PRACTICE EXAM 17 SIMULATION (60 QUESTIONS)

1. A mechanic must add three shim stacks of 1/4 inch, 3/8 inch, and 1/8 inch. The total thickness is:

A. 5/8 inch

B. 3/4 inch

C. 1/2 inch

D. 7/8 inch

2. Which property describes a metal's ability to resist penetration, wear, and abrasion?

A. Ductility

B. Malleability

C. Hardness

D. Elasticity

3. A mechanic must verify the fuel for a turbine-powered aircraft. The correct fuel is:

A. 100LL avgas, dyed blue

B. 80/87 avgas, dyed red

C. Automotive premium gasoline

D. Jet A turbine fuel

4. A circuit operates at 28 volts with a 7-ohm load. The current is:

A. 196 amps

B. 0.25 amps

C. 35 amps

D. 4 amps

5. A mechanic finds white powdery deposits with pitting beneath on an aluminum lap joint near a battery box. The most likely cause is:

A. Excessive paint thickness

B. Over-torqued fasteners

C. Spilled electrolyte and trapped moisture

D. The use of aluminum rivets

6. Which federal regulation governs how maintenance is performed, recorded, and approved for return to service?

A. 14 CFR Part 65

B. 14 CFR Part 61

C. 14 CFR Part 43

D. 14 CFR Part 21

7. A mechanic must compute the loaded CG: empty 1,900 lb at arm 70 in and cargo 100 lb at arm 120 in. The CG is closest to:

A. 70.0 inches

B. 72.5 inches

C. 95.0 inches

D. 120.0 inches

8. Aircraft flared tube fittings are formed to what flare angle?

A. 30 degrees

B. 45 degrees

C. 60 degrees

D. 37 degrees

9. An NDI method that works only on ferromagnetic materials is:

A. Magnetic particle inspection

B. Liquid penetrant inspection

C. Ultrasonic inspection

D. Radiographic inspection

10. Bonding and grounding an aircraft before fueling primarily serves to:

A. Dissipate static and prevent vapor ignition

B. Increase the fuel flow rate

C. Calibrate the fuel quantity gauges

D. Keep water out of the fuel

11. A mechanic finds an applicable AD that has not been complied with. The aircraft is:

A. Airworthy if the annual is current

B. Not airworthy until the AD is complied with

C. Airworthy with an owner's waiver

D. Exempt because it is privately operated

12. Which heat-treatment process reheats a hardened metal to reduce brittleness and restore toughness?

A. Annealing

B. Hardening

C. Normalizing

D. Tempering

13. Two 6-ohm resistors are wired in parallel. The total resistance is:

A. 12 ohms

B. 6 ohms

C. 0.33 ohms

D. 3 ohms

14. A mechanic servicing an oxygen system must keep it free of oil because oil with high-pressure oxygen can:

A. Slowly dilute the oxygen

B. Ignite spontaneously and violently

C. Freeze the regulator

D. Make the gauge read low

15. The center of gravity is found by which calculation?

A. Total moment divided by total weight

B. Total weight divided by total moment

C. Total arm multiplied by total weight

D. Total weight added to the datum

16. A mechanic finds a flexible hose installed with a spiraled lay line. This indicates the hose:

A. Is the correct length

B. Is at end of life

C. Has been installed with a twist and must be corrected

D. Is rated for higher pressure

17. Which is the most complete description of an airworthy aircraft?

A. It is in a condition for safe operation only

B. It conforms to its type design and is in a condition for safe operation

C. It has a current annual only

D. It has been recently cleaned

18. A mechanic must compute the power of a device at 24 volts drawing 5 amps. The power is:

A. 120 watts

B. 4.8 watts

C. 29 watts

D. 19 watts

19. A castellated nut on a critical bolt is safetied by:

A. A fiber locking insert

B. A drop of thread adhesive

C. A cotter pin through the drilled bolt

D. Reliance on torque alone

20. A mechanic must select the data required to accomplish a major alteration. The correct data is:

A. Acceptable data from a handbook

B. A sales brochure

C. FAA-approved data

D. A coworker's verbal description

21. Which reinforcing fiber is electrically conductive and causes galvanic corrosion when contacting aluminum?

A. Carbon/graphite fiber

B. Fiberglass

C. Aramid (Kevlar)

D. Cotton-reinforced phenolic

22. A mechanic converts 35°C to Fahrenheit. The result is:

A. 63°F

B. 67°F

C. 99°F

D. 95°F

23. A self-locking fiber-insert nut must not be used where:

A. The fastener is easily accessible

B. The panel is non-structural

C. High heat could degrade the insert

D. The bolt is under one inch

24. A mechanic finds an aluminum surface lifted into flaky layers. This is:

A. Exfoliation corrosion

B. Uniform surface corrosion

C. A paint blister

D. Filiform corrosion

25. The grip length of a bolt should span the joined parts so that:

A. The threads carry the shear load

B. The smooth shank bears against the parts

C. The bolt extends past the nut

D. The head sits in a countersink

26. A mechanic computes the volume of a cylinder with a 3-inch radius and 8-inch height ($\pi \approx 3.1416$). It is closest to:

A. 75 cubic inches

B. 226 cubic inches

C. 151 cubic inches

D. 452 cubic inches

27. Which inspection is required every 12 calendar months and must be signed by an IA holder?

A. The annual inspection

B. The 100-hour inspection

C. The preflight inspection

D. The progressive check

28. A mechanic must never use which tool to remove corrosion from aluminum?

A. A nylon abrasive pad

B. Aluminum wool

C. An aluminum-compatible brush

D. A steel wire brush

29. In a series circuit, the total resistance is:

A. Less than the smallest resistor

B. The sum of the individual resistances

C. Equal to the largest resistor only

D. The reciprocal of the sum of conductances

30. A mechanic finds an aircraft within CG limits but 50 lb over maximum gross weight. The aircraft is:

A. Airworthy because the CG is correct

B. Airworthy if the excess is fuel

C. Not airworthy until the overweight is corrected

D. Within limits because weight is unregulated

31. Standard atmospheric pressure at sea level is approximately:

A. 7.5 psi

B. 14.7 psi

C. 10.2 psi

D. 50 psi

32. A mechanic must convert 60 inch-pounds of torque to foot-pounds. The result is:

A. 5 foot-pounds

B. 12 foot-pounds

C. 60 foot-pounds

D. 720 foot-pounds

33. Which statement correctly distinguishes mass from weight?

A. Mass is constant; weight changes with gravity

B. Weight is constant; mass changes with gravity

C. They are identical in all conditions

D. Mass is measured only in slugs

34. A mechanic must classify a fire involving energized avionics. This is a:

A. Class A fire

B. Class B fire

C. Class C fire

D. Class D fire

35. A mechanic adds a 40-lb item at arm 90 in to an aircraft of 1,960 lb and 119,800 in-lb moment. The new CG is closest to:

A. 90.0 inches

B. 65.0 inches

C. 61.7 inches

D. 67.5 inches

36. Which document provides the FAA-approved datum and weight limits for a specific aircraft type?

A. The owner's flight log

B. The Type Certificate Data Sheet (TCDS)

C. A sales brochure

D. A shop price sheet

37. A mechanic must record a return-to-service entry. It must include the work description, date, and the signer's:

A. Home address

B. Resale estimate

C. Tool serial numbers

D. Signature, certificate number, and certificate type

38. A mechanic finds a tube bend flattened well beyond the allowable limit. The tube should be:

A. Rejected, because it restricts flow and creates a stress point

B. Returned to service if it passes fluid

C. Re-rounded with a hammer

D. Painted over the flat area

39. Which gas is preferred for servicing aircraft struts and tires?

A. Pure oxygen

B. Moist shop air

C. Dry nitrogen

D. Carbon dioxide

40. A mechanic computes the area of a triangle with a 10-inch base and 4-inch height. The area is:

A. 40 square inches

B. 14 square inches

C. 20 square inches

D. 80 square inches

41. A Service Bulletin not referenced by an AD or operating rule is generally:

A. Mandatory federal law

B. A replacement for the type certificate

C. Prohibited from being accomplished

D. Advisory in nature

42. A mechanic must determine the resistance of a 24-volt circuit drawing 6 amps. The resistance is:

A. 144 ohms

B. 4 ohms

C. 0.25 ohms

D. 30 ohms

43. Safety wire on two fasteners must be routed so that the wire tension tends to:

A. Loosen both fasteners

B. Pull them apart laterally

C. Hold them in neutral

D. Tighten each fastener

44. A mechanic identifies a green or blue-green corrosion deposit. This indicates corrosion of:

A. Aluminum

B. Steel

C. Magnesium

D. Copper alloy

45. A mechanic must determine which inspection an A&P without an IA may approve. The correct one is:

A. The annual inspection

B. The 100-hour inspection

C. A major alteration

D. A progressive annual

46. A mechanic converts 5/8 inch to a decimal. The result is:

A. 0.625 inch

B. 0.580 inch

C. 0.875 inch

D. 0.500 inch

47. A mechanic must determine the first step when corrosion is found on a panel. The first step is to:

A. Apply primer over the corrosion

B. Paint the panel to seal it

C. Return to service and monitor

D. Clean the area to assess the full extent

48. Pascal's Law states that pressure applied to a confined fluid is transmitted:

A. Only in the direction of the force

B. With loss over distance

C. Only through gases

D. Undiminished and equally in all directions

49. A mechanic recognizes a co-worker rushing to finish before shift's end and skipping steps. This reflects the Dirty Dozen factor of:

A. Complacency

B. Lack of knowledge

C. Pressure

D. Lack of resources

50. A composite material is made by combining a reinforcing fiber with a:

A. Resin matrix that binds the fibers

B. Sheet of solid aluminum

C. Layer of pure magnesium

D. Coat of zinc-chromate primer

51. A mechanic must compute the total resistance of a 4-ohm resistor in series with a parallel pair of 12-ohm and 12-ohm resistors. The total is:

A. 22 ohms

B. 10 ohms

C. 8 ohms

D. 4 ohms

52. A diode in a circuit functions primarily to:

A. Store energy in a magnetic field

B. Allow current to flow in one direction only

C. Increase the circuit's voltage

D. Convert mechanical energy to electrical

53. A mechanic preparing a metal surface for paint cleans and treats it because paint over a contaminated surface will:

A. Dry faster than normal

B. Fail to adhere and allow corrosion underneath

C. Add strength to the panel

D. Become too thick to inspect

54. A mechanic must classify a fire involving burning magnesium. This is a:

A. Class D fire

B. Class A fire

C. Class B fire

D. Class C fire

55. A mechanic computes 70% of a 60-question exam to confirm the passing count. It is:

A. 42 questions

B. 36 questions

C. 30 questions

D. 48 questions

56. A mechanic must determine the four conditions required for corrosion. They are an anode, a cathode, a conductive path, and:

A. A primer coat

B. A dry environment

C. An inert gas

D. An electrolyte

57. The empty weight of an aircraft includes the structure, powerplant, fixed equipment, and:

A. Unusable fuel

B. Crew and passengers

C. All usable fuel

D. Cargo

58. A mechanic must determine why aircraft loads are wired in parallel across the bus. The reason is:

A. To force identical current through each load

B. To increase total resistance

C. So one load failing open does not interrupt the others

D. To eliminate circuit protection

59. A mechanic converts 0.375 inch to a fraction. The result is:

A. 1/4 inch

B. 5/8 inch

C. 1/2 inch

D. 3/8 inch

60. A mechanic recognizes that exfoliation corrosion is dangerous because it:

A. Produces only a harmless stain

B. Lifts the metal into layers, indicating advanced intergranular attack

C. Appears only on copper

D. Is easily wiped away

Answer Key

1. B — 3/4 inch. Converting to eighths: 1/4 = 2/8, 3/8 stays, 1/8 stays, giving 2/8 + 3/8 + 1/8 = 6/8 = 3/4 inch. A common denominator is required before adding fractions.

2. C — Hardness. Hardness is a metal's ability to resist penetration, wear, and abrasion. It is distinct from ductility (drawn into wire) and elasticity (returning to shape after load).

3. D — Jet A turbine fuel. Turbine engines run on kerosene-type jet fuel such as Jet A, never on aviation gasoline. Putting avgas in a turbine engine can cause engine failure.

4. D — 4 amps. From Ohm's Law, I = E ÷ R = 28 ÷ 7 = 4 amps. Dividing voltage by resistance gives the current.

5. C — Spilled electrolyte and trapped moisture. Battery boxes are corrosion hot spots because spilled electrolyte and trapped moisture aggressively attack nearby aluminum, producing white powder with pitting. This combination drives the corrosion.

6. C — 14 CFR Part 43. Part 43 prescribes how maintenance is performed, recorded, and approved for return to service. Part 65 governs the certification and privileges of the mechanic.

7. B — 72.5 inches. Total moment = (1,900 × 70) + (100 × 120) = 133,000 + 12,000 = 145,000 in-lb; total weight = 2,000 lb; CG = 145,000 ÷ 2,000 = 72.5 inches. Adding an aft item shifted the CG aft.

8. D — 37 degrees. Aircraft flared tube fittings use a 37-degree flare, distinct from the 45-degree automotive flare. The two are not interchangeable.

9. A — Magnetic particle inspection. Magnetic particle inspection magnetizes the part, so it works only on ferromagnetic iron-based materials and cannot be used on aluminum or composites. Non-magnetic materials require other NDI methods.

10. A — Dissipate static and prevent vapor ignition. Bonding and grounding dissipate the static charge generated by fuel flow, preventing a spark from igniting fuel vapors. This is the central fire-prevention purpose.

11. B — Not airworthy until the AD is complied with. An applicable uncomplied AD makes the aircraft unairworthy regardless of inspection status. Compliance must be accomplished and documented.

12. D — Tempering. Tempering reheats a hardened metal to a lower temperature to reduce brittleness and restore toughness. Annealing instead softens the metal, and hardening increases brittleness.

13. D — 3 ohms. Two equal parallel resistors give half the value of one: $6 \div 2 = 3$ ohms. Total parallel resistance is always less than the smallest branch.

14. B — Ignite spontaneously and violently. Oil in contact with high-pressure oxygen can ignite spontaneously and violently, so oxygen systems must be free of petroleum products. This ignition hazard is the reason for absolute cleanliness.

15. A — Total moment divided by total weight. Center of gravity is found by summing all moments and dividing by total weight, giving the CG as an arm from the datum. This single relationship underlies every loading calculation.

16. C — Has been installed with a twist and must be corrected. A spiraling lay line indicates the hose was installed with a twist, an unacceptable condition that stresses the hose. It must be reinstalled correctly.

17. B — It conforms to its type design and is in a condition for safe operation. Airworthiness requires both conditions together — conformity to the approved type design and a condition for safe operation. A current annual or clean exterior alone does not establish airworthiness.

18. A — 120 watts. Power equals voltage times current: $P = E \times I = 24 \times 5 = 120$ watts. This base formula gives the electrical load directly.

19. C — A cotter pin through the drilled bolt. A castellated nut is safetied by a cotter pin passed through the drilled bolt and the nut's slots, then bent to lock it. It is a non-self-locking nut requiring positive safetying.

20. C — FAA-approved data. A major alteration must be accomplished with FAA-approved data, not acceptable data, a brochure, or a verbal description. Approved data is required for major work.

21. A — Carbon/graphite fiber. Carbon/graphite fiber is electrically conductive, so direct contact with aluminum forms a galvanic couple that corrodes the aluminum, requiring isolation. Fiberglass and aramid are not conductive in this way.

22. D — 95°F. Converting 35°C gives $(35 \times 1.8) + 32 = 63 + 32 = 95$°F. The conversion is a routine application of the formula.

23. C — High heat could degrade the insert. A fiber-insert self-locking nut has a temperature limitation and must not be used where high heat would degrade the insert and reduce locking. A metal self-locking nut is used in high-heat areas.

24. A — Exfoliation corrosion. Exfoliation lifts the metal surface into flaky layers and is an advanced form of intergranular corrosion. Its layered appearance distinguishes it from a paint blister or surface stain.

25. B — The smooth shank bears against the parts. Correct grip length places the smooth unthreaded shank through the joined parts so the bolt bears on its shank, keeping shear load off the threads. This prevents fastener failure at the threads.

26. B — 226 cubic inches. Cylinder volume is $\pi r^2 h = 3.1416 \times 3^2 \times 8 = 3.1416 \times 72 \approx 226$ cubic inches. Volume is in cubic units.

27. A — The annual inspection. The annual inspection is required every 12 calendar months for most aircraft and must be signed by a mechanic holding an Inspection Authorization. The 100-hour may be signed by an A&P.

28. D — A steel wire brush. A steel wire brush must never be used on aluminum because it embeds steel particles that create galvanic corrosion. Aluminum requires aluminum or non-metallic abrasives.

29. B — The sum of the individual resistances. In a series circuit, resistances add directly to give the total. Total parallel resistance, by contrast, is less than the smallest branch.

30. C — Not airworthy until the overweight is corrected. Exceeding maximum gross weight makes the aircraft unairworthy even with an acceptable CG. Both the weight and CG limits must independently pass.

31. B — 14.7 psi. Standard atmospheric pressure at sea level is approximately 14.7 psi, equivalent to 29.92 inches of mercury. This baseline value is used in pressure calculations and as a reference.

32. A — 5 foot-pounds. Since one foot-pound equals 12 inch-pounds, 60 ÷ 12 = 5 foot-pounds. Confirming torque units before setting the wrench prevents errors.

33. A — Mass is constant; weight changes with gravity. Mass is the unchanging amount of matter, while weight is the gravitational force on that mass and varies with the field. The same object has identical mass but different weight on Earth and the Moon.

34. C — Class C fire. A fire involving energized avionics is a Class C fire, requiring a non-conductive agent such as CO_2. Water must never be used on energized electrical equipment.

35. C — 61.7 inches. New moment = 119,800 + (40 × 90) = 119,800 + 3,600 = 123,400 in-lb; new weight = 2,000 lb; CG = 123,400 ÷ 2,000 = 61.7 inches. CG is total moment divided by total weight.

36. B — The Type Certificate Data Sheet (TCDS). The TCDS provides the FAA-approved datum location and weight limits for a specific aircraft type. It is the authoritative reference for an aircraft's certificated limits.

37. D — Signature, certificate number, and certificate type. A return-to-service entry must include the work description, the date, and the approving person's signature, certificate number, and certificate type. The other options are never required.

38. A — Rejected, because it restricts flow and creates a stress point. A bend flattened beyond the limit restricts flow and creates a stress concentration that can crack, so the tube must be rejected. A proper bend stays round.

39. C — Dry nitrogen. Nitrogen is preferred for servicing struts and tires because it is inert, dry, and will not support combustion. Pure oxygen is never used, and moist air invites corrosion.

40. C — 20 square inches. The area of a triangle is one-half base times height: ½ × 10 × 4 = 20 square inches. This formula sizes gussets and triangular reinforcements.

41. D — Advisory in nature. A Service Bulletin not referenced by an AD or operating rule is generally advisory. It becomes mandatory only when an AD mandates its action or a rule requires it.

42. B — 4 ohms. From Ohm's Law, R = E ÷ I = 24 ÷ 6 = 4 ohms. Dividing voltage by current gives the resistance.

43. D — Tighten each fastener. Safety wire must be routed so any loosening tendency increases the wire's tension and pulls each fastener tight. Installed backward, it would permit loosening.

44. D — Copper alloy. A green or blue-green deposit (verdigris) is the characteristic corrosion product of copper alloys. Identifying the metal from its corrosion color guides treatment.

45. B — The 100-hour inspection. A standard A&P may perform and approve a 100-hour inspection without an Inspection Authorization. The annual and major alterations require an IA.

46. A — 0.625 inch. Dividing 5 by 8 gives 0.625. Memorizing common fraction-to-decimal equivalents speeds hardware and drawing work.

47. D — Clean the area to assess the full extent. The first step in addressing corrosion is to clean the area so its full extent can be seen and assessed. Painting or priming over corrosion seals it in and worsens the damage.

48. D — Undiminished and equally in all directions. Pascal's Law states that pressure applied to a confined fluid transmits undiminished and equally in all directions, which is why hydraulic systems can transmit and multiply force. Liquids being incompressible makes this direct.

49. C — Pressure. Rushing to finish before shift's end and skipping steps reflects the Dirty Dozen factor of pressure. Recognizing and managing deadline pressure defends against the errors it causes.

50. A — Resin matrix that binds the fibers. A composite combines a reinforcing fiber with a resin matrix that bonds the fibers, producing a material stronger and lighter than either alone. Common matrices include epoxy, polyester, and phenolic resins.

51. B — 10 ohms. The two 12-ohm resistors in parallel give 6 ohms, and that in series with the 4-ohm resistor totals 4 + 6 = 10 ohms. Reduce the parallel group first.

52. B — Allow current to flow in one direction only. A diode permits current flow in one direction and blocks it in reverse, which is why diodes rectify AC into DC and protect circuits. It is a solid-state device.

53. B — Fail to adhere and allow corrosion underneath. Paint over a contaminated surface will not adhere and lets corrosion start beneath the finish, so the surface must be clean and treated. Surface preparation determines a finish's protective value.

54. A — Class D fire. A fire involving burning magnesium is a Class D combustible-metal fire, requiring a special dry-powder agent. Water dramatically worsens a magnesium fire.

55. A — 42 questions. A 70% passing score on 60 questions requires 0.70 × 60 = 42 correct answers. Knowing this threshold helps a candidate gauge their margin.

56. D — An electrolyte. Corrosion requires four ingredients: an anode, a cathode, a conductive path, and an electrolyte such as moisture. Removing any one halts the reaction.

57. A — Unusable fuel. Empty weight includes the structure, powerplant, fixed equipment, and unusable fuel (plus full operating fluids). It excludes the useful load of crew, passengers, usable fuel, and cargo.

58. C — So one load failing open does not interrupt the others. Aircraft loads are wired in parallel so an open failure in one branch leaves the others operating on the common bus voltage. Parallel branches provide independent paths.

59. D — 3/8 inch. Writing 0.375 over its place value gives 375/1000, which reduces to 3/8 inch. Fluent decimal-to-fraction conversion is essential.

60. B — Lifts the metal into layers, indicating advanced intergranular attack. Exfoliation lifts the metal into layers or flakes, signaling deep intergranular attack and serious structural damage. It is far more than a harmless surface stain.