ASSIGNMENT 4

Textbook Assignment: "Aircraft Basic Construction," chapter 4, pages 4-1 through 4-22.

4-1. What are the most important factors in aircraft construction?

1. Lightness and strength
2. Strength, weight, and reliability
3. Maneuverability and speed
4. Speed, strength, and weight

4-2. The weight of the aircraft is primarily a product of what force?

1. Lift
2. Thrust
3. Gravity
4. Drag

4-3. All stresses imposed on the aircraft wings are transmitted to what area?

1. The fuselage structure
2. The outer layer or shield of the wings
3. The surrounding atmosphere
4. The stress releaser plugs

4-4. A study of each load or stress that is imposed on an aircraft is known by what term?

1. Load and stress configuration
2. Load and stress reaction
3. Dynamic analysis
4. Stress analysis

4-5. Load and stress imposed upon an aircraft must first be analyzed when the aircraft is in what stage of the manufacturing cycle?

1. Final assembly
2. Design
3. Initial flight test
4. Acceptance by Navy

4-6. What aircraft stress results from squeezing of a material?

1. Compression
2. Tension
3. Torsion
4. Bending

4-7. What aircraft stress results from two fastened materials that tend to separate?

1. Tension
2. Bending
3. Torsional
4. Shear

4-8. What aircraft stress results from a twisting force?

1. Compression
2. Bending
3. Torsional
4. Shear

4-9. A reaction to engine torque creates what type of stress in an aircraft fuselage?

1. Bending
2. Tension
3. Compression
4. Torsional

4-10. What primary force is at work on the fuselage when an aircraft is at rest?

1. Torsion
2. Tension
3. Bending
4. Compression

4-11. What is the result of the action of lift forces against the wings of an aircraft in flight?

1. Tension on the bottom and compression on the top
2. Compression on both the bottom and top
3. Tension on both the bottom and top
4. Compression on the bottom and tension on the top

4-12. Wings of an aircraft in flight are under what primary force?

1. Torsional
2. Compression
3. Bending
4. Tension

4-13. Which of the following metals are used in modern aircraft construction?

1. Aluminum and magnesium
2. Titanium and steel
3. Alloys
4. All of the above

4-14. Instead of pure aluminum, an aircraft builder uses aluminum alloys to get what desired result?

1. Stronger end product
2. More conductive metal
3. Less conductive metal
4. Softer end product

4-15. What is the main disadvantage of the use of magnesium in aircraft construction?

1. Weight
2. Strength
3. Hardness
4. Low resistance to corrosion

4-16. Which of the following alloys or metals is particularly valuable for use in or near salt water?

1. Magnesium
2. Titanium
3. Carbon steel
4. Pure aluminum

4-17. Transparent plastic becomes soft and pliable at approximately what minimum temperature?

1. 200°F
2. 225°F
3. 250°F
4. 275°F

4-18. What is the main advantage of reinforced plastic?

1. It has high strength-to-weight ratio
2. Its resistance to mildew and rot
3. Its ease of fabrication
4. All of the above

4-19. When several layers of bonding materials are used together and then mechanically fastened to conventional substructures, it is known as what type of construction?

1. Fiber glass
2. Composite
3. Metallic
4. Honeycomb core

4-20. The terms *right* or *left* used in relation to any of the structural units refer to the right or left hand of the pilot seated in the cockpit.

1. True
2. False

4-21. What is the main structure of an aircraft?

1. Engine
2. Wings
3. Fuselage
4. Tail

4-22. In the monocoque design, the main stress on an airplane is carried by what structural unit(s)?

1. Skin
2. Formers
3. Frame assemblies
4. Bulkheads

4-23. What is the main purpose of stringers in the semimonocoque design?

1. To add length to the frame
2. To carry concentrated loads
3. For attachment of the wings
4. For shape and attachment of the skin

4-24. What type of skin construction can withstand considerable damage and still hold together?

1. Semimonocoque
2. Monocoque
3. Plastic-impregnated
4. Wood-impregnated

4-25. Where is fuselage station 0 (zero) of an aircraft usually located?

1. Center of fuselage
2. Tail of aircraft
3. Nose of aircraft
4. Pilot's location

4-26. What is the unit of measurement in the station's numbering system?

1. Centimeters
2. Feet
3. Meters
4. Inches

4-27. Wings on an aircraft are designed for which of the following purposes?

1. Lift
2. Steering
3. Cutting through the air
4. Balancing the aircraft

4-28. What are the main structural members of the wing?

1. Beams
2. Ribs
3. Spars
4. Formers

4-29. The spars are designed with extra strength to combat which of the following forces?

1. Torsion
2. Bending
3. Tension
4. Compression

4-30. What parts of an aircraft wing transmit the load from the skin covering to the spars?

1. Formers
2. Stringers
3. False spars
4. Ribs

4-31. What is the purpose of the false spar in some aircraft wings?

1. To support the ailerons and flaps
2. To give the wings bending strength
3. To help transmit the air load from the wing
4. To help carry the load

4-32. The term *wet wing* is used to describe what construction feature?

1. How water drains from the surface
2. Fuel cells installed in the wing
3. How water is used to balance the wing
4. Oil tanks installed in the wing

4-33. The flight control surfaces on a simple wing include what controls?

1. Edge flaps and ailerons
2. Trailing and leading edge flaps
3. Ailerons and leading edge flaps
4. Ailerons and trailing edge flaps

4-34. The empennage of the aircraft consists of which of the following sections?

1. Wings and tail
2. Speed brakes, spoilers, and flaps
3. Vertical and horizontal stabilizers, rudder, and elevators
4. Ribs, spars, and skin

4-35. What is the primary function of the stabilizers?

1. To provide drag for the aircraft
2. To control the direction of flight
3. To balance the weight of the wings
4. To keep the aircraft flying straight and level

4-36. What surfaces maintain directional stability in an aircraft?

1. The rudder
2. The elevators
3. The vertical stabilizer
4. The horizontal stabilizer

4-37. What are the three groups of flight control surfaces?

1. Main, ancillary, and optional
2. Primary, secondary, and optional
3. Primary, secondary, and auxiliary
4. Primary, secondary, and tertiary

4-38. Ailerons, elevators, and rudders make up what group of aircraft control surfaces?

1. Primary
2. Auxiliary
3. Optional
4. Secondary

4-39. The ailerons control what motion of the aircraft?

1. Pitch
2. Roll
3. Yaw
4. Skid

4-40. Elevators are used to control what aspects of flight?

1. Motion about the vertical axis
2. Motion about the lateral axis
3. Forward flight
4. Landing or takeoff

4-41. Where are the elevator control surfaces located?

1. Trailing edge of the wings
2. Horizontal stabilizer
3. Lower surface of the fuselage
4. Vertical stabilizer

4-42. Where are the rudder control surfaces located?

1. Trailing edge of the wings
2. Horizontal stabilizer
3. Lower surfaces of the fuselage
4. Vertical stabilizer

4-43. What assembly operates the ailerons and elevators on a multiengine fixed–wing aircraft?

1. Yoke and wheel assembly
2. Control stick assembly
3. Stock and shaft assembly
4. Steering and shaft assembly

4-44. What is the purpose of trim tabs?

1. To maneuver the aircraft
2. To reduce landing speed
3. To maintain aircraft balance
4. To move the primary control surfaces

4-45. What is the purpose of the spring tabs?

1. To steer the aircraft
2. To aid in moving larger surfaces
3. To trim out unbalanced conditions
4. To secure removable panels

4-46. Which of the following auxiliary flight control surfaces are used for the purpose of shortening the landing and takeoff runs?

1. Slats
2. Spoilers
3. Wing flaps
4. Speed brakes

4-47. What is the purpose of spoilers?

1. To increase wing lift
2. To decrease wing lift
3. To increase aircraft speed
4. To decrease aircraft speed

4-48. Speed brakes are designed to slow down the aircraft during which of the following operations?

1. Takeoffs and landings
2. Skids and ascents
3. Dives and preparations for landing
4. Turn and banks

4-49. What auxiliary control surfaces affect the boundary layer over the top of the wing?

1. Flaps
2. Spoilers
3. Speed brakes
4. Slats

4-50. The three general types of manually operated flight control mechanisms does NOT include which of the following types?

1. Cable operated
2. Torque tube operated
3. Bell crank operated
4. Push-pull tube operated

4-51. What power-oriented device moves the control surface in high-performance aircraft?

1. Pneumatic actuator
2. Hydraulic cylinder
3. Hydraulic booster
4. Pneumatic booster

4-52. What type of landing gear is designed with the main landing gear located behind the center of gravity and the auxiliary landing gear under the nose of the aircraft?

1. Bicycle gear
2. Tricycle gear
3. Conventional gear
4. Protective skid

4-53. Shock encountered in landing, taxiing, and takeoff of all naval aircraft is absorbed by what agent(s) or component in shock struts?

1. Nitrogen only
2. Hydraulic fluid only
3. Nitrogen and hydraulic fluid
4. Springs

4-54. By what means is the arresting hook of an aircraft released, lowered, and raised?

1. It is released mechanically, lowered hydraulically, and raised pneumatically
2. It is released mechanically, lowered pneumatically, and raised hydraulically
3. It is released hydraulically, lowered mechanically, and raised pneumatically
4. It is released pneumatically, lowered hydraulically, and raised mechanically

4-55. What mechanism is used to hold the arresting hook in the down position?

1. Springs only
2. Snubber only
3. Springs and snubber
4. Mechanical fingers

4-56. When an aircraft is catapulted from an aircraft carrier, the holdback assembly is used for what purpose?

1. To connect the bridle to the aircraft
2. To direct the exhaust upward
3. To secure the aircraft to the deck
4. To keep the nosewheel straight

4-57. When an aircraft is catapulted from an aircraft carrier, the holdback tension bar separates when what other action occurs?

1. The catapult fires
2. The maintenance person releases a handle
3. The tail hook is lowered
4. The pilot releases a handle

4-58. The fuselage of the H-60 helicopter is of what type of construction?

1. Graphite monocoque
2. All–metal semimonocoque
3. Reinforced carbon shell
4. Welded steel truss

4-59. What type of main landing gear is mounted on the H–60 helicopter?

1. Retractable
2. Fixed–skid type
3. Nonretractable
4. Conventional fixed

4-60. What assembly provides attachment of the main rotor blade to the rotor hub?

1. Cuff
2. Spar
3. Root end
4. Tip cap

4-61. The hub and swashplate of a helicopter are the principal components of what unit(s)?

1. Tail rotor
2. Droop restrainers
3. Rotary head
4. Antiflapping restrainers

4-62. The movements of the flight controls are transmitted to the rotary wing by the action of what components?

1. Hinges and rotating scissors
2. Sleeve spindles and antiflapping restrainers
3. Damper positioners and stationary scissors
4. Hydraulic servo cylinders, swashplate, and pitch control rods

4-63. Change in rotary rudder head pitch is increased as the pitch change shaft is moved in what direction?

1. Up
2. Down
3. Inward
4. Outward

4-64. The efficiency of hydraulic operation is approximately what percent?

1. 100%
2. 95%
3. 85%
4. 75%

4-65. Which of the following is a disadvantage of the hydraulic system as a power source for aircraft control units?

1. Extensive maintenance requirements
2. Possibility of internal and external leakage
3. Loss of efficiency due to friction
4. Heavy weight

IN ANSWERING QUESTIONS 4-66 THROUGH 4-68, REFER TO FIGURE 4-22 IN THE TEXT.

4-66. What component is often referred to as an unloading valve?

1. Pressure regulator
2. Check valve
3. Selector valve
4. Actuating unit

4-67. What component maintains an even pressure in the hydraulic system and acts as an emergency source for operating certain actuating units?

1. Power pump
2. Accumulator
3. Pressure gauge
4. Selector valve

4-68. Check valves are used in a hydraulic system for what purpose?

1. To bleed off pressure
2. To stop the flow of fluid
3. To allow one direction of flow only
4. To bypass filter element

4-69. Foreign material in the hydraulic system of an aircraft is defined as hydraulic contamination.

1. True
2. False

4-70. What source of hydraulic contamination usually causes the most trouble?

1. Poor servicing
2. Self-generated
3. Normal wear
4. Manufactured

4-71. Which of the following rules is/are basic to aircraft hydraulic servicing?

1. Never use fluid from a container that has been left open
2. Use only approved servicing units
3. Always maintain a high state of cleanliness
4. All of the above

4-72. What, if anything, would the continued operation of a contaminated hydraulic system cause?

1. Normal wear
2. Early failure
3. Late failure
4. Nothing, if only used for a short time

4-73. Prior to flight, the air storage bottles for the emergency pneumatic system are filled with what gas?

1. Carbon dioxide
2. Oxygen
3. Hydrogen
4. Nitrogen

4-74. The shuttle valve is used for what purpose?

1. To transfer pneumatic pressure
2. To transfer hydraulic pressure
3. To direct fluid back to accumulator
4. To separate normal systems from emergency pneumatic systems

4-75. By what means are the air compressors in most aircraft driven?

1. Electric motor
2. Hydraulic motor
3. Electrohydraulic motor
4. Electropneumatic motor