PRACTICE TEST 11: LANDING GEAR SYSTEMS

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

1. Tricycle landing gear configuration consists of:
   A. Two main gear, no nose gear
   B. Single main gear, tail wheel
   C. Two main gear and steerable nose gear
   D. Three wheels in tandem

2. Tailwheel (conventional) landing gear provides:
   A. Better propeller clearance but less directional stability
   B. Maximum braking
   C. Nose gear steering
   D. Retractable configuration only

3. The main advantage of tricycle gear over tailwheel is:
   A. Lower weight
   B. Simpler construction
   C. Better visibility
   D. Better ground handling and visibility during taxi

4. Tandem landing gear has main wheels:
   A. Side by side
   B. Fore and aft along fuselage centerline
   C. Triangular pattern
   D. Single main

5. Bicycle landing gear requires:
   A. No outriggers
   B. Single wheel
   C. Outriggers or tip wheels for lateral stability
   D. Tail support only

6. Fixed landing gear advantages include:
   A. Simplicity, lower weight, lower cost, less maintenance
   B. Reduced drag

C. Higher cruise speed
D. Better appearance

7. Retractable landing gear provides:
   A. Lower cost
   B. Simpler systems
   C. Easier maintenance
   D. Reduced drag and higher cruise speed

8. Landing gear struts absorb:
   A. Engine vibration only
   B. Steering loads
   C. Landing impact energy through compression
   D. Braking forces only

9. Oleo-pneumatic struts use:
   A. Springs only
   B. Hydraulic fluid and compressed air/nitrogen
   C. Solid construction
   D. Rubber only

10. Oleo strut compression stroke uses:
    A. Fluid flowing through orifice providing damping
    B. Spring compression only
    C. Air compression only
    D. No damping

11. Oleo strut extension is controlled by:
    A. Hydraulic pressure
    B. Spring force
    C. Manual operation
    D. Compressed gas pushing fluid back

12. Proper oleo strut inflation uses:
    A. Oxygen
    B. Compressed air
    C. Dry nitrogen or air per specifications
    D. Hydraulic fluid only

13. Torque links (scissors) on oleo struts:
    A. Absorb shock
    B. Prevent strut rotation while allowing compression
    C. Retract gear
    D. Apply brakes

14. Shock strut servicing requires:
    A. Maximum extension
    B. Random fluid level
    C. Hot strut
    D. Aircraft weight on gear, proper fluid level
15. Low fluid in oleo strut causes:
    A. Excessive compression, hard bottoming
    B. No compression
    C. Improved performance
    D. Higher ride height
16. Overserviced oleo strut shows:
    A. Low ride height
    B. Hard bottoming
    C. Extended position, harsh ride from inadequate compression
    D. No extension
17. Bungee cord shock absorption uses:
    A. Hydraulic fluid
    B. Rubber cord stretched during compression
    C. Nitrogen
    D. Steel springs
18. Spring steel landing gear:
    A. Flexes to absorb landing loads
    B. Uses hydraulic damping
    C. Requires nitrogen service
    D. Contains fluid
19. Shimmy damper prevents:
    A. Landing
    B. Retraction
    C. Extension
    D. Nose or main wheel oscillation
20. Shimmy dampers typically use:
    A. Springs
    B. Electrical actuation
    C. Hydraulic resistance to rapid movement
    D. Mechanical locks
21. Landing gear retraction systems use:
    A. Manual only

B. Hydraulic, electric, or manual power
C. Pneumatic only
D. Gravity only

22. Hydraulic gear retraction provides:
A. Slow operation
B. Low reliability
C. Weak actuation
D. Powerful reliable actuation

23. Electric landing gear uses:
A. Electric motors driving mechanical linkages
B. Hydraulic power
C. Pneumatic cylinders
D. Manual operation

24. Emergency gear extension typically uses:
A. Primary hydraulics
B. Electric backup only
C. Gravity, manual crank, or stored pressure
D. Engine power

25. Free-fall emergency extension:
A. Uses hydraulic power
B. Releases up-locks allowing gravity to extend gear
C. Requires manual pumping
D. Is not reliable

26. Landing gear position indicators show:
A. Hydraulic pressure only
B. Strut extension
C. Brake temperature
D. Gear up, down, or in transit

27. Green landing gear lights indicate:
A. Gear retracting
B. System failure
C. Gear down and locked
D. Hydraulic pressure

28. Red landing gear warning light activates when:
A. Gear not down with power reduced or flaps extended
B. Gear is down

C. Gear is up
D. Hydraulic pressure normal

29. Landing gear squat switches:
A. Control brakes only
B. Sense weight on gear preventing retraction on ground
C. Indicate airspeed
D. Measure strut pressure

30. Gear doors protect:
A. Brakes
B. Hydraulics
C. Tires
D. Gear wells from debris and reduce drag

31. Gear door sequencing ensures:
A. Doors remain open
B. Random operation
C. Doors open before gear moves, close after
D. Doors never operate

32. Microswitches in landing gear system:
A. Provide position sensing for sequencing and indication
B. Generate hydraulic pressure
C. Control engine
D. Adjust struts

33. Up-locks secure gear in:
A. Down position
B. Transit
C. Any position
D. Retracted position

34. Down-locks secure gear in:
A. Up position
B. Extended position for landing
C. Transit
D. Any position

35. Positive locking mechanisms use:
A. Electrical switches only
B. Hydraulic pressure only
C. Mechanical over-center linkage or hooks
D. Springs only

36. Landing gear safety override prevents:
    A. Extension
    B. Down-lock
    C. Normal operation
    D. Inadvertent retraction on ground

37. Aircraft wheels are typically:
    A. Split construction allowing tire mounting and brake installation
    B. One-piece solid
    C. Plastic
    D. Wood construction

38. Wheel halves are joined by:
    A. Welding
    B. Through-bolts with proper torque sequence
    C. Glue
    D. Rivets

39. Wheel bearings support:
    A. Brakes only
    B. Tires only
    C. Wheel on axle allowing rotation
    D. Hydraulics

40. Tapered roller bearings:
    A. Handle radial and thrust loads, common in aircraft wheels
    B. Handle no loads
    C. Are not adjustable
    D. Require no lubrication

41. Wheel bearing adjustment requires:
    A. Maximum torque
    B. No torque
    C. Random torque
    D. Specified torque and locking method

42. Excessive wheel bearing clearance causes:
    A. Smooth operation
    B. Wheel wobble and accelerated wear
    C. No problems
    D. Improved performance

43. Wheel bearing lubrication uses:
    A. Engine oil

B. Hydraulic fluid
C. High-temperature wheel bearing grease
D. Water

44. Wheel inspection includes checking for:
A. Color only
B. Weight only
C. Age only
D. Cracks, corrosion, bearing condition, proper assembly

45. Fusible plugs in wheels:
A. Melt at high temperature releasing tire pressure
B. Secure wheel halves
C. Lubricate bearings
D. Seal against leaks

46. Aircraft tires are rated by:
A. Color
B. Age
C. Ply rating and speed rating
D. Weight only

47. Tire ply rating indicates:
A. Number of layers
B. Strength capability not actual ply count
C. Speed limit
D. Age

48. Proper tire inflation pressure:
A. Per manufacturer specifications for aircraft weight
B. Maximum always
C. Minimum always
D. Random

49. Overinflated tires cause:
A. Improved performance
B. Better traction
C. Longer life
D. Center tread wear, harsh ride, blowout risk

50. Underinflated tires result in:
A. Better ride
B. Improved handling

C. Sidewall flex, shoulder wear, overheating
D. No problems

51. Tire tread depth minimum:
A. None required
B. Varies by tire, typically visible in wear indicators
C. 1 inch
D. Full depth always

52. Tire sidewall damage:
A. Requires evaluation; cuts to cord require replacement
B. Is always acceptable
C. Improves flexibility
D. Has no effect

53. Tire flat spots indicate:
A. Normal wear
B. Proper inflation
C. Good brakes
D. Locked wheel skid requiring replacement

54. Retreaded aircraft tires:
A. Are prohibited
B. Never acceptable
C. May be used if approved and properly retreaded
D. Are required

55. Tire storage requires:
A. Direct sunlight
B. Cool, dark, dry conditions away from petroleum products
C. High humidity
D. Any conditions

56. Tube-type tires require:
A. No inner tube
B. Special wheels
C. Rim strips
D. Inner tube and proper installation

57. Tubeless tires seal against:
A. Special wheel rim preventing air loss
B. Inner tube
C. Spokes
D. External patches

58. Tire changing safety includes:
   A. Overinflating
   B. No safety cage
   C. Using safety cage, proper deflation, bead breaking
   D. Random procedures

59. Tire mounting requires:
   A. Maximum force
   B. Proper bead seating, inflation in safety cage
   C. No lubrication
   D. Hammering

60. Tire balancing:
   A. May be required to prevent vibration
   B. Is never done
   C. Causes problems
   D. Is decorative

61. Disc brakes use:
   A. Drum configuration
   B. Springs only
   C. Manual operation
   D. Friction pads clamping rotating disc

62. Brake calipers contain:
   A. Tire
   B. Axle
   C. Pistons actuating brake pads
   D. Bearings only

63. Brake discs (rotors) are made from:
   A. Plastic
   B. Steel or carbon composite materials
   C. Aluminum
   D. Rubber

64. Segmented rotor brakes allow:
   A. No expansion
   B. Less effectiveness
   C. Reduced braking
   D. Thermal expansion without warping

65. Single-disc brakes have:
   A. One disc per wheel

B. Multiple discs
C. No discs
D. External discs

66. Multiple-disc brakes provide:
A. Less braking
B. Single friction surface
C. Greater braking capacity for heavy aircraft
D. No advantage

67. Carbon brakes offer:
A. Lower cost
B. Lighter weight, longer life, higher temperature capability
C. Heavier weight
D. Lower temperature limits

68. Expander tube brakes use:
A. Electric actuation
B. Spring pressure
C. Gravity
D. Inflatable tube forcing shoes against drum

69. Master cylinder in brake system:
A. Converts pedal force to hydraulic pressure
B. Cools brakes
C. Holds wheels
D. Supports tires

70. Independent brake systems allow:
A. No steering
B. Simultaneous braking only
C. Differential braking for steering
D. No braking

71. Parking brake holds pressure by:
A. Spring force
B. Locking brake system valve closed
C. Electric motor
D. Mechanical linkage only

72. Brake fluid for aircraft must be:
A. Automotive fluid
B. Water-based

C. Any hydraulic fluid
D. Specified type (MIL-PRF-5606 or MIL-PRF-83282)

73. Brake bleeding removes:
A. Air from brake system
B. Pressure
C. Fluid
D. Pads

74. Brake pedal travel excessive indicates:
A. Perfect adjustment
B. No problems
C. Air in system or worn pads
D. Overservicing

75. Brake pads inspection checks for:
A. Color only
B. Weight
C. Age only
D. Wear thickness, cracks, glazing, contamination

76. Glazed brake pads show:
A. Perfect condition
B. Hard, shiny surface from overheating reducing friction
C. Improved braking
D. New pads

77. Brake disc wear limits:
A. Specified by manufacturer, measured with micrometer
B. Are unlimited
C. Don't exist
D. Are visual only

78. Dragging brakes cause:
A. No problems
B. Improved performance
C. Excessive heat, premature wear, reduced performance
D. Better efficiency

79. Anti-skid system components include:
A. Tires only
B. Wheels only
C. Brakes only
D. Wheel speed sensors, control unit, modulating valves

80. Anti-skid wheel speed sensors detect:
   A. Temperature
   B. Wheel deceleration indicating impending skid
   C. Brake pressure
   D. Tire wear

81. Anti-skid modulating valves:
   A. Reduce brake pressure when skid detected
   B. Increase pressure only
   C. Shut off brakes
   D. Control steering

82. Anti-skid system testing:
   A. Is never done
   B. Uses random procedures
   C. Follows manufacturer procedures checking sensors and response
   D. Requires flight

83. Locked wheel skid protection:
   A. Is not provided
   B. Has no benefit
   C. Increases stopping distance
   D. Prevents tire damage and maintains directional control

84. Nose wheel steering systems use:
   A. Tail wheel
   B. Hydraulic or mechanical linkage to rudder pedals
   C. Brakes only
   D. No steering

85. Differential braking provides:
   A. No steering
   B. Straight tracking only
   C. Steering by applying brake to inside wheel
   D. Reverse

86. Shimmy damper on nose gear:
   A. Prevents wheel oscillation during taxi and landing
   B. Steers aircraft
   C. Retracts gear
   D. Applies brakes

87. Castering nose wheel:
   A. Is locked

B. Never rotates
C. Is fixed
D. Free to swivel, steered by differential braking

88. Tailwheel steering uses:
A. Nose gear
B. Springs or cables from rudder pedals
C. Hydraulics only
D. Brakes only

89. Landing gear alignment checks:
A. Are never done
B. Are visual only
C. Ensure proper tracking and load distribution
D. Are random

90. Gear alignment is measured using:
A. Specialized fixtures, plumb bobs, or laser equipment
B. Tape measure only
C. Visual estimate
D. No tools

91. Improper gear alignment causes:
A. No problems
B. Improved handling
C. Better braking
D. Uneven tire wear, poor handling, structural stress

92. Landing gear load limits:
A. Are unlimited
B. Don't exist
C. Must not exceed design limits for weight and loads
D. Are suggestions only

93. Side load limits protect:
A. Engines
B. Gear from excessive side forces during landing
C. Wings
D. Fuel system

94. Gear inspection intervals:
A. Per maintenance manual (pre-flight, periodic, annual)
B. Are not specified

C. Are optional
D. Once only

95. Hard landing inspection required when:
A. Landing is perfect
B. No impact felt
C. Routine touchdown
D. Landing loads exceed normal, per checklist

96. Gear retraction test checks:
A. Color
B. Weight
C. Proper operation, timing, sequencing, locks
D. Fuel quantity

97. Nitrogen servicing equipment must:
A. Use oxygen
B. Have accurate gauge, dry nitrogen source
C. Use compressed air always
D. Have no gauge

98. Hydraulic fluid leaks on gear:
A. Are normal
B. Should be ignored
C. Improve operation
D. Require investigation and repair

99. Corrosion on landing gear:
A. Requires treatment per manual specifications
B. Improves strength
C. Is beneficial
D. Should be painted over

100. Landing gear logbook entries include:
A. Personal notes only
B. Random information
C. Inspections, servicing, repairs, AD compliance
D. Nothing required

Answer Explanations

1. C. Two main gear and steerable nose gear Tricycle landing gear configuration consists of two main gear under fuselage or wings supporting most aircraft weight, plus steerable nose gear providing directional control and balanced ground attitude.

2. A. Better propeller clearance but less directional stability Tailwheel (conventional) gear provides better propeller ground clearance and simpler structure but less inherent directional stability on ground, tendency to ground loop, and restricted forward visibility during taxi.

3. D. Better ground handling and visibility during taxi Tricycle gear advantages include better directional stability, excellent forward visibility during taxi, reduced ground loop tendency, easier landing in crosswinds, and simpler pilot transition training.

4. B. Fore and aft along fuselage centerline Tandem landing gear has main wheels positioned fore and aft along fuselage centerline, requiring outriggers or wing-tip wheels for lateral stability. Used on some military aircraft like B-47 and U-2.

5. C. Outriggers or tip wheels for lateral stability Bicycle landing gear requires outriggers (small stabilizing wheels) on wings or fuselage providing lateral stability since main wheels aligned fore/aft cannot prevent lateral tipping.

6. A. Simplicity, lower weight, lower cost, less maintenance Fixed landing gear advantages include mechanical simplicity, lower weight (no retraction mechanism), lower initial cost, reduced maintenance, no hydraulic/electrical systems, and no gear extension failure risk.

7. D. Reduced drag and higher cruise speed Retractable landing gear provides significantly reduced drag when retracted, higher cruise speeds, better fuel economy, improved performance justifying additional weight, cost, and complexity.

8. C. Landing impact energy through compression Landing gear struts absorb landing impact energy through controlled compression, converting kinetic energy to heat through hydraulic damping, protecting airframe from excessive shock loads.

9. B. Hydraulic fluid and compressed air/nitrogen Oleo-pneumatic struts (shock struts) use hydraulic fluid for damping and compressed air or nitrogen gas for spring action, providing excellent shock absorption and controlled rebound.

10. A. Fluid flowing through orifice providing damping Oleo strut compression forces hydraulic fluid through metering orifice creating controlled damping, absorbing landing energy smoothly. Gas compresses providing spring action; fluid provides damping resistance.

11. D. Compressed gas pushing fluid back Oleo strut extension controlled by compressed gas (air or nitrogen) pushing fluid back through orifice as load removed, extending strut at controlled rate preventing rapid rebound.

12. C. Dry nitrogen or air per specifications Proper oleo strut inflation uses dry nitrogen (preferred) or dry compressed air per manufacturer specifications. Nitrogen prevents corrosion and doesn't support combustion; moisture-free preventing internal corrosion.

13. B. Prevent strut rotation while allowing compression Torque links (scissors) connect outer and inner strut cylinders preventing rotation while allowing linear compression/extension. Maintains wheel alignment and prevents brake line twisting.

14. D. Aircraft weight on gear, proper fluid level Shock strut servicing requires aircraft weight on gear (strut compressed to operating position), filling fluid to specified level when compressed, then inflating gas to proper pressure.

15. A. Excessive compression, hard bottoming Low fluid in oleo strut allows excessive compression during landing potentially bottoming metal-to-metal, harsh ride, inadequate damping, and possible structural damage from insufficient cushioning.

16. C. Extended position, harsh ride from inadequate compression Overserviced oleo strut (excessive fluid) extends too far reducing available compression stroke, creating harsh ride from limited shock absorption capability and potential damage from bottoming.

17. B. Rubber cord stretched during compression Bungee cord shock absorption uses natural or synthetic rubber cord stretched during landing compression, storing energy elastically then releasing during extension. Simple, lightweight, used on light aircraft.

18. A. Flexes to absorb landing loads Spring steel landing gear uses heat-treated spring steel flexing to absorb landing loads, storing energy in metal deflection. Simple, lightweight, maintenance-free, common on light aircraft and gliders.

19. D. Nose or main wheel oscillation Shimmy damper prevents rapid oscillating wheel shimmy (violent side-to-side movement) during taxi, takeoff, and landing caused by dynamic imbalance, tire irregularities, or aerodynamic forces.

20. C. Hydraulic resistance to rapid movement Shimmy dampers typically use hydraulic piston providing resistance to rapid steering movement while allowing slow deliberate steering. Fluid restriction damps oscillations without preventing normal steering.

21. B. Hydraulic, electric, or manual power Landing gear retraction systems use hydraulic power (most common, powerful, reliable), electric motors with mechanical linkage, or manual operation (emergency backup or small aircraft).

22. D. Powerful reliable actuation Hydraulic gear retraction provides powerful reliable actuation handling heavy gear loads, positive locking, fast operation, and simultaneous actuation of multiple gear legs.

23. A. Electric motors driving mechanical linkages Electric landing gear uses electric motors (typically reversible) driving screwjacks, cables, or linkages extending/retracting gear. Common on smaller aircraft, simpler than hydraulics.

24. C. Gravity, manual crank, or stored pressure Emergency gear extension typically uses gravity (free-fall after releasing up-locks), manual hand crank operating mechanical linkage, or accumulator stored pressure providing hydraulic power.

25. B. Releases up-locks allowing gravity to extend gear Free-fall emergency extension releases up-locks and hydraulic pressure allowing gear to fall by gravity and airstream forces, down-locks engaging mechanically. Simple, reliable backup system.

26. D. Gear up, down, or in transit Landing gear position indicators show gear up (retracted and locked), down (extended and locked), or in transit (moving between positions). Essential for safe operation.

27. C. Gear down and locked Green landing gear lights indicate gear down and locked, all three gear legs (tricycle) in extended position with down-locks engaged, safe for landing.

28. A. Gear not down with power reduced or flaps extended Red landing gear warning light (and horn) activates when throttle reduced below threshold or flaps extended beyond limit with gear not down and locked, alerting pilot of unsafe landing configuration.

29. B. Sense weight on gear preventing retraction on ground Landing gear squat switches (weight-on-wheels switches) sense strut compression from aircraft weight, preventing inadvertent gear retraction on ground and controlling other systems (stall warning, ground spoilers).

30. D. Gear wells from debris and reduce drag Gear doors protect gear wells from debris, moisture, and foreign objects when gear retracted, reduce drag by streamlining wheel wells, improve aerodynamics.

31. C. Doors open before gear moves, close after Gear door sequencing ensures doors open before gear begins moving (preventing gear hitting doors), gear extends/retracts completely, then doors close. Microswitches and linkages control sequence.

32. A. Provide position sensing for sequencing and indication Microswitches in landing gear system sense gear/door positions, controlling sequencing valves, providing cockpit position indication, activating warning systems, and interlocking safety systems.

33. D. Retracted position Up-locks secure gear mechanically in fully retracted position preventing extension in flight from aerodynamic loads or vibration. Released hydraulically or mechanically during normal extension.

34. B. Extended position for landing Down-locks secure gear mechanically in fully extended position for landing, independent of hydraulic pressure. Mechanical over-center linkage or hook mechanism provides positive locking.

35. C. Mechanical over-center linkage or hooks Positive locking mechanisms use mechanical over-center linkage or spring-loaded hooks engaging when gear reaches full travel, providing mechanical lock independent of hydraulic/electric power.

36. D. Inadvertent retraction on ground Landing gear safety override (squat switch interlock) prevents inadvertent gear retraction while weight on gear, protecting against accidental gear handle movement or control system malfunction on ground.

37. A. Split construction allowing tire mounting and brake installation Aircraft wheels are split construction (two halves) allowing tire mounting/removal without deflating tire completely and providing access for brake installation and bearing service.

38. B. Through-bolts with proper torque sequence Wheel halves joined by through-bolts torqued in star pattern to manufacturer specifications ensuring uniform clamping force, proper seal compression, and even stress distribution.

39. C. Wheel on axle allowing rotation Wheel bearings support wheel on axle allowing free rotation while carrying radial loads (aircraft weight) and thrust loads (side forces, braking). Proper adjustment critical.

40. A. Handle radial and thrust loads, common in aircraft wheels Tapered roller bearings handle both radial and thrust loads through tapered contact surfaces, ideal for aircraft wheels experiencing combined loading. Adjustable for proper clearance.

41. D. Specified torque and locking method Wheel bearing adjustment requires torquing axle nut to specification while rotating wheel (seats bearings), backing off specified amount, then locking with cotter pin or locknut.

42. B. Wheel wobble and accelerated wear Excessive wheel bearing clearance allows wheel wobble (shimmy), uneven tire wear, bearing damage from impact loading, and potential bearing failure from inadequate load distribution.

43. C. High-temperature wheel bearing grease Wheel bearing lubrication uses high-temperature wheel bearing grease withstanding brake heat, water resistance, proper viscosity range. Aviation-approved greases meet stringent requirements.

44. D. Cracks, corrosion, bearing condition, proper assembly Wheel inspection checks for cracks (especially around bolt holes), corrosion, bearing condition, proper assembly torque, fusible plug condition, tire condition, and brake wear.

45. A. Melt at high temperature releasing tire pressure Fusible plugs in wheels melt at predetermined temperature (typically 300-350°F) releasing tire pressure preventing tire explosion from overheated brakes or fire.

46. C. Ply rating and speed rating Aircraft tires rated by ply rating (strength capability), speed rating (maximum ground speed), and size designation. Proper tire selection critical for safe operation.

47. B. Strength capability not actual ply count Tire ply rating indicates strength capability equivalent to number of cotton plies, not actual ply count. Modern tires use fewer stronger plies than rating number.

48. A. Per manufacturer specifications for aircraft weight Proper tire inflation pressure follows manufacturer specifications based on actual aircraft weight and operating conditions. Incorrect pressure causes premature wear and potential failure.

49. D. Center tread wear, harsh ride, blowout risk Overinflated tires show center tread wear from reduced contact patch, harsh ride transmitting more shock to aircraft, increased blowout risk from reduced flex capability.

50. C. Sidewall flex, shoulder wear, overheating Underinflated tires result in excessive sidewall flex, shoulder wear from increased contact patch edges, overheating from internal friction, potential blowout, and reduced handling.

51. B. Varies by tire, typically visible in wear indicators Tire tread depth minimum varies by tire type and manufacturer, typically when wear indicators (bars) become flush with tread or specified depth remains (often bottom of groove).

52. A. Requires evaluation; cuts to cord require replacement Tire sidewall damage requires careful evaluation; weather checking (minor surface cracks) may be acceptable but cuts exposing cord, deep cracks, or bulges require immediate replacement.

53. D. Locked wheel skid requiring replacement Tire flat spots indicate locked wheel skid abrading tread flat in one location. Severe flat spots require tire replacement; cord damage or unbalance creates unsafe condition.

54. C. May be used if approved and properly retreaded Retreaded aircraft tires may be used if properly retreaded by approved facility, meeting specifications, and approved for specific aircraft. Not allowed on all aircraft types.

55. B. Cool, dark, dry conditions away from petroleum products Tire storage requires cool, dark, dry conditions away from ozone sources, petroleum products, and solvents which degrade rubber. Protect from sunlight, excessive heat, and chemicals.

56. D. Inner tube and proper installation Tube-type tires require inner tube properly installed with valve aligned, no wrinkles or twists, preventing pinching during installation. Tube provides air retention; tire provides structure.

57. A. Special wheel rim preventing air loss Tubeless tires seal directly against specially designed wheel rim preventing air loss. Bead seats on rim creating airtight seal without inner tube.

58. C. Using safety cage, proper deflation, bead breaking Tire changing safety requires complete deflation removing valve core, proper bead breaking, mounting/inflation in safety cage containing potential explosion from improper seating.

59. B. Proper bead seating, inflation in safety cage Tire mounting requires lubricating beads, ensuring proper bead seating on rim shoulders, inflating in safety cage to seat beads (may require higher pressure briefly), then adjusting to operating pressure.

60. A. May be required to prevent vibration Tire balancing may be required on nose wheels or high-speed aircraft to prevent vibration and shimmy. Dynamic balancing using weights corrects imbalance from tire/wheel assembly.

61. D. Friction pads clamping rotating disc Disc brakes use friction pads (containing friction material) clamped against rotating disc (rotor) attached to wheel, creating friction force stopping wheel rotation.

62. C. Pistons actuating brake pads Brake calipers contain hydraulic pistons actuating brake pads, clamping them against disc when hydraulic pressure applied. Single or multiple pistons depending on brake design.

63. B. Steel or carbon composite materials Brake discs made from steel (economical, good performance) or carbon composite (lighter, higher temperature capability, longer life, more expensive). Must withstand extreme heat.

64. D. Thermal expansion without warping Segmented rotor brakes use multiple disc segments allowing radial thermal expansion without warping from uneven heating. Prevents disc distortion maintaining flat contact surface.

65. A. One disc per wheel Single-disc brakes have one disc (rotor) per wheel with brake pads on one or both sides. Adequate for light aircraft; limited heat capacity.

66. C. Greater braking capacity for heavy aircraft Multiple-disc brakes use stacked alternating rotors (rotating with wheel) and stators (stationary), multiplying friction surfaces providing much greater braking capacity for heavy aircraft.

67. B. Lighter weight, longer life, higher temperature capability Carbon brakes offer significant weight savings, much longer life (5-10× steel), higher temperature capability (3000°F+), and no corrosion, justifying higher initial cost on transport aircraft.

68. D. Inflatable tube forcing shoes against drum Expander tube brakes use inflatable rubber tube inside brake drum expanding when hydraulic pressure applied, forcing brake shoes against drum creating friction. Used on older/light aircraft.

69. A. Converts pedal force to hydraulic pressure Master cylinder in brake system converts mechanical pedal force to hydraulic pressure. Piston in cylinder pressurizes fluid transmitting force to brake actuators.

70. C. Differential braking for steering Independent brake systems (separate master cylinder each main wheel) allow differential braking applying more brake to one side for ground steering, especially important on tailwheel aircraft.

71. B. Locking brake system valve closed Parking brake holds pressure by mechanically locking brake system valve closed or holding master cylinder pistons preventing fluid return, maintaining brake application with pedals released.

72. D. Specified type (MIL-PRF-5606 or MIL-PRF-83282) Brake fluid must be specified type (typically same as hydraulic system: MIL-PRF-5606 petroleum or MIL-PRF-83282 synthetic). Never mix types; incompatibility damages seals.

73. A. Air from brake system Brake bleeding removes entrapped air bubbles from brake system by operating brakes while opening bleeder valves at high points, allowing air to escape until solid fluid flows.

74. C. Air in system or worn pads Excessive brake pedal travel indicates air in system (compressible causing spongy feel) or worn brake pads requiring more piston travel to contact disc.

75. D. Wear thickness, cracks, glazing, contamination Brake pads inspection checks remaining friction material thickness against wear limits, cracks or chunks missing, glazing (hard shiny surface), contamination from oil/fluid.

76. B. Hard, shiny surface from overheating reducing friction Glazed brake pads show hard, glassy, shiny surface from overheating hardening friction material, significantly reducing braking effectiveness. Require replacement or resurfacing.

77. A. Specified by manufacturer, measured with micrometer Brake disc wear limits specified by manufacturer as minimum thickness. Measured with micrometer at multiple points; excessive wear or uneven wear requires disc replacement.

78. C. Excessive heat, premature wear, reduced performance Dragging brakes (not fully releasing) cause excessive heat buildup, premature pad and disc wear, reduced aircraft performance from constant friction, potential brake fire.

79. D. Wheel speed sensors, control unit, modulating valves Anti-skid system components include wheel speed sensors (transducers or generators), electronic control unit processing signals, and modulating valves controlling brake pressure.

80. B. Wheel deceleration indicating impending skid Anti-skid wheel speed sensors continuously monitor wheel rotational speed, detecting rapid deceleration indicating impending wheel lock-up (skid condition) signaling control unit to reduce brake pressure.

81. A. Reduce brake pressure when skid detected Anti-skid modulating valves (servo valves) automatically reduce brake hydraulic pressure when control unit detects impending skid, allowing wheel to accelerate, then reapplying pressure optimizing braking.

82. C. Follows manufacturer procedures checking sensors and response Anti-skid system testing follows manufacturer procedures using specialized test equipment checking sensor output, control unit response, valve operation, and system self-test functions.

83. D. Prevents tire damage and maintains directional control Locked wheel skid protection prevents tire flat spots from locked wheel abrasion, maintains directional control (locked wheel slides), maximizes braking efficiency through optimal slip ratio.

84. B. Hydraulic or mechanical linkage to rudder pedals Nose wheel steering systems use hydraulic power steering controlled by rudder pedals (limited deflection) or separate tiller (full deflection), or mechanical linkage from pedals on simpler aircraft.

85. C. Steering by applying brake to inside wheel Differential braking provides steering capability by applying brake to inside wheel during turn, creating differential drag turning aircraft. Essential on aircraft without steerable nose wheel.

86. A. Prevents wheel oscillation during taxi and landing Shimmy damper on nose gear prevents rapid oscillating shimmy during taxi and landing caused by dynamic forces, tire imbalance, or aerodynamic loads creating violent wheel shaking.

87. D. Free to swivel, steered by differential braking Castering nose wheel free to swivel (not directly connected to rudder pedals), steered by differential braking and aerodynamic forces. Simple, lightweight, used on many light tailwheel aircraft.

88. B. Springs or cables from rudder pedals Tailwheel steering uses springs or cables connecting rudder pedals to tailwheel providing limited steering authority (typically ±15-30°), free castering beyond limits, locked for takeoff/landing on some aircraft.

89. C. Ensure proper tracking and load distribution Landing gear alignment checks ensure wheels track properly (parallel or specified toe-in/out), gear legs perpendicular to ground, and loads distributed evenly preventing uneven tire wear.

90. A. Specialized fixtures, plumb bobs, or laser equipment Gear alignment measured using specialized alignment fixtures, plumb bobs establishing vertical reference, precision scales, or laser alignment equipment measuring angles and positions accurately.

91. D. Uneven tire wear, poor handling, structural stress Improper gear alignment causes uneven tire wear (toe wear, shoulder wear), poor directional stability, increased rolling resistance, shimmy tendency, and excessive structural stress.

92. C. Must not exceed design limits for weight and loads Landing gear load limits must not exceed design limits specified for maximum takeoff weight, landing weight, side loads, and vertical impact loads ensuring structural integrity.

93. B. Gear from excessive side forces during landing Side load limits protect landing gear from excessive lateral forces during crosswind landings or ground handling, preventing structural damage to gear struts, fittings, or attachments.

94. A. Per maintenance manual (pre-flight, periodic, annual) Gear inspection intervals specified in maintenance manual including pre-flight checks, periodic inspections (50/100-hour), annual inspections, and special inspections after hard landings or overweight landings.

95. D. Landing loads exceed normal, per checklist Hard landing inspection required when landing loads exceed normal (hard touchdown, high sink rate, overweight landing, abnormal attitude) following manufacturer checklist inspecting for structural damage.

96. C. Proper operation, timing, sequencing, locks Gear retraction test checks proper operation through complete cycle, retraction/extension times, door/gear sequencing, up-lock and down-lock engagement, position indications, and warning systems.

97. B. Have accurate gauge, dry nitrogen source Nitrogen servicing equipment must have accurate calibrated pressure gauge, dry nitrogen source (typically from bottle with regulator), proper fittings preventing cross-contamination, and leak-free connections.

98. D. Require investigation and repair Hydraulic fluid leaks on landing gear require investigation to identify source (actuator seals, hoses, fittings), determine cause, and perform proper repairs preventing system contamination and failure.

99. A. Requires treatment per manual specifications Corrosion on landing gear requires treatment per maintenance manual including removal, neutralization, protective treatment, evaluation of remaining strength, and documentation of repair.

100. C. Inspections, servicing, repairs, AD compliance Landing gear logbook entries document all inspections performed, servicing (strut, tire, bearing), repairs completed, parts replaced, hard landing inspections, and Airworthiness Directive compliance.