

PRACTICE EXAM 12

1. The typical aircraft reciprocating engine operates on which cycle?
 - A. A two-stroke cycle
 - B. A continuous rotary cycle
 - C. A turbine cycle
 - D. A four-stroke cycle

2. During the four-stroke cycle, power is produced during which stroke?
 - A. The power stroke, when the ignited mixture drives the piston down
 - B. The intake stroke, as the mixture enters
 - C. The compression stroke, as the mixture is compressed
 - D. The exhaust stroke, as gases leave

3. Why is the aircraft engine fitted with two magnetos?
 - A. To provide ignition redundancy and more complete combustion
 - B. To power the radios and lights
 - C. To eliminate the need for spark plugs
 - D. To run the engine without any fuel

4. How do magnetos differ from the rest of the electrical system?
 - A. They require the battery to function
 - B. They generate their own current independently of the battery

- C. They are powered by the alternator alone
- D. They operate only with the master switch on

5. During the run-up, the pilot switches from BOTH to L and observes the expected small RPM drop. What does this indicate?

- A. A failed magneto requiring shutdown
- B. A dangerously rich mixture
- C. The carburetor heat is stuck on
- D. Normal operation of that magneto

6. During the magneto check, switching to one magneto produces no RPM drop at all. What does this most likely indicate?

- A. The mixture is correctly leaned
- B. The propeller is set to coarse pitch
- C. A grounding problem, possibly a "hot" magneto
- D. Normal operation requiring no concern

7. Why must a propeller always be treated as if the ignition is live?

- A. A magneto with a broken ground can fire the engine even with switches off
- B. The battery always powers the propeller directly
- C. The propeller stores fuel that can ignite
- D. The alternator keeps the propeller energized

8. In a high-wing airplane, fuel often reaches the engine by what means?

- A. An electric pump only

- B. A pressurized nitrogen system
- C. Gravity feed
- D. A hand-operated wobble pump in cruise

9. Why must the mixture be leaned as the airplane climbs to altitude?

- A. The engine produces more power and needs more fuel
- B. The thinner air makes the mixture too rich at a fixed fuel flow
- C. Cooler air burns fuel less efficiently
- D. The propeller demands additional fuel

10. Aviation gasoline grade 100LL is identified by which color?

- A. Red
- B. Green
- C. Blue
- D. Clear

11. What is the primary risk of putting jet fuel into a reciprocating (piston) engine?

- A. Improved performance at altitude
- B. No effect, as the engine adapts
- C. Slightly higher fuel economy
- D. Detonation, power loss, or catastrophic engine failure

12. Which is a primary function of the engine oil system?

- A. To increase the octane of the fuel

- B. To power the electrical system
- C. To lubricate, cool, clean, and protect moving parts
- D. To generate ignition spark

13. Carburetor ice forms in the induction system because of what?

- A. The exhaust gases cooling the intake
- B. The propeller wash chilling the carburetor
- C. The temperature drop from fuel vaporization and pressure reduction
- D. The battery overheating the air intake

14. When carburetor heat is applied, the initial RPM response is typically what?

- A. A slight drop, because warm air is less dense
- B. An immediate large increase that holds
- C. No change whatsoever
- D. The engine stops entirely

15. Which component produces electrical power in flight and recharges the battery?

- A. The magneto
- B. The starter motor
- C. The vacuum pump
- D. The alternator

16. An ammeter showing a discharge in cruise, with the engine running normally, most likely indicates what?

- A. Both magnetos have failed

- B. The pitot tube is blocked
- C. The static port is obstructed
- D. The alternator has failed and the battery is supplying the load

17. Why is the propeller blade twisted from hub to tip?

- A. To keep each blade section at an efficient angle despite different speeds
- B. To allow the blades to fold on shutdown
- C. To reduce the propeller's weight
- D. To increase drag for braking

18. Most training airplanes within the recreational class use which type of propeller?

- A. A fixed-pitch propeller
- B. A constant-speed propeller
- C. A feathering propeller
- D. A reversible-pitch propeller

19. Which instruments operate on the pitot-static system?

- A. Attitude indicator, heading indicator, turn coordinator
- B. Tachometer, oil pressure gauge, ammeter
- C. Airspeed indicator, altimeter, vertical speed indicator
- D. Magnetic compass, attitude indicator, ammeter

20. A blocked pitot tube, with the drain hole also blocked, causes the airspeed indicator to do what?

- A. Drop immediately to zero

- B. Behave like an altimeter, reading higher in a climb
- C. Read accurately with a slight lag
- D. Freeze at the value present when blocked

21. A blocked static port (with the pitot clear) most affects which instruments?

- A. Only the tachometer and oil gauge
- B. Only the magnetic compass
- C. The attitude and heading indicators
- D. The altimeter and vertical speed indicator

22. Which instruments rely on gyroscopes?

- A. Airspeed indicator, altimeter, VSI
- B. Attitude indicator, heading indicator, turn coordinator
- C. Tachometer, manifold gauge, ammeter
- D. Magnetic compass, fuel gauge, oil gauge

23. Why are the gyroscopic instruments commonly driven by two different power sources?

- A. So a single power-source failure does not disable all of them at once
- B. To reduce the total weight of the panel
- C. To eliminate the need for a battery
- D. To increase the airspeed reading accuracy

24. The magnetic compass is unique among the direction instruments because it does what?

- A. Requires vacuum power to operate

- B. Senses direction without electrical or vacuum power
- C. Is driven by the alternator
- D. Depends on the gyroscopic instruments

25. The magnetic compass acceleration and deceleration errors are most pronounced on which headings?

- A. North and south
- B. East and west
- C. Only on a heading of 360°
- D. Only when descending

26. The pitot tube senses which type of pressure?

- A. Ambient static pressure only
- B. The pressure inside the cabin
- C. The pressure of the fuel system
- D. Ram (impact) air pressure

27. The static port senses which type of pressure?

- A. Ram air pressure from forward motion
- B. Ambient, still-air pressure
- C. The pressure within the engine cylinders
- D. The pressure of the exhaust gases

28. The altimeter must be set to the current local altimeter setting so that it does what?

- A. Reads the correct altitude

- B. Displays the outside temperature
- C. Shows the fuel remaining
- D. Indicates the airspeed accurately

29. Flying into an area of lower pressure without resetting the altimeter causes it to do what?

- A. Read exactly correct
- B. Stop functioning entirely
- C. Over-read, so the aircraft is lower than indicated
- D. Under-read, so the aircraft is higher than indicated

30. During the intake stroke of the four-stroke cycle, what occurs?

- A. The spark plugs ignite the mixture
- B. The mixture is compressed by the rising piston
- C. The burned gases are expelled
- D. The piston moves down, drawing the fuel-air mixture in

31. The fuel selector and fuel quantity gauges are part of which system?

- A. The electrical system
- B. The ignition system
- C. The fuel system
- D. The pitot-static system

32. Why does the engine continue to run after a complete electrical failure?

- A. The battery has a long-life reserve cell

- B. The starter keeps the engine turning
- C. The magnetos provide ignition independently of the electrical system
- D. The alternator switches to manual mode

33. Circuit breakers or fuses in the electrical system serve what purpose?

- A. To increase the alternator's output
- B. To protect circuits from overload
- C. To power the magnetos
- D. To regulate the fuel flow

34. Carburetor ice is most likely to form under which conditions?

- A. Very cold, dry air far below freezing
- B. Hot, dry air with a large temperature-dewpoint spread
- C. Clear skies with very low humidity
- D. High humidity with temperatures around 50 to 70°F

35. A magneto generates spark in what manner?

- A. It is engine-driven and self-contained, producing its own current
- B. It draws current from the battery through the master switch
- C. It is charged by the alternator before each flight
- D. It uses the vacuum pump to create a spark

36. Engine oil pressure and temperature are monitored in flight because abnormal readings indicate what?

- A. A problem with the radios

- B. A change in the outside air temperature
- C. Possible impending engine trouble
- D. The need to reset the altimeter

37. Leaning the mixture at altitude provides which benefit?

- A. It increases the fuel flow to the engine
- B. It cools the exhaust system dramatically
- C. It improves efficiency and prevents fouled spark plugs
- D. It increases the propeller pitch

38. The vertical speed indicator (VSI) operates on which pressure source?

- A. Ram air from the pitot tube only
- B. The static port, measuring the rate of pressure change
- C. A gyroscope spun by engine vacuum
- D. The combination of pitot and static together

39. The airspeed indicator measures speed by comparing which two pressures?

- A. Ram (pitot) pressure against static pressure
- B. Oil pressure against fuel pressure
- C. Manifold pressure against cabin pressure
- D. Exhaust pressure against intake pressure

40. Firing two spark plugs per cylinder rather than one provides what benefit?

- A. It reduces the engine's weight

- B. It produces more complete and efficient combustion
- C. It eliminates the need for fuel
- D. It powers the aircraft's lighting

41. What is the empty weight of an airplane defined to include, under modern standards?

- A. Full usable fuel and all occupants
- B. The pilot but no fuel
- C. Half fuel and average baggage
- D. Unusable fuel and full operating fluids, but no usable fuel or occupants

42. The induction system delivers what to the engine?

- A. Air for combustion
- B. Oil for lubrication
- C. Electrical current for ignition
- D. Hydraulic fluid for the brakes

43. A magneto check producing an RPM drop far larger than allowed, with a rough engine, indicates what?

- A. Normal operation within limits
- B. The mixture is correctly leaned
- C. The propeller is feathered
- D. An ignition problem on the magneto being tested

44. Why does the airspeed indicator behave like an altimeter when the pitot tube and its drain are both blocked?

- A. The static port feeds it directly in that case
- B. The gyroscope inside it tumbles
- C. The alternator stops supplying it power
- D. The trapped pressure responds to changing static pressure with altitude

45. The compass correction card in the cockpit accounts for what?

- A. Magnetic variation between true and magnetic north
- B. Deviation caused by the aircraft's own magnetic fields
- C. The wind correction angle for the route
- D. The standard temperature lapse rate

46. During the compression stroke of the four-stroke cycle, what happens?

- A. The piston rises, compressing the fuel-air mixture
- B. The mixture is drawn into the cylinder
- C. The ignited gases drive the piston down
- D. The exhaust valve opens to release gases

47. Why must a pilot verify the correct fuel grade by its color before flight?

- A. To confirm the fuel will fit the tank opening
- B. Because using a lower grade or the wrong fuel can cause serious engine damage
- C. To estimate the aircraft's empty weight
- D. To set the altimeter correctly

48. With a fixed-pitch propeller, engine RPM is controlled directly by what?

- A. A separate propeller control lever
- B. The mixture control
- C. The carburetor heat
- D. The throttle

49. The master switch in the electrical system controls what?

- A. The ignition timing of the magnetos
- B. The fuel flow to the carburetor
- C. The aircraft's electrical system
- D. The propeller blade angle

50. The "ANDS" memory aid (Accelerate North, Decelerate South) describes errors of which instrument?

- A. The attitude indicator
- B. The altimeter
- C. The magnetic compass
- D. The vertical speed indicator

Answer Key & Explanations

1. D — The typical aircraft reciprocating engine operates on a four-stroke cycle: intake, compression, power, and exhaust. Each stroke serves one function in converting fuel energy into rotary motion.
2. A — Power is produced during the power stroke, when the ignited mixture expands and drives the piston down. The other three strokes prepare for or follow that event.
3. A — Two magnetos provide ignition redundancy — the engine runs if one fails — and firing two plugs per cylinder improves combustion. They do not power radios or run the engine without fuel.

4. B — Magnetos are engine-driven and generate their own current independently of the battery. This is why the engine keeps running through a complete electrical failure.
5. D — A small, expected RPM drop when switching to one magneto indicates that magneto is operating normally. The engine runs slightly rougher on a single magneto, producing the drop.
6. C — No RPM drop at all suggests the magneto is not being properly grounded by the switch, meaning it could remain "hot" even with switches off. This is a safety hazard requiring maintenance.
7. A — A magneto with a broken ground can fire the engine if the propeller is moved by hand, even with all switches off. This is why a propeller must always be treated as live.
8. C — In high-wing airplanes, fuel often reaches the engine by gravity feed, since the tanks sit above the engine. Low-wing aircraft require a fuel pump because gravity cannot do the job.
9. B — As the airplane climbs, the thinner air makes the fuel-air mixture too rich at a fixed fuel flow, so leaning restores the proper ratio. This improves efficiency and prevents fouled plugs.
10. C — Aviation gasoline grade 100LL (low lead) is dyed blue. The color allows a pilot to verify the correct fuel visually.
11. D — Jet fuel in a reciprocating engine can cause detonation, power loss, or catastrophic engine failure. This is why verifying the correct fuel is critical before flight.
12. C — The oil system lubricates, cools, cleans, seals, and protects the engine's moving parts. It does not affect fuel octane, ignition, or the electrical system.
13. C — Carburetor ice forms because the temperature drop from fuel vaporization and pressure reduction can chill the carburetor below freezing. This can happen even in warm outside air.
14. A — Applying carburetor heat causes a slight initial RPM drop because the warm air is less dense. If ice was present, the engine then runs rough briefly before smoothing out.

15. D — The alternator produces electrical power in flight and recharges the battery. The magneto powers ignition independently, and the battery serves as a reserve.

16. D — An ammeter showing discharge with the engine running normally indicates the alternator has failed and the battery is supplying the load. The engine keeps running because the magnetos are independent.

17. A — The propeller blade is twisted so each section meets the air at an efficient angle despite moving faster at the tip than the hub. This keeps the whole blade producing thrust efficiently.

18. A — Most training airplanes in the recreational class use a fixed-pitch propeller, whose blade angle cannot change in flight. This keeps the powerplant simple, fitting the certificate's scope.

19. C — The airspeed indicator, altimeter, and vertical speed indicator operate on the pitot-static system. The attitude, heading, and turn instruments are gyroscopic.

20. B — With both the pitot inlet and drain blocked, trapped pressure makes the airspeed indicator behave like an altimeter, reading higher in a climb. This produces dangerously misleading airspeed.

21. D — A blocked static port affects the instruments that depend on static pressure: the altimeter and vertical speed indicator (and the airspeed indicator's accuracy). The gyroscopic instruments are unaffected.

22. B — The attitude indicator, heading indicator, and turn coordinator rely on gyroscopes. The airspeed indicator, altimeter, and VSI are pitot-static instruments.

23. A — Gyroscopic instruments are commonly split across vacuum and electric power so a single power-source failure does not disable all of them at once. This gives the pilot a cross-check.

24. B — The magnetic compass senses direction without electrical or vacuum power, making it uniquely independent. It is, however, subject to several predictable errors.

25. B — Magnetic compass acceleration and deceleration errors are most pronounced on east and west headings. Turning errors, by contrast, are worst near north and south.

26. D — The pitot tube senses ram (impact) air pressure from the aircraft's forward motion. The airspeed indicator compares this to static pressure.

27. B — The static port senses ambient, still-air pressure. The altimeter and VSI use it, and the airspeed indicator compares it to ram pressure.

28. A — The altimeter must be set to the current local altimeter setting so it reads the correct altitude. An incorrect setting produces altitude errors.

29. C — Flying into lower pressure without resetting causes the altimeter to over-read, so the aircraft is actually lower than indicated — "high to low, look out below." This is a terrain-clearance hazard.

30. D — During the intake stroke, the piston moves down, drawing the fuel-air mixture into the cylinder. Ignition, compression, and exhaust occur on the other strokes.

31. C — The fuel selector and fuel quantity gauges are part of the fuel system. This system stores and delivers fuel to the engine.

32. C — The engine continues to run after a complete electrical failure because the magnetos provide ignition independently of the electrical system. Electrical failure is not engine failure.

33. B — Circuit breakers or fuses protect circuits from overload. They interrupt excessive current to prevent damage or fire.

34. D — Carburetor ice is most likely in high humidity at temperatures around 50–70°F, because vaporization can cool the carburetor below freezing even on a warm day. Carburetor heat is the remedy.

35. A — A magneto is engine-driven and self-contained, producing its own current. It does not rely on the battery, master switch, or alternator.

36. C — Abnormal oil pressure or temperature indicates possible impending engine trouble. Low pressure or high temperature are early warnings to act.

37. C — Leaning the mixture at altitude improves efficiency and prevents fouled spark plugs by restoring the correct fuel-air ratio. It reduces, not increases, fuel flow.

38. B — The VSI operates on the static port, measuring the rate of change of static pressure to display climb or descent rate. It does not use ram air or a gyroscope.

39. A — The airspeed indicator measures speed by comparing ram (pitot) pressure against static pressure. The difference reflects the airplane's speed through the air.

40. B — Firing two spark plugs per cylinder produces more complete and efficient combustion. This, with redundancy, is why the engine uses dual ignition.

41. D — Empty weight includes unusable fuel and full operating fluids, but no usable fuel or occupants. It is the baseline weight from which useful load is calculated.

42. A — The induction system delivers air for combustion to the engine. In carbureted engines, fuel mixes with this air in the carburetor.

43. D — An RPM drop far exceeding the allowable limit, with a rough engine, indicates an ignition problem on the magneto being tested. This warrants maintenance before flight.

44. D — With both the pitot inlet and drain blocked, the trapped pressure can no longer reflect airspeed, so the instrument responds only to changing static pressure with altitude. This makes it behave like an altimeter.

45. B — The compass correction card accounts for deviation, the error caused by the aircraft's own magnetic fields. Variation, by contrast, is shown on charts by isogonic lines.

46. A — During the compression stroke, the piston rises and compresses the fuel-air mixture. Ignition follows on the power stroke.

47. B — A pilot must verify the correct fuel grade by color because using a lower grade or the wrong fuel can cause serious engine damage. The color coding allows visual confirmation.

48. D — With a fixed-pitch propeller, engine RPM is controlled directly by the throttle, since there is no separate propeller control. This keeps the powerplant simple.

49. C — The master switch controls the aircraft's electrical system. It does not affect magneto timing, fuel flow, or propeller pitch.

50. C — The "ANDS" memory aid — Accelerate North, Decelerate South — describes the acceleration and deceleration errors of the magnetic compass. These errors are most pronounced on east-west headings.