

99. B — Oil pressure relief valve. The positive-displacement gear pump delivers more oil than needed, and the relief valve bleeds the excess to regulate pressure.

100. C — Permanent elongation of turbine blades over time. Creep is the slow, permanent elongation of turbine blades under combined high centrifugal load and heat, accelerated by overtemperature.