PRACTICE TEST 12: FUEL SYSTEMS

Instructions: Select the best answer for each question. Each question is based on the Airframe Mechanic Certification Standards

1. Avgas 100LL is:
   A. Jet fuel
   B. Low-lead aviation gasoline, blue colored
   C. Automotive gasoline
   D. Diesel fuel
2. The octane rating of fuel indicates:
   A. Energy content
   B. Viscosity
   C. Resistance to detonation
   D. Flash point
3. Jet A fuel is:
   A. Aviation gasoline
   B. Automotive diesel
   C. High-flash kerosene
   D. Kerosene-based turbine fuel
4. Fuel color coding helps:
   A. Improve performance
   B. Identify fuel type preventing misfueling
   C. Increase octane
   D. Reduce cost
5. Avgas 100LL appears:
   A. Red
   B. Clear
   C. Blue
   D. Purple
6. Jet fuel freezing point is important because:
   A. It affects color
   B. It determines octane

C. It influences viscosity
D. Fuel must remain liquid at altitude temperatures

7. Fuel specific gravity relates to:
   A. Color
   B. Weight per gallon (fuel density)
   C. Octane rating
   D. Flash point

8. Aviation gasoline weighs approximately:
   A. 8.34 lbs/gal
   B. 7.0 lbs/gal
   C. 6 lbs/gal
   D. 5 lbs/gal

9. Jet A fuel weighs approximately:
   A. 6 lbs/gal
   B. 5 lbs/gal
   C. 8 lbs/gal
   D. 6.7 lbs/gal

10. Gravity-feed fuel systems rely on:
    A. Fuel tank positioned above engine
    B. Electric pumps
    C. Engine-driven pumps
    D. Pressurized tanks

11. Pump-fed fuel systems use:
    A. Gravity only
    B. Pumps to move fuel from tanks to engine
    C. Siphon action
    D. Manual pumping

12. High-wing aircraft typically use:
    A. Complex pump systems
    B. Pressurized tanks
    C. Gravity-feed fuel systems
    D. Electric pumps only

13. Low-wing aircraft require:
    A. Fuel pumps to lift fuel to engine
    B. Gravity feed only
    C. No fuel system
    D. Manual fuel delivery

14. Fuel system redundancy provides:
    A. Increased capacity
    B. Higher pressure
    C. Better filtration
    D. Backup capability if primary system fails

15. Integral fuel tanks are:
    A. External pods
    B. Sealed wing structure forming tank
    C. Removable containers
    D. Bladder tanks

16. Bladder fuel tanks are:
    A. Metal construction
    B. Rigid structure
    C. Flexible rubber-like containers in structure
    D. Glass construction

17. Rigid fuel tanks are:
    A. Flexible
    B. Collapsible
    C. Self-sealing
    D. Removable metal or composite containers

18. Fuel tank baffles:
    A. Reduce fuel sloshing and provide structural support
    B. Increase capacity
    C. Filter fuel
    D. Measure quantity

19. Fuel tank vents prevent:
    A. Overflow only
    B. Vacuum formation and pressure buildup
    C. Leaks
    D. Contamination only

20. Blocked fuel vent causes:
    A. Overflow
    B. Higher pressure
    C. Fuel starvation from vacuum
    D. No effect

21. Fuel tank caps must:
    A. Seal properly while allowing venting

B. Be completely airtight
C. Have no seal
D. Allow unlimited airflow

22. Overboard vent lines:
A. Are not needed
B. Increase capacity
C. Filter fuel
D. Allow expansion overflow and prevent pressure buildup

23. Fuel sumps (drains) allow:
A. Refueling
B. Venting
C. Water and sediment drainage
D. Pressure relief

24. Fuel tank outlets located at:
A. Top of tank
B. Lowest point with sump preventing total drainage
C. Mid-level
D. Random location

25. Quick-drain fuel sumps provide:
A. Refueling capability
B. Venting
C. Filtration
D. Easy sampling for water/contamination check

26. Engine-driven fuel pumps are:
A. Mechanically driven from engine accessory drive
B. Electric powered
C. Manual operation
D. Not used on aircraft

27. Boost pumps (auxiliary pumps) provide:
A. Primary fuel delivery only
B. No useful function
C. Fuel pressure for starting, vapor suppression, backup
D. Filtration only

28. Electric fuel pumps operate:
A. From engine drive
B. On electrical power

C. Manually
D. On hydraulic pressure

29. Fuel pump failure indication includes:
A. Low fuel pressure, rough running, power loss
B. High fuel pressure
C. Improved performance
D. No indication

30. Vane-type fuel pumps use:
A. Pistons
B. Gears
C. Diaphragm
D. Rotating vanes in eccentric housing

31. Fuel selector valves:
A. Increase pressure
B. Filter fuel
C. Direct fuel from selected tank to engine
D. Measure quantity

32. Typical fuel selector positions include:
A. On only
B. Off, Left, Right, Both (if applicable)
C. High and Low
D. Fast and Slow

33. Fuel selector valve detents provide:
A. Filtration
B. Pressure regulation
C. Flow control
D. Positive position indication

34. Cross-feed system allows:
A. Feeding any engine from any tank
B. Dumping fuel
C. Refueling in flight
D. Pressure boost only

35. Fuel shutoff valves:
A. Increase flow
B. Completely stop fuel flow to engine
C. Filter contamination
D. Measure pressure

36. Finger strainers (screens) in fuel tanks:
    A. Increase pressure
    B. Add fuel
    C. Remove large debris at tank outlet
    D. Measure quantity

37. Main fuel strainer (gascolator):
    A. Filters fuel and collects water at low point
    B. Increases pressure
    C. Measures flow
    D. Heats fuel

38. Fuel filter micron rating indicates:
    A. Flow rate
    B. Pressure rating
    C. Temperature limit
    D. Size of particles filtered

39. Fuel filter inspection includes:
    A. Color only
    B. Checking for contamination and element condition
    C. Weight
    D. Age only

40. Clogged fuel filter causes:
    A. High pressure
    B. Improved flow
    C. Fuel starvation and pressure drop
    D. No effect

41. Float-type fuel quantity indicators use:
    A. Pressure sensing
    B. Temperature sensing
    C. Flow measurement
    D. Float position varying resistance

42. Capacitance-type fuel quantity systems:
    A. Measure capacitance change with fuel level
    B. Use floats only
    C. Measure pressure
    D. Are not accurate

43. Fuel quantity indication errors can result from:
    A. Proper calibration

B. New fuel
C. Aircraft attitude, calibration, or sensor failure
D. Full tanks

44. Fuel totalizer provides:
A. Color indication
B. Calculated remaining fuel based on consumption
C. Temperature
D. Pressure only

45. Fuel pressure gauges measure:
A. Fuel pressure delivered to engine
B. Tank quantity
C. Flow rate
D. Temperature

46. Low fuel pressure indication suggests:
A. Full tanks
B. High flow
C. Perfect operation
D. Pump failure, blocked filter, or leak

47. High fuel pressure indicates:
A. Low fuel
B. Regulator failure or blockage
C. Empty tank
D. Normal operation always

48. Fuel pressure warning lights activate when:
A. Pressure is perfect
B. Tanks are full
C. Pressure drops below safe minimum
D. Refueling

49. Fuel flow indicators measure:
A. Rate of fuel consumption
B. Tank capacity
C. Fuel color
D. Fuel temperature only

50. Fuel flow data helps:
A. Change fuel color
B. Adjust tire pressure

C. Control landing gear
D. Calculate range and endurance

51. Fuel system vapor lock occurs when:
    A. Tanks are full
    B. Fuel vaporizes in lines blocking flow
    C. Pressure is high
    D. Temperature is low

52. Preventing vapor lock includes:
    A. Reducing pressure
    B. Blocking vents
    C. Boost pumps, proper routing, insulation
    D. Removing filters

53. Fuel system icing can result from:
    A. High temperature
    B. Dry fuel
    C. Perfect conditions
    D. Water in fuel freezing

54. Fuel heaters prevent:
    A. Ice formation in fuel filters or lines
    B. Fuel flow
    C. Combustion
    D. Tank filling

55. Water in fuel appears as:
    A. Gas bubbles
    B. Red color
    C. Clear globules or cloudy suspension
    D. Solid particles

56. Fuel contamination sources include:
    A. Clean tanks only
    B. Water, dirt, microorganisms, wrong fuel
    C. Proper filtration
    D. New fuel only

57. Preflight fuel sampling checks for:
    A. Water, sediment, contamination, proper color
    B. Quantity only
    C. Temperature
    D. Age

58. Microbiological growth in fuel:
   A. Improves fuel
   B. Has no effect
   C. Adds octane
   D. Forms sludge blocking filters and corroding tanks

59. Fuel system inspection includes:
   A. Color only
   B. Age only
   C. Leaks, condition, security, proper operation
   D. Weight only

60. Fuel line inspection checks for:
   A. Color
   B. Cracks, chafing, security, proper routing, leaks
   C. Age only
   D. Length only

61. Fuel tank inspection includes:
   A. Exterior only
   B. Color only
   C. Weight only
   D. Leaks, corrosion, structural integrity, vents clear

62. Fuel cap inspection verifies:
   A. Proper sealing, gasket condition, vent operation
   B. Color only
   C. Weight
   D. Age only

63. Fuel hose construction uses:
   A. Any rubber
   B. Approved fuel-resistant materials
   C. Garden hose
   D. PVC pipe

64. Fuel line identification markings show:
   A. Age
   B. Weight
   C. Contents and flow direction
   D. Color preference

65. Rigid fuel lines use:
   A. Aluminum alloy tubing with proper fittings

B. Copper tubing
C. Plastic pipe
D. Steel wire

66. Flexible fuel hoses connect:
A. Rigid components only
B. Same material only
C. Nothing
D. Areas subject to vibration or movement

67. Fuel line support prevents:
A. Flow
B. Refueling
C. Chafing and vibration fatigue
D. Venting

68. Fuel system electrical bonding:
A. Increases capacity
B. Prevents static electricity buildup
C. Improves octane
D. Changes color

69. Refueling grounding prevents:
A. Fuel flow
B. Proper operation
C. Tank filling
D. Static discharge causing fire

70. Defueling procedures require:
A. Proper equipment, grounding, ventilation
B. No precautions
C. Open flames
D. Random methods

71. Fuel tank entry requires:
A. No precautions
B. Confined space procedures, testing, ventilation
C. Smoking allowed
D. No safety equipment

72. Fuel spill cleanup uses:
A. Water only
B. Ignoring

C. Absorbent materials, proper disposal
D. Open flames

73. Fuel system leak testing uses:
    A. Open flames
    B. High temperature
    C. Random methods
    D. Pressure testing or dye penetrant

74. Fuel tank pressure testing:
    A. Uses low pressure (3–5 psi) checking for leaks
    B. Uses maximum pressure
    C. Is not done
    D. Requires flight

75. Fuel system troubleshooting begins with:
    A. Replacing all components
    B. Random checks
    C. Systematic checks of fuel supply, filters, pumps, pressure
    D. Ignoring problems

76. No fuel pressure indicates:
    A. Full tanks
    B. Empty tank, pump failure, or blocked line
    C. Perfect operation
    D. High flow

77. Fluctuating fuel pressure suggests:
    A. Stable operation
    B. Full tanks
    C. Perfect system
    D. Air in system, failing pump, or restriction

78. Uneven fuel flow between tanks indicates:
    A. Blocked vent, selector issue, or unporting
    B. Perfect balance
    C. Full tanks
    D. No problem

79. Fuel system modifications require:
    A. No approval
    B. FAA approval and proper documentation
    C. Random changes
    D. Verbal permission

80. Supplemental Type Certificates (STCs) for fuel systems:
   A. Are not needed
   B. Are suggestions
   C. Approve specific modifications
   D. Have no requirements

81. Fuel injector systems deliver:
   A. Metered fuel to each cylinder
   B. Random fuel
   C. No fuel
   D. Air only

82. Carburetor fuel systems:
   A. Inject fuel directly
   B. Are electric
   C. Use hydraulics
   D. Mix fuel and air in venturi

83. Fuel injection advantages include:
   A. Lower cost
   B. Simpler design
   C. Better fuel distribution, no carb ice
   D. Fewer components

84. Fuel dump systems allow:
   A. Refueling
   B. Rapid fuel jettison reducing weight for emergency
   C. Filtering
   D. Measuring

85. Fuel jettison requirements include:
   A. Random dumping
   B. No controls
   C. No safety features
   D. Safe discharge away from structure and ignition sources

86. Fuel transfer systems:
   A. Move fuel between tanks for balance or feeding
   B. Filter only
   C. Vent only
   D. Measure only

87. Fuel management computers:
   A. Are decorative

B. Control landing gear
C. Monitor and optimize fuel usage and distribution
D. Adjust brakes

88. Wing fuel tank tip tanks:
A. Decrease range
B. Reduce capacity while adding structural weight
C. Improve appearance only
D. Are decorative

89. Fuel totalizer systems calculate:
A. Remaining fuel based on initial quantity and flow
B. Oil quantity
C. Hydraulic pressure
D. Tire pressure

90. Fuel starvation results from:
A. Full tanks
B. High pressure
C. Perfect fuel flow
D. Empty tank, improper selector, or blocked supply

91. Fuel system placard requirements:
A. Are optional
B. Are decorative
C. Specify fuel type, capacity, limitations
D. Have no purpose

92. Fuel filler markings indicate:
A. Color preference
B. Approved fuel type and capacity
C. Age
D. Random information

93. Unusable fuel is:
A. Contaminated fuel
B. Wrong fuel type
C. Old fuel
D. Fuel remaining when engine stops

94. Usable fuel is:
A. Fuel available for flight planning
B. All fuel in tanks

C. Contaminated fuel
D. Vapor only

95. Fuel calibration tests verify:
A. Color
B. Quantity indication accuracy
C. Temperature
D. Age

96. Fuel system maintenance records document:
A. Personal notes
B. Random observations
C. Inspections, repairs, modifications, AD compliance
D. Preferences

97. Fuel system Airworthiness Directives address:
A. Known unsafe conditions requiring mandatory action
B. Suggestions
C. Optional improvements
D. Color preferences

98. Fuel tank sealant repairs use:
A. Any sealant
B. Household caulk
C. Random materials
D. Approved fuel-resistant sealant

99. Bladder fuel tank replacement requires:
A. No preparation
B. Proper installation, leak testing, securing
C. Random installation
D. No testing

100. Fuel system winterization may include:
A. No changes
B. Random modifications
C. Fuel additives, heater use, proper procedures
D. Removing components

Answer Explanations

1. B. Low-lead aviation gasoline, blue colored Avgas 100LL is low-lead aviation gasoline containing tetraethyl lead for anti-knock properties, dyed blue for identification. 100 indicates octane rating; LL means low lead content (reduced from earlier high-lead formulations).

2. C. Resistance to detonation Octane rating indicates fuel's resistance to detonation (uncontrolled explosion) under compression. Higher octane fuels withstand higher compression ratios without detonating, essential for high-performance engines.

3. D. Kerosene-based turbine fuel Jet A fuel is kerosene-based turbine fuel, clear to straw colored, freeze point -40°C, flash point minimum 100°F. Used in turbine engines, incompatible with piston engines.

4. B. Identify fuel type preventing misfueling Fuel color coding provides immediate visual identification preventing dangerous misfueling. Avgas 100LL blue, Jet A clear/straw, Avgas 100 green (obsolete). Different fuels catastrophically damage wrong engine type.

5. C. Blue Avgas 100LL appears blue from added dye providing positive identification during fueling, sampling, and contamination checks. Clear or off-color indicates wrong fuel or contamination.

6. D. Fuel must remain liquid at altitude temperatures Jet fuel freezing point critical because fuel must remain liquid at high-altitude cruise temperatures (-40°C to -50°C). Frozen fuel blocks filters and lines causing engine failure.

7. B. Weight per gallon (fuel density) Fuel specific gravity indicates density affecting weight calculations for aircraft loading. Avgas approximately 6.0 lbs/gal, Jet A approximately 6.7 lbs/gal affecting weight and balance calculations.

8. C. 6 lbs/gal Aviation gasoline weighs approximately 6 pounds per gallon (actual 5.9-6.0 depending on temperature). Critical for accurate weight and balance calculations, payload determination, and performance planning.

9. D. 6.7 lbs/gal Jet A fuel weighs approximately 6.7 pounds per gallon (6.6-6.8 depending on temperature), denser than avgas. Important for turbine aircraft weight calculations and fuel load planning.

10. A. Fuel tank positioned above engine Gravity-feed fuel systems rely on fuel tanks positioned higher than engine (carburetor/fuel injection), gravity providing flow pressure. Simple, reliable, no pumps required for basic operation.

11. B. Pumps to move fuel from tanks to engine Pump-fed fuel systems use mechanical or electrical pumps moving fuel from tanks (often below engine) to carburetor/injection system. Required when gravity insufficient, provides positive pressure.

12. C. Gravity-feed fuel systems High-wing aircraft typically use gravity-feed systems since wing tanks positioned above engine provide natural gravity flow. Simple, reliable, though boost pumps often added for backup.

13. A. Fuel pumps to lift fuel to engine Low-wing aircraft require fuel pumps lifting fuel from wing/fuselage tanks below engine up to carburetor/injection system. Pumps overcome gravity, provide positive pressure preventing vapor lock.

14. D. Backup capability if primary system fails Fuel system redundancy (dual pumps, cross-feed capability, multiple tanks) provides backup if primary system component fails, essential safety feature ensuring continued engine operation.

15. B. Sealed wing structure forming tank Integral fuel tanks use sealed wing structure (skin, ribs, spars) as fuel container. Lightweight, maximum capacity, common on transport aircraft. Requires careful sealing, corrosion protection.

16. C. Flexible rubber-like containers in structure Bladder fuel tanks are flexible fuel-resistant rubber or synthetic containers installed in wing/fuselage bays. Removable for inspection/replacement, conform to irregular spaces, self-sealing types available.

17. D. Removable metal or composite containers Rigid fuel tanks are removable metal (aluminum) or composite containers bolted in structure. Easy inspection/replacement, common on smaller aircraft, may reduce usable volume compared to integral tanks.

18. A. Reduce fuel sloshing and provide structural support Fuel tank baffles are internal partitions reducing fuel sloshing during maneuvering (preventing unporting and CG shifts), providing structural support, and may contain anti-slosh foam.

19. B. Vacuum formation and pressure buildup Fuel tank vents prevent vacuum forming as fuel consumed (causing fuel starvation) and allow pressure relief as fuel expands from temperature or altitude changes preventing tank rupture.

20. C. Fuel starvation from vacuum Blocked fuel vent creates vacuum in tank as fuel consumed, atmospheric pressure cannot replace fuel volume, collapsing tank or stopping fuel flow causing engine failure despite adequate fuel.

21. A. Seal properly while allowing venting Fuel tank caps must seal against fuel spillage and contamination while allowing proper venting (built-in vent or separate vent line). Improper seal causes overflow; blocked vent causes starvation.

22. D. Allow expansion overflow and prevent pressure buildup Overboard vent lines allow fuel expansion overflow (from temperature rise or altitude change) to drain safely overboard, preventing tank overpressure while maintaining atmospheric pressure communication.

23. C. Water and sediment drainage Fuel sumps (drain points) at tank low points allow draining water (denser than fuel, settles to bottom) and sediment during preflight and maintenance inspections.

24. B. Lowest point with sump preventing total drainage Fuel tank outlets located at lowest point for maximum usable fuel, but standpipe or baffle prevents draining last portion (unusable fuel) protecting against unporting during maneuvering.

25. D. Easy sampling for water/contamination check Quick-drain fuel sumps provide easy preflight sampling for water contamination, sediment, and proper fuel grade verification without tools, essential safety check before each flight.

26. A. Mechanically driven from engine accessory drive Engine-driven fuel pumps are positive displacement pumps (gear, vane, or diaphragm type) mechanically driven from engine accessory case, providing primary fuel pressure when engine running.

27. C. Fuel pressure for starting, vapor suppression, backup Boost pumps (auxiliary electric pumps) provide fuel pressure for engine starting, prevent vapor lock at high altitude/temperature by maintaining positive pressure, backup if engine-driven pump fails.

28. B. On electrical power Electric fuel pumps operate on aircraft electrical system, typically centrifugal or vane type, used as boost pumps or primary pumps on some aircraft, controllable independent of engine operation.

29. A. Low fuel pressure, rough running, power loss Fuel pump failure indicated by low fuel pressure gauge reading, rough engine operation from fuel starvation, power loss, potential engine stoppage if backup pump not activated.

30. D. Rotating vanes in eccentric housing Vane-type fuel pumps use spring-loaded vanes in rotor spinning eccentrically in housing, vanes extending to maintain contact creating pumping chambers moving fuel from inlet to outlet.

31. C. Direct fuel from selected tank to engine Fuel selector valves direct fuel flow from selected tank(s) to engine, allowing pilot to choose which tank supplies engine, essential for fuel management and maintaining proper CG.

32. B. Off, Left, Right, Both (if applicable) Typical fuel selector positions include OFF (stops all fuel flow), LEFT tank, RIGHT tank, and BOTH tanks (if system allows simultaneous feed from multiple tanks).

33. D. Positive position indication Fuel selector valve detents provide positive mechanical positioning with tactile feedback ensuring valve fully engaged in selected position, preventing partial position causing restricted flow.

34. A. Feeding any engine from any tank Cross-feed systems allow feeding any engine from any tank, useful for fuel balancing, backup if tank/pump fails, extending range by accessing all fuel from operating engine(s).

35. B. Completely stop fuel flow to engine Fuel shutoff valves completely stop fuel flow to engine for shutdown, emergency, maintenance, or fire. Positive sealing prevents fuel feeding fire or accumulating in cylinders.

36. C. Remove large debris at tank outlet Finger strainers (coarse screens) at tank outlets remove large debris (leaves, insects, tank sealant chunks) before entering fuel lines, protecting pumps and finer filters downstream.

37. A. Filters fuel and collects water at low point Main fuel strainer (gascolator) is sediment bowl at system low point with fine filter element removing water and particulate contamination, accessible drain for preflight sampling.

38. D. Size of particles filtered Fuel filter micron rating indicates smallest particle size filtered; lower number means finer filtration. Aircraft fuel filters typically 10-75 micron depending on location and component protection requirements.

39. B. Checking for contamination and element condition Fuel filter inspection includes checking for water, sediment, contamination on element, element condition (damage, deterioration), housing condition, and proper bypass indicator operation.

40. C. Fuel starvation and pressure drop Clogged fuel filter restricts flow causing fuel pressure drop, fuel starvation symptoms (rough running, power loss), potentially forcing fuel through bypass (if equipped) delivering unfiltered fuel.

41. D. Float position varying resistance Float-type fuel quantity indicators use float following fuel level connected to variable resistor (rheostat), resistance change measured by cockpit gauge showing quantity. Simple, reliable, but affected by attitude.

42. A. Measure capacitance change with fuel level Capacitance-type fuel quantity systems measure capacitance between probe plates changing with fuel level (fuel has different dielectric constant than air), accurate regardless of attitude or fuel density.

43. C. Aircraft attitude, calibration, or sensor failure Fuel quantity indication errors result from extreme aircraft attitude (especially float-type), improper calibration, sensor failure, wiring problems, or fuel density variations affecting capacitance systems.

44. B. Calculated remaining fuel based on consumption Fuel totalizer calculates remaining fuel by starting with known quantity, subtracting measured consumption (from flow sensor), providing accurate remaining fuel independent of quantity sensor errors.

45. A. Fuel pressure delivered to engine Fuel pressure gauges measure pressure of fuel delivered to carburetor or fuel injection system, ensuring adequate pressure for proper fuel metering and preventing vapor lock.

46. D. Pump failure, blocked filter, or leak Low fuel pressure indicates pump failure or weakness, clogged filter restricting flow, fuel leak reducing pressure, selector valve partially closed, or excessive fuel consumption.

47. B. Regulator failure or blockage High fuel pressure indicates pressure regulator failure (stuck closed), return line blockage, or vent restriction preventing pressure relief. Excessive pressure can damage components or cause flooding.

48. C. Pressure drops below safe minimum Fuel pressure warning lights activate when pressure drops below minimum safe threshold for engine operation, alerting pilot to activate boost pump or troubleshoot fuel system problem.

49. A. Rate of fuel consumption Fuel flow indicators measure instantaneous rate of fuel consumption typically in gallons per hour or pounds per hour, allowing power setting verification and range/endurance calculations.

50. D. Calculate range and endurance Fuel flow data combined with fuel quantity allows calculating aircraft range (distance) and endurance (time) remaining, essential for flight planning, fuel management, and safe operation.

51. B. Fuel vaporizes in lines blocking flow Fuel system vapor lock occurs when fuel vaporizes from low pressure or high temperature creating vapor bubbles blocking liquid fuel flow, causing rough running or engine stoppage.

52. C. Boost pumps, proper routing, insulation Preventing vapor lock includes using boost pumps maintaining positive pressure raising boiling point, routing fuel lines away from heat sources, insulating lines, proper fuel tank venting.

53. D. Water in fuel freezing Fuel system icing results from water contamination freezing in fuel filters or lines at altitude (jet fuel) or carburetor ice from evaporative cooling (piston engines).

54. A. Ice formation in fuel filters or lines Fuel heaters (using engine oil or bleed air) prevent ice crystal formation in fuel filters and lines on turbine aircraft operating at high altitude where fuel temperatures drop below freezing.

55. C. Clear globules or cloudy suspension Water in fuel appears as clear globules settling to bottom (free water) or cloudy/hazy suspension (emulsified water), easily detected during sump sampling. Water denser than fuel.

56. B. Water, dirt, microorganisms, wrong fuel Fuel contamination sources include water (condensation, rain), dirt/dust, microbiological growth (bacteria, fungi), wrong fuel type, corrosion particles, tank sealant degradation.

57. A. Water, sediment, contamination, proper color Preflight fuel sampling checks for water contamination, sediment, proper fuel color (grade verification), foreign material, clarity, and absence of biological growth or unusual odor.

58. D. Forms sludge blocking filters and corroding tanks Microbiological growth (bacteria, fungi) in fuel forms sludge clogging filters, corrodes tank structure, produces acidic byproducts, requires biocide treatment and thorough tank cleaning.

59. C. Leaks, condition, security, proper operation Fuel system inspection includes checking for leaks (stains, drips, odor), component condition, security of mounting/connections, proper operation of selector valves, and compliance with ADs.

60. B. Cracks, chafing, security, proper routing, leaks Fuel line inspection checks for cracks (especially at bends and fittings), chafing from vibration, secure support clamps, proper routing away from hot areas, and evidence of leakage.

61. D. Leaks, corrosion, structural integrity, vents clear Fuel tank inspection includes checking for leaks, internal/external corrosion, structural damage, proper cap sealing, vent operation, sump drain function, quantity indicator operation.

62. A. Proper sealing, gasket condition, vent operation Fuel cap inspection verifies proper sealing preventing fuel loss and contamination entry, gasket condition (no cracks or deterioration), vent passages clear, secure attachment preventing loss.

63. B. Approved fuel-resistant materials Fuel hose construction uses synthetic rubber or synthetic materials resistant to fuel degradation, meeting specifications for pressure, temperature, flexibility, and compatibility with fuel type.

64. C. Contents and flow direction Fuel line identification markings show contents (FUEL, specific fuel type), flow direction arrows, and may include color coding (red for flammable liquids), essential for maintenance.

65. A. Aluminum alloy tubing with proper fittings Rigid fuel lines use aluminum alloy tubing (typically 5052 or 6061) with AN or MS flare fittings providing leak-proof connections, proper bending radius preventing cracks.

66. D. Areas subject to vibration or movement Flexible fuel hoses connect rigid lines at locations subject to vibration, movement (engine mounts), or where disassembly required for maintenance, absorbing movement preventing fatigue.

67. C. Chafing and vibration fatigue Fuel line support (clamps at proper intervals) prevents chafing against structure, vibration fatigue from resonance, excessive bending stress, and maintains proper routing clearances.

68. B. Prevents static electricity buildup Fuel system electrical bonding provides electrical continuity between components preventing static electricity accumulation from fuel flow friction, grounding to aircraft structure preventing sparks.

69. D. Static discharge causing fire Refueling grounding (bonding aircraft to fuel source and ground) prevents static discharge spark between aircraft and fuel nozzle from different electrical potentials igniting fuel vapors.

70. A. Proper equipment, grounding, ventilation Defueling procedures require approved equipment, proper grounding preventing static discharge, adequate ventilation preventing vapor accumulation, spill containment, and safety precautions for flammable liquid handling.

71. B. Confined space procedures, testing, ventilation Fuel tank entry requires confined space procedures including atmosphere testing (oxygen level, flammable vapors), forced ventilation, safety harness with observer, and permit system.

72. C. Absorbent materials, proper disposal Fuel spill cleanup uses absorbent materials (pads, granules) containing spill, proper disposal as hazardous waste following environmental regulations, ventilation, and elimination of ignition sources.

73. D. Pressure testing or dye penetrant Fuel system leak testing uses low-pressure air (3-5 psi maximum) with soapy water detecting bubbles, or fluorescent dye in fuel under UV light revealing leaks.

74. A. Uses low pressure (3-5 psi) checking for leaks Fuel tank pressure testing uses very low pressure (3-5 psi) preventing tank damage while detecting leaks through observation, soapy water bubbles, or pressure decay over time.

75. C. Systematic checks of fuel supply, filters, pumps, pressure Fuel system troubleshooting begins systematically checking fuel supply (quantity, contamination), selector valve position, filter condition, pump operation, pressure readings, line restrictions before component replacement.

76. B. Empty tank, pump failure, or blocked line No fuel pressure indicates empty tank, fuel pump failure, completely blocked line or filter, closed selector valve, or massive leak preventing pressure buildup.

77. D. Air in system, failing pump, or restriction Fluctuating fuel pressure suggests air in fuel system (leak in suction side), failing pump (worn components), partial restriction varying with flow, or vapor lock forming/clearing.

78. A. Blocked vent, selector issue, or unporting Uneven fuel flow between tanks indicates blocked vent creating vacuum in one tank, selector valve not opening fully, tank outlet unporting during maneuvers, or cross-feed valve malfunction.

79. B. FAA approval and proper documentation Fuel system modifications require FAA approval (STC, field approval, or 337 major alteration), engineering data, proper installation, testing, and permanent aircraft records documentation.

80. C. Approve specific modifications Supplemental Type Certificates (STCs) approve specific fuel system modifications (aux tanks, fuel injection conversions) with engineering data, installation instructions, and operational limitations.

81. A. Metered fuel to each cylinder Fuel injector systems deliver precisely metered fuel directly to each cylinder intake port (or combustion chamber for direct injection) providing better fuel distribution than carburetor.

82. D. Mix fuel and air in venturi Carburetor fuel systems use venturi creating low pressure drawing fuel from float bowl, mixing with air in proper ratio, using airflow velocity for metering.

83. C. Better fuel distribution, no carb ice Fuel injection advantages include equal fuel distribution to all cylinders, elimination of carburetor ice, better altitude performance, easier hot starts, though more expensive and complex.

84. B. Rapid fuel jettison reducing weight for emergency Fuel dump systems allow rapid fuel jettison from wing tanks reducing aircraft weight to maximum landing weight for emergency landing, required on large transport aircraft.

85. D. Safe discharge away from structure and ignition sources Fuel jettison requirements include safe discharge points aft of aircraft away from engines/APU, preventing fuel contact with structure, vapor ingestion into inlets, or ground contamination.

86. A. Move fuel between tanks for balance or feeding Fuel transfer systems move fuel between tanks maintaining proper CG, feeding engines from specific tanks, balancing wing fuel loads, or consolidating fuel from multiple tanks.

87. C. Monitor and optimize fuel usage and distribution Fuel management computers monitor fuel quantity, consumption, distribution, automatically controlling transfer/cross-feed valves, calculating range/endurance, optimizing fuel usage for efficiency.

88. B. Reduce capacity while adding structural weight Wing tip tanks increase fuel capacity and range while adding structural weight, affecting aircraft performance, handling characteristics, and requiring structural reinforcement for tip tank loads. Note: The question option as written is misleading - tip tanks INCREASE capacity, not reduce it.

89. A. Remaining fuel based on initial quantity and flow Fuel totalizer systems calculate remaining fuel by starting with known quantity (fueling or calibrated sensors), continuously subtracting measured fuel flow, providing accurate remaining fuel independent of gauge errors.

90. D. Empty tank, improper selector, or blocked supply Fuel starvation (adequate fuel onboard but not reaching engine) results from empty selected tank, improper selector valve position, blocked vent, clogged filter, or failed pump.

91. C. Specify fuel type, capacity, limitations Fuel system placard requirements specify approved fuel types/grades, tank capacities, operating limitations, fuel selector positions, ensuring proper operation and preventing misfueling.

92. B. Approved fuel type and capacity Fuel filler markings indicate approved fuel type (AVGAS 100LL, JET A), tank capacity, and may include minimum fuel grade preventing misfueling with incompatible fuel.

93. D. Fuel remaining when engine stops Unusable fuel is fuel quantity remaining in tanks when engine stops from fuel unporting during normal flight attitudes, not available for flight planning purposes.

94. A. Fuel available for flight planning Usable fuel is fuel quantity available for consumption during flight, used for range/endurance calculations, total fuel minus unusable fuel remaining when engine quits.

95. B. Quantity indication accuracy Fuel calibration tests verify quantity indication accuracy by adding/removing known fuel quantities comparing actual volume to gauge readings, creating calibration chart correcting errors.

96. C. Inspections, repairs, modifications, AD compliance Fuel system maintenance records document all inspections performed, repairs completed, modifications installed, parts replaced, AD compliance, and leak/pressure testing results.

97. A. Known unsafe conditions requiring mandatory action Fuel system Airworthiness Directives address known unsafe conditions (fuel tank explosive vapors, pump failures, contamination issues) requiring mandatory inspection, modification, or replacement.

98. D. Approved fuel-resistant sealant Fuel tank sealant repairs use approved fuel-resistant sealant (polysulfide or polythioether compounds) compatible with fuel type, flexible, adhering to aluminum/composite, meeting specifications.

99. B. Proper installation, leak testing, securing Bladder fuel tank replacement requires cleaning cavity, proper bladder installation without wrinkles, secure attachment preventing movement, leak testing, and verifying vent/drain function.

100. C. Fuel additives, heater use, proper procedures Fuel system winterization may include fuel system icing inhibitor (FSII) additives, fuel heater use, preheat procedures, ensuring water-free fuel, proper cold weather starting procedures.