PRACTICE EXAM 11 SIMULATION

1. An engine shows falling oil pressure, rising oil temperature, metal on the chip detector, and a growing knock under load. Taken together, these point most strongly to:

A. Carburetor ice forming in humid air

B. An induction air leak leaning the mixture

C. A failing bearing breaking down internally

2. A turbocharged engine detonates at low altitude and full throttle with the correct fuel grade installed. After ruling out fuel, the mechanic traces the cause to a wastegate that is:

A. Stuck fully open, venting all exhaust

B. Stuck closed, driving overboost

C. Oversensitive to oil temperature

3. A six-cylinder engine with a 5.0-inch bore, a 4.5-inch stroke, a mean effective pressure of 135 psi, running at 2,700 RPM, develops an indicated horsepower of approximately:

A. 244 horsepower

B. 305 horsepower

C. 198 horsepower

4. A magneto check shows zero RPM drop on the left magneto and an excessive drop on the right. The combined diagnosis is:

A. A non-grounding P-lead on the left and an ignition fault on the right

B. A rich mixture affecting both magnetos

C. A propeller governor malfunction

5. A turbine engine shows a slow EGT climb and a slow fuel-flow climb at a fixed thrust over many flights, plus a borescope reveals combustor hot streaks. The unifying cause is:

A. An overfilled oil tank

B. Hot-section deterioration with a fuel nozzle producing an uneven spray

C. A faulty fuel totalizer alone

6. During a turbine start the EGT spikes rapidly toward its limit while N2 rises slowly. The correct immediate action and the underlying fault are:

A. Add fuel to stabilize a lean flame

B. Engage the starter longer to raise N2

C. Cut fuel and motor the engine to clear a hot start

7. An aircraft used for flight instruction for hire is 4 hours from its 100-hour inspection but must fly 7 hours to reach a maintenance base. Regarding the 100-hour limit, the aircraft may:

A. Exceed the limit by up to 25 hours without conditions

B. Not be flown once within 10 hours of the limit

C. Exceed the limit by up to 10 hours only to reach the inspection site, deducting the excess

8. A six-cylinder engine with a 5.125-inch bore and a 4.875-inch stroke has a total displacement of approximately:

A. 603 cubic inches

B. 540 cubic inches

C. 471 cubic inches

9. A reciprocating engine runs rough, shows high oil consumption with blue smoke, and air escapes at the breather during a compression test while the valves seat well. The root cause is:

A. Leaking intake valves

B. Worn or broken piston rings

C. A clogged oil cooler

10. A turbine engine experiences loud banging and airflow reversal immediately after a rapid throttle advance. The condition and its cause are:

A. A hung start from low starter air

B. A compressor surge from too-rapid acceleration

C. A hot start from excess fuel at light-off

11. A constant-speed-prop aircraft in visible moisture shows a manifold-pressure drop with steady RPM and no roughness. The mechanic explains this as:

A. A slipping propeller governor

B. A failed alternator field

C. Induction icing while the governor holds RPM by pitch

12. A reciprocating engine develops detonation under high power on a hot day after being fueled below the specified grade. The mechanic distinguishes this from pre-ignition because detonation:

A. Occurs before the spark from a hot spot

B. Happens only on the exhaust stroke

C. Is uncontrolled end-gas burning after the normal spark

13. An engine producing 525 lb-ft of torque at 2,500 RPM develops a brake horsepower of approximately:

A. 250 horsepower

B. 312 horsepower

C. 198 horsepower

14. A turbine engine's thrust is markedly lower on a hot, high-altitude day than on a cold day at sea level at the same RPM. The mechanic attributes both effects to:

A. The fuel control reducing thrust automatically

B. Increased exhaust back pressure at altitude

C. Reduced air density lowering mass airflow

15. An engine will not shut down when the ignition switch is moved to OFF, and a separate cylinder shows a large magneto-check drop with normal compression. The two findings indicate, respectively:

A. A failed boost pump and worn rings

B. A stuck starter and a leaking exhaust valve

C. A non-grounding P-lead (hot magneto) and an ignition fault on that cylinder

16. A fuel-injected engine starts easily cold but is hard to start hot, acting fuel-starved after a brief shutdown. The cause, tied to the injection system, is:

A. A cracked exhaust manifold

B. Vapor lock from fuel boiling in hot lines

C. An out-of-track propeller

17. A reciprocating engine overheats on one cylinder only with normal performance elsewhere, and a deteriorated component is found nearby. The cause is most likely a:

A. Magneto timed too far advanced

B. Missing or damaged baffle seal at that cylinder

C. Excess of oil reaching that cylinder

18. A turbine engine lights off during start but stabilizes well below idle with EGT in limits. The condition and likely cause are:

A. A hot start from excess fuel

B. A compressor surge from rapid acceleration

C. A hung start from insufficient starter air or a fuel-control fault

19. A reciprocating engine's oil pressure reads low while the engine runs and sounds normal with proper oil temperature. Before condemning the engine, the mechanic should:

A. Split the crankcase to inspect bearings

B. Verify the reading with a master gauge, suspecting the sender or gauge

C. Replace the oil pump immediately

20. A turbine engine in flight moves 55 lb of air per second, accelerating it from 450 ft/s to 1,750 ft/s. The net thrust is approximately:

A. 2,221 pounds

B. 2,990 pounds

C. 1,540 pounds

21. A reciprocating engine knocks audibly, runs hot on one cylinder, and shows a melted spark-plug electrode. The mechanic concludes the cylinder is suffering:

A. Carburetor icing

B. Pre-ignition from a glowing hot spot

C. A leaking intake valve

22. A turbine engine's N1 reads normal but N2 reads abnormally low. The mechanic localizes the fault to the:

A. Low-pressure spool or fan

B. High-pressure spool

C. Exhaust nozzle area

23. A reciprocating engine experiences a gradual power loss that recovers fully when carburetor heat is applied and then removed, on a humid 55°F day. The diagnosis is:

A. A failing magneto

B. A cracked cylinder head

C. Carburetor icing

24. A turbine engine ingests a bird on takeoff. The mechanic focuses the FOD inspection on the cold section because the bird first strikes the:

A. Turbine disk bore

B. Exhaust cone

C. Fan and compressor blades

25. A reciprocating engine's compression reads 60/80 with air heard at the carburetor air intake. The mechanic diagnoses a:

A. Worn ring set

B. Leaking intake valve

C. Cracked piston crown

26. A turbine engine produces 1,800 lb of thrust while moving at 620 ft/s. The thrust horsepower is approximately:

A. 2,029 horsepower

B. 1,636 horsepower

C. 1,200 horsepower

27. A reciprocating engine runs rough at idle but smooths at higher RPM, and lead deposits are found bridging a spark-plug gap. The root cause and its behavior are:

A. Spark-plug fouling that clears at higher speed and temperature

B. An advanced magneto timing worsening with RPM

C. A failed oil scavenge pump

28. A turbine engine shows normal oil pressure and temperature but metal chips on the magnetic chip detector. The mechanic should:

A. Add oil and return to service

B. Investigate the source as a sign of internal wear

C. Disregard it since pressure is normal

29. A propeller-equipped engine develops a vibration that worsens with RPM, and the blade tips do not follow the same path. The cause is:

A. A fouled spark plug

B. A clogged fuel injector

C. An out-of-track propeller

30. A turbocharged engine produces manifold pressure above ambient at full throttle near sea level with normal performance. The mechanic recognizes the system is:

A. Leaking induction air

B. Boosting induction air above ambient as designed

C. Suffering a wastegate stuck open

31. A turbine engine fails to reach self-accelerating speed during a pneumatic start. The mechanic first verifies the:

A. Igniter plug gap only

B. Starter air supply pressure

C. Thrust reverser stow position

32. An engine cylinder has a 126-cubic-inch displacement volume and an 18-cubic-inch clearance volume. The compression ratio is:

A. 8:1

B. 7:1

C. 9:1

33. An engine producing 300 indicated horsepower and 255 brake horsepower has a mechanical efficiency of:

A. 85%

B. 118%

C. 76%

34. A reciprocating engine's CHT runs high in climb with cowl flaps open and baffles intact. After ruling out cooling-air issues, the mechanic checks the mixture for:

A. An excessively rich condition

B. A failed propeller governor

C. An excessively lean condition

35. A four-stroke engine operating at 3,200 RPM has a camshaft turning at:

A. 1,600 RPM

B. 3,200 RPM

C. 6,400 RPM

36. A turbine engine's variable stator vanes stick, and the engine stalls during acceleration. The mechanic explains the vanes normally:

A. Increase the bypass ratio at cruise

B. Maintain smooth compressor airflow across the speed range

C. Reduce exhaust noise on takeoff

37. A reciprocating engine experiences detonation. To reduce the tendency, the mechanic verifies the correct fuel grade and:

A. That the propeller is feathered

B. That the boost pump is off

C. A mixture that is not excessively lean

38. A turbine engine's igniters continue firing after light-off and stabilization. The mechanic recognizes this is abnormal because turbine combustion is:

A. Dependent on continuous ignition like a piston engine

B. Self-sustaining, so ignition should be off

C. Impossible without the exciter in flight

39. A reciprocating engine's differential compression reads 75/80 with no audible leak. The mechanic concludes the cylinder is:

A. Failing and must be replaced

B. Sealing well and serviceable

C. Leaking past the rings significantly

40. A reciprocating engine's compression test reads 70/80. The leakage is:

A. 12.5%

B. 25%

C. 10%

41. A pilot reports the engine quits at altitude on hot days but runs after the auxiliary fuel pump is switched on. The cause and its remedy are:

A. A fouled magneto cured by the boost pump

B. Vapor lock relieved by the boost pump's added pressure

C. A failed governor corrected by the boost pump

42. A turbine blade shows a small leading-edge nick within manufacturer limits. The correct repair is to:

A. Weld filler into the nick

B. Blend the nick smooth to remove the stress riser

C. Heat-treat the entire blade

43. A reciprocating engine's oil filter contains aluminum particles at an oil change. Based on the metal, the mechanic suspects wear of the:

A. Pistons

B. Steel crankshaft journals

C. Bronze valve guides

44. A reciprocating engine misfires intermittently, and the ignition harness shielding is cracked and moist. Besides misfire, the mechanic expects:

A. Increased oil consumption

B. Radio and navigation interference

C. Loss of manifold pressure

45. A turbine engine's life-limited compressor disk reaches its cycle limit but borescopes clean. The mechanic must:

A. Extend its limit by half

B. Return it to service based on condition

C. Remove and discard the disk

46. A reciprocating engine's manifold pressure cannot exceed ambient at full throttle as the aircraft climbs, and power falls steadily. This is normal for a:

A. Turbocharged engine below critical altitude

B. Naturally aspirated engine losing power with altitude

C. Supercharged engine at sea level

47. A turbine engine's bleed-air supply drops, affecting pressurization and anti-ice. The mechanic checks the extraction point at the:

A. Exhaust section

B. Compressor section

C. Turbine discharge cone

48. A turbine engine has a turbine discharge pressure of 51 and an inlet pressure of 17. The EPR is:

A. 3.0

B. 2.5

C. 3.5

49. A reciprocating engine's exhaust valve leaks on a compression test. Before condemning the cylinder, the mechanic may attempt to reseat it by:

A. Adding oil to the cylinder

B. Increasing the test pressure

C. Running the engine or staking per procedure

50. A propeller governor is suspected after the engine fails to hold the selected RPM. The mechanic confirms the governor senses speed using:

A. A manifold pressure diaphragm

B. An exhaust thermocouple

C. Rotating flyweights

51. A high-bypass turbofan moves 110 units of fan air with 22 units through the core. The bypass ratio is:

A. 5:1

B. 22:1

C. 6:1

52. A reciprocating engine's pre-ignition persists after switching to the correct fuel grade. The mechanic looks for:

A. An overly rich mixture

B. A failed vacuum pump

C. A glowing hot spot such as a deposit or overheated plug

53. A turbine engine's starter fails to disengage after the engine reaches idle. The risk the mechanic identifies is that the:

A. Running engine drives and damages the starter

B. Ignition will not turn off

C. Fuel control will overspeed

54. An engine cylinder with a 160-cubic-inch BDC volume and a 20-cubic-inch TDC volume has a compression ratio of:

A. 8:1

B. 9:1

C. 6:1

55. A turbine engine's thrust is set by the crew using a pressure-ratio instrument. The primary reference is:

A. N2 percentage

B. EPR

C. Oil pressure

56. A reciprocating engine has been preserved for storage. To monitor internal humidity, the mechanic checks the:

A. Oil pressure gauge

B. Manifold pressure gauge

C. Color-indicating dehydrator plugs

57. An engine develops 340 indicated horsepower and 289 brake horsepower. The friction horsepower is:

A. 51 horsepower

B. 629 horsepower

C. 86 horsepower

58. A turbine engine's combustor liner shows localized discoloration. The mechanic explains this hot spot most likely results from a:

A. Worn compressor blade set

B. Failed oil scavenge pump

C. Clogged or damaged fuel nozzle producing an uneven spray

59. A reciprocating engine's oil pressure is low and the oil is thin and hot. The mechanic identifies the most consistent cause as:

A. Oil too cold and thick

B. A stuck-closed thermostatic valve

C. Worn bearings combined with heat-thinned oil

60. A multi-engine aircraft loses an engine, and the pilot reduces drag from the dead engine. The mechanic confirms this is accomplished by:

A. The thrust reverser

B. Propeller feathering

C. The synchrophaser

61. A reciprocating engine designation "TSIO-520" tells the mechanic the engine is turbocharged, supercharged, fuel-injected, opposed, and:

A. Of 520 horsepower

B. A twin-spool design

C. Approximately 520 cubic inches in displacement

62. A single cylinder with a 4.5-inch bore and a 4.0-inch stroke displaces approximately:

A. 64 cubic inches

B. 90 cubic inches

C. 50 cubic inches

63. A turbine engine's exhaust produces excessive noise, and it is an older low-bypass design. The mechanic explains the noise arises from:

A. A hotter combustor

B. An undersized oil cooler

C. The high jet-to-ambient velocity difference

64. A reciprocating engine's alternator does not charge at idle but charges at higher RPM. The mechanic recognizes the engine uses a:

A. Starter-generator in run mode

B. DC generator rather than an alternator

C. Magneto-driven exciter

65. A turbine engine overtemperatures during start. The mechanic identifies the most damaging consequence to the hot section as:

A. A harmless temporary thrust loss

B. Reduced fuel economy only

C. Accelerated creep and burning of components

66. A reciprocating engine's spark fires at TDC instead of before it, and power is reduced. The mechanic recognizes ignition should fire:

A. After TDC on the exhaust stroke

B. At BDC on the intake stroke

C. Before TDC on the compression stroke

67. A turbine engine static on the ground moves 48 lb of air per second and accelerates it to 1,500 ft/s. The gross thrust is approximately:

A. 2,236 pounds

B. 1,450 pounds

C. 3,100 pounds

68. A reciprocating engine's cabin heat is supplied by exhaust-warmed air. The mechanic stresses exhaust inspection because a leak can introduce:

A. Excess bleed air

B. Carbon monoxide into the cabin

C. Raw fuel vapor only

69. An engine producing 450 lb-ft of torque at 2,800 RPM develops a brake horsepower of approximately:

A. 240 horsepower

B. 312 horsepower

C. 180 horsepower

70. A turbine engine's compressor is inspected for grit-dulled blade leading edges. The mechanic identifies this condition as:

A. Creep

B. A hot start

C. Erosion

71. A reciprocating engine fails to develop full power, and the muffler's internal baffle has broken loose. The mechanic attributes the power loss to:

A. Exhaust back pressure

B. Carburetor icing

C. Loss of oil pressure

72. A turbine engine's fire-extinguisher bottle must be verified for charge. The mechanic uses the most reliable method:

A. Reading only the pressure gauge

B. Weighing the bottle against its charged weight

C. Listening for hissing at the valve

73. A reciprocating engine's new rings fail to seat with high oil consumption from new. The mechanic suspects the engine was broken in on:

A. Straight mineral oil

B. Ashless dispersant oil

C. Synthetic turbine oil

74. A turbine engine's fire detection is tested with the cockpit test switch and the warning illuminates. The mechanic confirms this verifies:

A. The agent bottle is fully charged

B. A real fire can be extinguished

C. The detection circuit and warning devices are functional

75. A four-stroke engine operating at 2,400 RPM has a camshaft turning at:

A. 1,200 RPM

B. 2,400 RPM

C. 4,800 RPM

76. A reciprocating engine's induction filter is blocked by impact ice. The system protects the engine by providing:

A. An alternate air source

B. A leaner mixture

C. Higher manifold pressure

77. A turbine engine's blades survive gas temperatures above the metal's melting point. The mechanic attributes this to:

A. A liquid coolant jacket

B. Engine oil routed through the blades

C. Internal air cooling and film cooling

78. A reciprocating engine's compression ratio was raised in a modification, and it now detonates on the previously used fuel. The mechanic explains the higher compression requires:

A. A lower-octane fuel

B. A higher-octane fuel

C. No change in fuel grade

79. An engine cylinder with a 135-cubic-inch BDC volume and a 15-cubic-inch TDC volume has a compression ratio of:

A. 9:1

B. 8:1

C. 6:1

80. A turbine engine's thrust reverser deploys on the landing roll. The mechanic confirms it is interlocked to prevent:

A. Ground operation

B. In-flight deployment

C. Reverse at idle

81. A reciprocating engine's magneto produces a weak spark at cranking speed without an aid. The mechanic identifies the device that provides a hot, retarded starting spark as the:

A. Voltage regulator

B. Distributor rotor

C. Impulse coupling

82. A turbine engine's anti-ice is activated before entering icing and runs continuously. The mechanic identifies this as a/an:

A. De-ice system

B. Smoke detection system

C. Anti-ice system

83. A reciprocating engine's connecting-rod bearing rides on a film of pressurized oil. The mechanic explains loss of that film most directly causes:

A. Carburetor icing

B. Bearing failure from metal-to-metal contact

C. A lean mixture

84. An engine producing 280 indicated horsepower and 245 brake horsepower has a mechanical efficiency of:

A. 87.5%

B. 114%

C. 76%

85. A turbine engine's combustor is a single continuous ring around the engine axis. The mechanic identifies it as a/an:

A. Can-type combustor

B. Can-annular combustor

C. Annular combustor

86. A reciprocating engine's compression test reads 72/80. The leakage is:

A. 10%

B. 12.5%

C. 25%

87. A turbine engine has a turbine discharge pressure of 56 and an inlet pressure of 14. The EPR is:

A. 4.0

B. 3.0

C. 5.0

88. A reciprocating engine's mixture becomes richer as it climbs without adjustment. The mechanic explains this is because:

A. The fuel pump increases pressure with altitude

B. The exhaust back pressure rises

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

89. A high-bypass turbofan moves 126 units of fan air with 21 units through the core. The bypass ratio is:

A. 6:1

B. 21:1

C. 5:1

90. A reciprocating engine's exhaust valve uses a hollow stem filled with a substance that aids cooling. The mechanic identifies it as:

A. Mercury

B. Metallic sodium

C. Lead shot

91. A turbine engine produces 1,600 lb of thrust while moving at 550 ft/s. The thrust horsepower is approximately:

A. 1,600 horsepower

B. 2,029 horsepower

C. 1,200 horsepower

92. A single cylinder with a 5.0-inch bore and a 4.25-inch stroke displaces approximately:

A. 83 cubic inches

B. 110 cubic inches

C. 65 cubic inches

93. A reciprocating engine's oil temperature is regulated separately from its pressure. The mechanic identifies the temperature control as the:

A. Pressure relief valve

B. Scavenge pump

C. Oil cooler and thermostatic valve

94. A turbine engine in flight moves 50 lb of air per second, accelerating it from 500 ft/s to 1,700 ft/s. The net thrust is approximately:

A. 1,863 pounds

B. 2,640 pounds

C. 1,200 pounds

95. A reciprocating engine's compression test must place the piston at TDC on which stroke for valid results?

A. The exhaust stroke

B. The compression stroke

C. The intake stroke

96. A turbine engine's net thrust in flight is lower 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

97. A reciprocating engine's annual inspection is due. The mechanic confirms it may be approved for return to service only by:

A. Any A&P mechanic

B. A mechanic holding an Inspection Authorization

C. The aircraft owner

98. An engine develops 320 indicated horsepower and 270 brake horsepower. The friction horsepower is:

A. 50 horsepower

B. 590 horsepower

C. 86 horsepower

99. A turbine engine's life-limited part is tracked in cycles rather than hours because:

A. Hours are not recorded for turbines

B. Each thermal cycle imposes a full fatigue load on rotating parts

C. Cycles are easier to count

100. A four-stroke engine operating at 2,000 RPM has a camshaft turning at:

A. 1,000 RPM

B. 2,000 RPM

C. 4,000 RPM

Answer Key & Full Answer Explanations

1. C — A failing bearing breaking down internally. Falling oil pressure, rising oil temperature, metal on the chip detector, and a load knock together point to a bearing breaking down, which sheds metal and loses its oil film.

2. B — Stuck closed, driving overboost. A wastegate stuck closed routes all exhaust through the turbocharger turbine, driving overboost and detonation even with correct fuel.

3. A — 244 horsepower. PLANK gives IHP = (135 × 0.375 × 19.635 × 1,350 × 6) ÷ 33,000 ≈ 244 horsepower, with stroke in feet and N as RPM ÷ 2.

4. A — A non-grounding P-lead on the left and an ignition fault on the right. Zero drop means the left magneto is not being grounded (hot), while an excessive drop isolates an ignition fault to the right system.

5. B — Hot-section deterioration with a fuel nozzle producing an uneven spray. A slow EGT and fuel-flow climb at fixed thrust signals hot-section wear, and the combustor hot streaks point to a fuel nozzle spraying unevenly.

6. C — Cut fuel and motor the engine to clear a hot start. A rapid EGT spike with slow N2 rise is a hot start; the response is to cut fuel and motor the engine to clear fuel and cool the hot section.

7. C — Exceed the limit by up to 10 hours only to reach the inspection site, deducting the excess. The 100-hour may be overflown up to 10 hours only to reach the inspection location, with the excess deducted from the next interval.

8. A — 603 cubic inches. One cylinder displaces $\pi \times (2.5625)^2 \times 4.875 \approx 100.6$ cubic inches, and six cylinders total about 603 cubic inches.

9. B — Worn or broken piston rings. Air at the breather indicates blow-by past the rings, and worn rings also pass oil into the chamber, producing blue smoke and high oil consumption while the valves seat well.

10. B — A compressor surge from too-rapid acceleration. Loud banging and airflow reversal right after a rapid throttle advance indicate a compressor surge, a violent breakdown of airflow.

11. C — Induction icing while the governor holds RPM by pitch. A manifold-pressure drop with steady RPM and no roughness in moisture is induction icing, with the constant-speed governor holding RPM by adjusting pitch.

12. C — Is uncontrolled end-gas burning after the normal spark. Detonation is the explosive self-ignition of the end gases after the normal spark, distinct from pre-ignition, which occurs before the spark.

13. A — 250 horsepower. Brake horsepower is torque times RPM divided by 5,252: (525 × 2,500) ÷ 5,252 ≈ 250 horsepower.

14. C — Reduced air density lowering mass airflow. Thrust falls on a hot, high day because the thinner air reduces the mass of air the engine can move, and thrust depends on mass airflow.

15. C — A non-grounding P-lead (hot magneto) and an ignition fault on that cylinder. A failure to shut down means a P-lead is not grounding the magneto, and a large single-cylinder magneto drop with normal compression isolates an ignition fault to that cylinder.

16. B — Vapor lock from fuel boiling in hot lines. A fuel-injected engine hard to start hot and acting fuel-starved after a brief shutdown is suffering vapor lock, a known drawback of injection.

17. B — Missing or damaged baffle seal at that cylinder. Single-cylinder overheating with normal performance elsewhere points to cooling air bypassing that cylinder from a missing or damaged baffle seal.

18. C — A hung start from insufficient starter air or a fuel-control fault. An engine that lights off but stabilizes below idle with EGT in limits is a hung start, typically from inadequate starter air or a fuel-control issue.

19. B — Verify the reading with a master gauge, suspecting the sender or gauge. A low indication with normal engine behavior may be a faulty gauge, sender, or line, so actual pressure is confirmed before condemning the engine.

20. A — 2,221 pounds. Net thrust is mass flow times velocity change: (55 ÷ 32.2) × (1,750 − 450) ≈ 2,221 pounds.

21. B — Pre-ignition from a glowing hot spot. Knocking, single-cylinder overheating, and a melted electrode indicate pre-ignition, where a glowing hot spot ignites the charge before the spark.

22. B — High-pressure spool. N2 indicates the high-pressure spool speed, so an abnormal N2 with normal N1 points to a high-pressure spool problem.

23. C — Carburetor icing. Gradual power loss that fully recovers with carburetor heat applied and removed, on a humid cool day, is the hallmark of carburetor icing.

24. C — Fan and compressor blades. A bird ingested on takeoff strikes the front of the engine first, so FOD inspection focuses on the cold-section fan and compressor blades.

25. B — Leaking intake valve. A 60/80 reading with air at the carburetor air intake indicates the intake valve is not sealing; the exhaust would indicate the exhaust valve.

26. A — 2,029 horsepower. Thrust horsepower is thrust times velocity divided by 550: (1,800 × 620) ÷ 550 ≈ 2,029 horsepower.

27. A — Spark-plug fouling that clears at higher speed and temperature. Idle roughness that smooths at higher RPM, with lead bridging a plug gap, indicates spark-plug fouling that clears as speed and temperature rise.

28. B — Investigate the source as a sign of internal wear. Metal chips are an early warning of internal wear or impending failure and must be investigated, even with normal oil pressure.

29. C — An out-of-track propeller. Vibration that worsens with RPM, with tips not following the same path, indicates an out-of-track propeller.

30. B — Boosting induction air above ambient as designed. A turbocharged engine producing manifold pressure above ambient with normal performance is functioning correctly, restoring or increasing power.

31. B — Starter air supply pressure. Failure to reach self-accelerating speed in a pneumatic start most often stems from inadequate starter air, checked first.

32. A — 8:1. Compression ratio is total volume divided by clearance volume: (126 + 18) ÷ 18 = 8:1.

33. A — 85%. Mechanical efficiency is brake divided by indicated horsepower: 255 ÷ 300 × 100 = 85%.

34. C — An excessively lean condition. With cooling airflow adequate, persistent high CHT in climb points to an excessively lean mixture, which burns hotter.

35. A — 1,600 RPM. The four-stroke camshaft turns at half crankshaft speed: 3,200 ÷ 2 = 1,600 RPM.

36. B — Maintain smooth compressor airflow 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.

37. C — A mixture that is not excessively lean. Detonation is reduced by using the specified fuel grade and avoiding an excessively lean mixture, since both low octane and lean mixtures promote it.

38. B — Self-sustaining, so ignition should be off. Once a turbine lights off, combustion sustains itself, so the ignition should be switched off; continued firing is abnormal.

39. B — Sealing well and serviceable. A 75/80 reading with no audible leak indicates the cylinder is sealing well and is serviceable.

40. A — 12.5%. A reading of 70/80 means 10 psi lost of 80 applied: 10 ÷ 80 × 100 = 12.5% leakage.

41. B — Vapor lock relieved by the boost pump's added pressure. An engine that quits at altitude on hot days but runs with the boost pump on is suffering vapor lock, which the pump's pressure suppresses.

42. B — Blend the nick smooth to remove the stress riser. A nick within limits is repaired by blending out the sharp stress riser; it is never welded, because blade fatigue failure is catastrophic.

43. A — Pistons. Aluminum particles point to wear of aluminum components such as the pistons; ferrous particles would indicate the crankshaft or gears.

44. B — Radio and navigation interference. Cracked, moist harness shielding lets electromagnetic interference escape, causing misfire plus radio and navigation interference.

45. C — Remove and discard the disk. A life-limited disk at its cycle limit must be retired regardless of how clean it borescopes; the limit is mandatory.

46. B — Naturally aspirated engine losing power with altitude. A naturally aspirated engine cannot exceed ambient manifold pressure, so power falls steadily as the aircraft climbs.

47. B — Compressor section. Bleed air is tapped from the compressor for pressurization and anti-ice; a bleed-air drop is traced to the compressor extraction point.

48. A — 3.0. EPR is turbine discharge pressure divided by inlet pressure: 51 ÷ 17 = 3.0.

49. C — Running the engine or staking per procedure. A leaking exhaust valve may sometimes be reseated by running the engine or staking per the manufacturer's procedure before the cylinder is condemned.

50. C — Rotating flyweights. The constant-speed governor senses engine speed with rotating flyweights, which meter oil pressure to the pitch-change mechanism.

51. A — 5:1. Bypass ratio is fan air divided by core air: 110 ÷ 22 = 5:1.

52. C — A glowing hot spot such as a deposit or overheated plug. Pre-ignition that persists after correcting fuel grade indicates a hot spot, such as a glowing deposit or overheated plug, igniting the charge early.

53. A — Running engine drives and damages the starter. The starter must disengage after start; if it fails to, the running engine drives the starter backward and can destroy it.

54. A — 8:1. Compression ratio is BDC divided by TDC volume: 160 ÷ 20 = 8:1.

55. B — EPR. On an engine using a pressure-ratio reference, EPR (turbine discharge over inlet pressure) is the primary thrust-setting instrument.

56. C — Color-indicating dehydrator plugs. Internal humidity in a preserved engine is monitored by color-indicating dehydrator plugs, which shift from blue to pink as they absorb moisture.

57. A — 51 horsepower. Friction horsepower is indicated minus brake: 340 − 289 = 51 horsepower.

58. C — Clogged or damaged fuel nozzle producing an uneven spray. Localized combustor liner discoloration—a hot spot—most often results from a fuel nozzle producing an uneven spray pattern.

59. C — Worn bearings combined with heat-thinned oil. Low pressure with thin, hot oil is consistent with worn bearings bleeding off pressure and oil thinned by heat; cold thick oil would raise pressure.

60. B — Propeller feathering. Feathering turns the blades edge-on to the airflow to stop windmilling and minimize the drag of a dead engine.

61. C — Approximately 520 cubic inches in displacement. The number in an engine designation is the approximate total piston displacement in cubic inches.

62. A — 64 cubic inches. Displacement is $\pi \times (2.25)^2 \times 4.0 \approx 63.6$ cubic inches for one cylinder.

63. C — The high jet-to-ambient velocity difference. Older low-bypass engines are louder because the large velocity difference between the fast exhaust and ambient air increases mixing noise.

64. B — DC generator rather than an alternator. Failure to charge at idle but normal charging at higher RPM is characteristic of a DC generator, which needs higher speed to begin charging.

65. C — Accelerated creep and burning of components. A start overtemperature can cause immediate burning and accelerated creep in the hot section, which is why it triggers a mandatory inspection.

66. C — Before TDC on the compression stroke. Ignition must fire before TDC on compression so peak combustion pressure arrives just after TDC; firing at TDC reduces power.

67. A — 2,236 pounds. Gross static thrust is mass flow times jet velocity: $(48 \div 32.2) \times 1{,}500 \approx 2{,}236$ pounds.

68. B — Carbon monoxide into the cabin. Because cabin heat comes from exhaust-warmed air, an exhaust leak can carry colorless, odorless, deadly carbon monoxide into the cabin.

69. A — 240 horsepower. Brake horsepower is torque times RPM divided by 5,252: $(450 \times 2{,}800) \div 5{,}252 \approx 240$ horsepower.

70. C — Erosion. Grit dulling the compressor blade leading edges is erosion, a wearing-away of the blade surfaces by ingested particles.

71. A — Exhaust back pressure. A broken-loose internal muffler baffle obstructs exhaust flow, causing back pressure and a loss of engine power.

72. B — Weighing the bottle against its charged weight. Indicated pressure varies with temperature while the mass of agent does not, so weighing is the reliable check of an extinguisher bottle's charge.

73. B — Ashless dispersant oil. New rings that fail to seat with high oil consumption from new suggest break-in on ashless dispersant oil, whose additives prevent seating; break-in requires straight mineral oil.

74. C — The detection circuit and warning devices are functional. The cockpit test switch confirms the detection circuit is continuous and the warning devices function; it does not test the agent charge.

75. A — 1,200 RPM. The four-stroke camshaft turns at half crankshaft speed: 2,400 ÷ 2 = 1,200 RPM.

76. A — An alternate air source. When the induction filter is blocked by impact ice, the system supplies alternate air—warm, unfiltered engine-compartment air—to keep the engine breathing.

77. C — Internal air cooling and film cooling. Cooling air routed through hollow blades exits tiny holes to form a protective film, allowing gas temperatures above the blade material's melting point.

78. B — A higher-octane fuel. A higher compression ratio raises combustion pressure and temperature, requiring a higher-octane fuel to resist detonation.

79. A — 9:1. Compression ratio is BDC divided by TDC volume: 135 ÷ 15 = 9:1.

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

81. C — Impulse coupling. The impulse coupling provides a hot, retarded spark at cranking speed by snapping the magneto through the E-gap, improving starting and preventing kickback.

82. C — Anti-ice system. A system activated before entering icing and run continuously to prevent ice formation is an anti-ice system; a de-ice system removes ice after it forms.

83. B — Bearing failure from metal-to-metal contact. Plain bearings ride on a film of pressurized oil; losing that film causes metal-to-metal contact and rapid bearing failure.

84. A — 87.5%. Mechanical efficiency is brake divided by indicated horsepower: 245 ÷ 280 × 100 = 87.5%.

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

86. A — 10%. A reading of 72/80 means 8 psi lost of 80 applied: 8 ÷ 80 × 100 = 10% leakage.

87. A — 4.0. EPR is turbine discharge pressure divided by inlet pressure: 56 ÷ 14 = 4.0.

88. 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, so the mixture richens.

89. A — 6:1. Bypass ratio is fan air divided by core air: 126 ÷ 21 = 6:1.

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

91. A — 1,600 horsepower. Thrust horsepower is thrust times velocity divided by 550: (1,600 × 550) ÷ 550 = 1,600 horsepower.

92. A — 83 cubic inches. Displacement is $\pi \times (2.5)^2 \times 4.25 \approx 83.4$ cubic inches for one cylinder.

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

94. A — 1,863 pounds. Net thrust is mass flow times velocity change: (50 ÷ 32.2) × (1,700 − 500) ≈ 1,863 pounds.

95. B — The 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.

96. 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.

97. B — A mechanic holding an Inspection Authorization. An annual may be approved for return to service only by an IA holder, not a plain A&P or the owner.

98. A — 50 horsepower. Friction horsepower is indicated minus brake: 320 − 270 = 50 horsepower.

99. B — Each thermal cycle imposes a full fatigue load on rotating parts. Life limits are counted in cycles because each start-to-shutdown cycle imposes a full fatigue load that drives fatigue more than running hours.

100. A — 1,000 RPM. The four-stroke camshaft turns at half crankshaft speed: 2,000 ÷ 2 = 1,000 RPM.