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Cover: Structural reconstruction of an IAI Westwind fuselage. Photo taken in cooperation with Straight Flight, Inc., Centennial, Colorado.
CHAPTER 1

AIRCRAFT STRUCTURAL ASSEMBLY AND RIGGING

SECTION 1A

1. truss  
2. stressed-skin, monocoque  
3. semi-monocoque  
4. semi-monocoque  
5. fail-safe  
6. attack  
7. low  
8. ribs  
9. behind  
10. truss  
11. drag  
12. cantilever  
13. chemical, electrochemical  
14. stiffness  
15. ahead of  
16. corrugating  
17. a. ailerons  
   b. rudder  
   c. elevator  
18. inboard  
19. spoiler  
20. performance, drag, wingtip vortices  
21. Vortex generators  
22. empennage  
23. dorsal  
24. stabilator  
25. anti-servo  
26. ruddervators  
27. fuselage  
28. Pratt  
29. Warren  
30. conventional  
31. tricycle  
32. parasite  
33. pressure  
34. fins  
35. cowl flaps  
36. open  
37. a. beneath the wing  
   b. at the rear fuselage

SECTION 1B

1. a. longitudinal, roll  
   b. lateral, pitch  
   c. vertical, yaw  
2. longitudinal (roll)  
3. lateral (pitch)  
4. vertical (yaw)  
5. rudder  
6. a. static  
   b. dynamic  
7. a. longitudinal (pitch)  
   b. lateral (roll)  
   c. vertical (yaw)  
8. stabilizer  
9. elevators  
10. downward  
11. up  
12. rearward  
13. down  
14. up  
15. balance  
16. aileron drag  
17. up  
18. Frise  
19. interconnect springs  
20. right  
21. trim tab  
22. opposite  
23. anti-servo  
24. same  
25. opposite  
26. high  
27. jackscrew  
28. down  
29. drag  
30. increase  
31. slotted  
32. Fowler  
33. slot, aileron  
34. a. hydraulically  
   b. electrically  
35. camber  
36. root  
37. a. at the wing root  
38. vortices  
39. high, low  
40. Winglets  
41. wing fence  
42. canard  
43. irreversible  
44. a. ailerons  
   b. flight spoilers  
45. two  
46. yaw damper  
47. a. Kreuger flaps  
   b. variable camber leading edge flaps  
48. Type Certificate Data Sheets  
49. washed-out  
50. droop  
51. a. 1 X 7 or 1 X 19  
   b. 7 X 7  
   c. 7 X 19  
52. a. 75%  
   b. 100%  
53. 60%  
54. a. wear  
   b. corrosion  
55. may not  
56. a. 92  
   b. 52  
   c. 70  
   d. 25  
57. three  
58. four  
59. is not  
60. positive  
61. decalage
62. landing
63. lower
64. cycle
65. a. metal fatigue  
  b. corrosion
66. tests and inspection, aging aircraft program

SECTION 1C

1. autorotational (autorotative)
2. vertical tail rotor
3. a. fore & aft counter-rotating rotors  
  b. co-axial counter-rotating rotors.
4. feather
5. a. gravity  
  b. centrifugal force  
  c. lift  
  d. drag
6. symmetrical
7. a. rigidity in space  
  b. precession
8. Precession
9. Coriolis effect
10. underslung
11. less than one diameter
12. Out of Ground Effect
13. In Ground Effect
14. advancing
15. forward
16. flap, feather
17. retreating
18. high
19. translational
20. autorotational
21. downward
22. upward
23. collective
24. correlator, governor
25. collective
26. cyclic
27. synchronized elevator
28. irreversible
29. pedals
30. fenestron
31. unstable
32. a. stabilizer bar  
  b. offset flapping hinges  
  c. stability augmentation
33. beat
34. low
35. vertical
36. lateral
37. a. statically  
  b. dynamically
38. a. chordwise  
  b. spanwise
39. a. marking stick or flag  
  b. strobe light  
  c. infrared light
40. on the ground
41. in-flight
42. fan
43. collective
44. a. direct-shaft  
  b. free turbine
45. clutch
46. freewheeling

CHAPTER 2

SHEET METAL STRUCTURES

SECTION 2A

1. aluminum
2. a. monocoque  
  b. semi-monocoque
3. a. strength  
  b. stiffness  
  c. shape
4. a. tension  
  b. compression  
  c. torsion  
  d. bending  
  e. shear
5. compressive
6. tensile
7. compression, tension
8. a. tensile (tension)  
  b. shear
9. shear
10. concentrate, cross-sectional area
11. stop-drill
12. are
13. a. copper  
  b. copper  
  c. magnesium  
  d. zinc
14. lxxx
15. 2024
16. pure aluminum, rolled
17. scratches, abrasions
18. solution
19. precipitation
20. softened
21. a. –F  
  b. –O  
  c. –T4  
  d. –T3  
  e. –T6  
  f. –H12  
  g. –H18
22. lighter
23. a. cracks easily  
  b. corrodes easily  
  c. burns readily
24. strength, weight
25. high
a. firewalls  
  b. exhaust systems
26. a. high strength  
  b. light weight  
  c. stiffness
27. a. cladding with pure aluminum  
  b. covering with an impenetrable oxide film  
  c. covering with primer and paint
28. a. An area of electrode potential difference  
  b. A conductive path between these areas.  
  c. An electrolyte covering the surface
29. will not
30. a. electrolytically  
  b. chemically

SECTION 2B

1. should not
2. should not, the part will crack when it is bent
3. Carbon infuses into the metal, which will cause the part to weaken and crack.
4. are
5. transfer
6. pin
7. nibbler
8. a. green  
  b. red  
  c. yellow
9. countersunk
10. squaring shear
11. a. tip  
  b. body  
  c. shank
12. 30
13. box
14. a. silver  
  b. copper
c. black  
  d. brass  
  15. hole finder  
  16. chip chaser  
  17. 1/16\\text{th}, 1/32\\text{nd}  
  18. a. countersunk  
    b. universal  
    c. round  
    d. flat  
  19. countersunk, dimpled  
  20. a. 1100  
    b. 2117  
    c. 2017  
    d. 2024  
    e. 5056  
  21. a. 1100  
    b. 5056  
    c. 2117  
    d. 2017  
    e. 2024  
    f. 7050  
  22. B  
  23. heat treated, icebox  
  24. rivnut  
  25. Dzus, Airloc, Camlock

**SECTION 2C**

1. 1 1/2  
2. two  
3. three, ten to twelve  
4. 75%  
5. a. #40  
    b. #30  
    c. #21  
    d. #11  
6. 100  
7. coin  
8. hot  
9. one-shot  
10. inside  
11. a. three  
    b. two  
    c. one  
12. across  
13. a. 0  
    b. 2-4t (.064"-.128")  
    c. 4-6t (.256"-.384")  
14. mold  
15. setback  
16. BR + MT  
17. K-value or K-factor  
18. (K) times (R+T)  
19. a. 0.290"  
    b. 0.120"  
    c. 0.700"  
    d. 0.625"  
20. bend allowance

21. a. 0.420"  
    b. 0.219"  
    c. 0.328"  
    d. 0.214"  
    e. 0.196"  
22. stretched  
23. may  
24. flanged  
25. joggling

**SECTION 2D**

1. burnishing  
2. Structural Repair  
3. data, FAA approved  
4. Inspection Authorization  
5. 337  
6. Provides a more gradual change for stresses to enter and leave the repair.  
7. 1/8\\text{th} (same size)  
9. inboard  
10. Slip roll former.  
11. wet  
12. removing the damaged area and installing a new piece of skin.  
13. add  
14. location, approved  
15. sealant

**CHAPTER 3**

**WOOD, COMPOSITE, AND TRANSPARENT PLASTIC STRUCTURES**

**SECTION 3A**

1. Sitka Spruce  
2. a. cut of the wood  
    b. slope of the grain  
    c. number of growth rings  
3. quarter, shrinkage  
4. 1 to 15  
5. a. Resorcinol glue  
    b. Epoxy resin glue  
6. should not  
7. a. pot life  
    b. open assembly time  
    c. closed assembly time  
    d. pressing time  
8. Mahogany  
9. lowest  
10. rot-inhibiting  
11. varnish  
12. rotted  
13. may not  
14. 1/10\\text{th}  
15. 5:1

**SECTION 3B**

1. a. strength and stiffness can be customized  
    b. high strength-to-weight ratio  
    c. can be formed into complex curves  
2. a. fiber  
    b. matrix  
    c. interface or boundary between elements  
3. a. S-glass  
    b. E-glass  
4. Aramid  
5. high stress, vibration  
6. compressive, galvanic  
7. ceramic  
8. parallel  
9. warp  
10. selvage  
11. bias  
12. uni-directional  
13. mats  
14. more  
15. a. thermoplastic  
    b. thermosetting  
16. little, must be  
17. will, will not  
18. resin, catalyst, catalyst  
19. resin  
20. frozen  
21. shelf, may not  
22. Glass microballoons  
23. chopped fibers, flox  
24. a. honeycomb  
    b. foam  
    c. wood  
25. can  
26. epoxy  
27. Urethane  
28. are  
29. Pot, shelf  
30. Material Safety Data Sheets  
31. a. respirator  
    b. goggles
c. gloves  
32. fire, well ventilated  
33. a. Methyl-Ethyl-Ketone  
   b. Acetone  
34. a. Compression molding  
   b. Vacuum bagging  
   c. Filament winding  
   d. Wet lay-up  
   e. Fiberglass lay-up  
35. a. Compression molding  
   b. Vacuum bagging  
   c. Filament winding  
   d. Wet lay-up  
   e. Fiberglass lay-up  
36. a. Aluminum wires woven into the top layer.  
   b. Aluminum screens under the top layer.  
   c. Aluminum foil bonded to the outer layer.  
   d. Aluminum flame sprayed onto the component.  
37. a. Visual inspection  
   b. Tap testing  
   c. Ultrasonic testing  
38. a. Aluminum wires woven into the top layer.  
   b. Aluminum screens under the top layer.  
   c. Aluminum foil bonded to the outer layer.  
   d. Aluminum flame sprayed onto the component.  
39. a. Cellulose acetate base  
   b. Acrylic  
40. a. Lucite  
   b. Plexiglas  
41. will not  
42. C  
43. crazed  
44. unsatisfactory  
45. a. stretch forming  
   b. using male and female dies  
   c. vacuum forming  
   d. vacuum forming with female dies  
46. slowly, overheating  
47. a. butt  
   b. tee  
   c. lap  
   d. corner  
   e. edge  
48. a. uniform width  
   b. good penetration  
   c. adequate reinforcement  
   d. uniform ripples  
49. 100  
50. capillary  
51. b  
52. tin, lead  
53. silver  
54. SECTION 3C  
1. a. Cellulose acetate base  
   b. Acrylic  
2. a. Lucite  
   b. Plexiglas  
3. will not  
4. C  
5. crazed  
6. unsatisfactory  
7. a. stretch forming  
   b. using male and female dies  
   c. vacuum forming  
   d. vacuum forming with female dies  
8. slowly, overheating  
9. a. butt  
   b. tee  
   c. lap  
   d. corner  
   e. edge  
10. Aramid  
11. should not  
12. cannot  
13. unairworthy  
14. a. negligible  
   b. repairable  
   c. non-repairable  
15. a. Capillary  
   b. Tin, lead  
   c. Silver  
16. SECTION 4B  
1. does not  
2. hydrogen  
3. cleaner  
4. carburizing  
5. inert gas  
6. oxygen, nitrogen  
7. DC  
8. 1/10th, 1/4th  
9. lap  
10. scarf, fish-mouth  
11. heat treated, difficult, impossible  
12. SECTION 4C  
1. 15  
2. 4 to 8  
3. acetone  
4. weight  
5. 1/4, 1/2  
6. petroleum  
7. gasoline, alcohol, hydraulic, steam-cleaned  
8. close  
9. right
10. red, left
11. acetylene
12. green, right
13. equal pressure
14. tip
15. smaller
16. number drill
17. striker, matches/lighters
18. copper
19. will not
20. lighter
21. blue
22. thickness
23. neutral
24. neutral
25. acetylene

CHAPTER 5

AIRCRAFT FABRIC COVERING

SECTION 5A

1. aluminum
2. cellulose nitrate
3. is
4. a. Manufacturer’s service manual
   b. Supplemental Type Certificate (STC)
   c. FAA field approval
5. 80
6. 56
7. Glider
8. a. Polyester
    b. Fiberglass
9. Reinforcing
10. Surface
11. second
12. cutting
13. Inspection grommets (rings)
14. Retarder
15. thinned
16. five
17. will not
18. plasticizers

SECTION 5B

1. 70
2. penetrate
3. a. Exposed to the sun
   b. Finished with dark colors
4. spar varnish
5. baseball
6. modified seine
7. a. blanket
    b. envelope
8. distilled or demineralized water
9. fungicidal
10. animal
11. loosen
12. 250
13. 1 4/5”, 2 2/5”
14. beside
15. splice
16. grounded
17. 200
18. clear
19. much
20. glossy
21. Butyrate

SECTION 5C

1. sprayed
2. baseball, apex
3. four, eight, ten
4. sew

CHAPTER 6

AIRCRAFT PAINTING AND FINISHING

SECTION 6A

1. Plasticizers
2. Scotch-Brite
3. solvents, plasticizers
4. plasticizers
5. heavy
6. 20
7. too much
8. moisture
9. retarder
10. warming
11. a. Excessive heat or wind
    b. Excessively atomized spray gun air
12. a. Moving the gun too slowly.
    b. Holding the work too close.
    c. Not thinning the dope properly.
13. a. Improper spraying techniques.
    b. Thinners evaporating too quickly.
    c. Air drafts over the surface.
14. fisheyes
15. roping
16. a. They are designed for metal.
    b. They are more difficult to repair.
17. flexative modified primer
18. sandpaper

SECTION 6B

1. a. chemical
    b. mechanical
    c. pyrolytic
2. a. personal injury
    b. aircraft damage
3. Environmental Protection Agency (EPA), Occupational Health and Occupational Safety and Health Administration (OSHA)
4. a. aluminum tape (or foil)
    b. polyethylene sheeting
5. thick
6. hot water, steam
7. is not
8. plastic
9. polyurethane
10. conversion
11. a. primer
    b. acid
    c. thinner
12. wash
13. a. primer
    b. acid
    c. thinner
14. 0.3 mil (0.0003in or 0.0076mm)
15. eight
16. moisture
17. low
18. B
19. polyurethane
20. Wash
21. induction
22. viscosity cup
23. 5, 24
24. pot
25. white reflective, transparent pigment, ultraviolet absorbing
26. polyurethane
27. will not
28. Linseed

SECTION 6C
1. heavier
2. daily
3. engine mounts, landing gear struts
4. suction, pressure
5. will not
6. air, electric
7. perpendicular
8. much
9. a. 2
   b. 5
   c. 1
   d. 3
   e. 4
10. True
11. 1/3 to 2/3
12. ahead of
13. thinner
14. polypropylene
15. 45
16. N
17. 58 inches
18. bad
19. water
20. wet

c. direction conductor moves through the magnetic field
4. armature
5. commutator
6. brushes
7. a. field frame
   b. armature
   c. commutator
   d. brush assembly
8. a. complete the magnetic circuit
   b. provide mechanical support for the other parts.
9. field, field poles, shoes
10. pigtail
11. carbon, commutator
12. a. series
    b. shunt
    c. compound
13. Series
14. flat, under, over
15. armature reaction
16. neutral
17. interpoles
18. coming-in, 1500
19. field
20. a. current limiter
    b. reverse current cutout (or relay)
    c. voltage regulator
21. reverse current
22. flashing (polarizing)
23. growler
24. large, light
25. stationary, moving
26. solid-state
27. a. rotor
    b. stator
    c. solid-state rectifier
    d. brush assembly
28. slip rings
29. replaced
30. is not
31. three
32. Y, delta
33. air, brushless
34. constant speed drive
35. 400, 3
36. lead-acid, nickel-cadmium
37. specific gravity
38. 1.275, 1.300
39. 1.150
40. hydrometer
41. 2.1
42. ampere-hours (amp-hours)
43. 5-hour discharge
44. clean, tight, corrosion
45. bristle brush, sodium bicarbonate (baking soda)
46. neutralizes
47. acid, water
48. current, voltage, voltage
49. a. carry most of the electrical loads
    b. charge the battery
50. 28, 14
51. baking soda, water
52. low
53. temperature
54. is not
55. chemically opposite, contaminate
56. boric acid, vinegar
57. fully charge or deep cycle, ampere-hour

SECTION 7B
1. relationship
2. voltage spikes
3. contactor
4. a. false
   b. false
   c. true
   d. true
5. coil
6. voltage
7. a. split-bus
    b. parallel-bus
    c. split-bus
8. parallel-bus

SECTION 7C
1. 600
2. Eight
3. American Wire
4. a. 2 volts
    b. .5 volt
    c. 8 volts
    d. 7 volts
5. a. 4
    b. 2
    c. 10
    d. 2/0
6. 12, 15
7. 6, above
8. 25
9. shielding
10. a. red
    b. yellow
    c. blue
11. equal to
12. four
13. 3 milliohms (0.003 ohms)
14. co-axial
15. BNC

CHAPTER 7
AIRFRAME ELECTRICAL SYSTEMS

SECTION 7A
1. relative
2. strength, speed
3. a. direction of magnetic flux (north to south)
    b. direction of induced EMF (voltage)
SECTION 7D

1. AC 43.13-1B
2. logical, consistent, up, forward
3. two, one
4. relay
5. slow-blow
6. trip-free
7. a. push-to-reset
   b. push-pull
   c. toggle type
8. a. red
   b. green
   c. white
9. a. rotating beacon
   b. flashing strobe
10. five
11. a. direction of the magnetic field
    b. direction of current flow
    c. direction the wire moves
12. a. permanent magnet
    b. electromagnet
13. a. series
    b. shunt
    c. compound
14. high
15. series
16. a. universal
    b. induction
    c. synchronous
17. a. the design
    b. the applied AC frequency

SECTION 8A

1. a. Lighter weight
   b. Ease of installation
   c. Simplified inspection
   d. Minimum maintenance
2. 100
3. incompressible
4. height of the column
5. equally, undiminished, all pressure
6. F = AP (F = A x P)
7. V = AD (V = A x D)
8. a. Force can be easily transmitted over large distances.
   b. Large gains in mechanical advantage are possible.
9. a. 225 pounds (approx.)
   b. 2.25 inches (approx.)
   c. 445 pounds (approx.)
   d. 500 psi
10. a. up
    b. 1,570 pounds (approx.)

SECTION 8B

1. a. Able to flow with minimum opposition
   b. Must be incompressible
   c. Have good lubricating properties
   d. Inhibit corrosion
   e. Must not foam in operation.
2. Viscosity
3. flash point
4. a. Vegetable based
   b. Petroleum based
   c. Phosphate-ester based
5. is not
6. castor, alcohol
7. blue
8. MIL-H-5606
9. MIL-H-5606
10. fire
11. purple
12. soap, water
13. a. alcohol
   b. Stoddard solvent, naptha or varsol
   c. Trichlorethylene
14. a. natural rubber
   b. neoprene or Buna-N
   c. butyl rubber or ethylene-propylene elastomers
15. fire
16. Double
17. constant
18. relief
19. constant
20. does not
21. flow
22. a. Pressure drop across the fuse
   b. Volume of fluid passing through the fuse
23. relief
24. pressure reducer
25. accumulator
26. air, nitrogen
27. a. piston type
   b. bladder type
   c. diaphragm type
28. H
29. linear
30. motor
31. one-way
32. two-way
33. larger
34. backup ring, 1500
35. cure
36. would
37. nicked, damaged

SECTION 8C

1. brakes
2. a. A suitable fluid
   b. A fluid reservoir
3. A pump
4. a. Integral
   b. In-line
5. unpressurized
6. a. An aspirator in the return line.
   b. Bleed air
   c. Piston type
7. 0.000039
8. return
9. can
10. Double
11. constant
12. relief
13. constant
14. does not
15. flow
16. open
17. check
18. orifice check
19. sequence
20. Priority
21. hydraulic fuse
22. a. Pressure drop across the fuse
   b. Volume of fluid passing through the fuse
23. relief
24. pressure reducer
25. accumulator
26. air, nitrogen
27. a. piston type
   b. bladder type
   c. diaphragm type
28. H
29. linear
30. motor
31. one-way
32. two-way
33. larger
34. backup ring, 1500
35. cure
36. would
37. nicked, damaged

SECTION 8D

1. high
2. bleed
3. gyro instruments
4. Vane
5. dessicant, chemical dryer
6. shuttle
7. shuttle
CHAPTER 9

AIRCRAFT LANDING GEAR SYSTEMS

SECTION 9A

1. conventional
2. parasite
3. tricycle
4. ground loop, center of gravity
5. wheel pants
6. bungee
7. air-oil, oleo
8. oil
9. air
10. piston tube
11. two
12. aluminum, magnesium
13. bead seat
14. brake disk
15. fusible plugs
16. make sure it is completely deflated
17. deflator cap, valve, valve core
18. should not
19. should not
20. intergranular
21. overheating
22. is not
23. Eddy current
24. magnetic particle
25. any
26. shimmy damper
27. toed-in
28. negative
29. fire, damage
30. lowering
31. a. mechanical
   b. alternate hydraulic
   c. compressed air
   d. free-fall
32. squat
33. green, locked
34. retarded, any
35. is not, landing

SECTION 9B

1. sintered
2. main
3. deboosting (pressure-reducing)
4. lockout debooster
5. pneumatic
6. linings
7. 0.100
8. Spongy
9. bleeding
10. wheel cylinder
11. a. drain and flush the system
    b. replace all the seals
12. is not
13. fluorescent penetrant
14. is not
15. overheating
16. dragging

SECTION 9C

1. III (3)
2. width, diameter
3. outside diameter, width
4. does not
5. tubeless
6. more
7. bead
8. rib
9. nose
10. internally
11. under-inflated
12. Under-inflations
13. a. under-inflated
    b. over-inflated
    c. correct inflation
14. inflation pressure
15. airframe
16. cold
17. is
18. are
19. O-ring
20. cannot
21. is not
22. is
23. vertically
24. a. holes (punctures)
    b. defective valves
25. valve
26. light
27. anti-seize
28. talcum powder
29. heavy
30. slowly, safety cage
31. a. in special brackets
    b. with a cotter pin through holes in the rim
    c. with adhesive
32. Taxiing
33. stop, check the clearance
34. Hydroplaning

CHAPTER 10

POSITION AND WARNING SYSTEMS

SECTION 10A

1. blow, damage, control
2. zero
3. slip, skid
4. all the way
5. 20
6. weight, wheels (main wheels)
7. a. wheel-speed sensors
    b. anti-skid computer
    c. control valves
8. current, voltage
9. pressure, current
10. a. generate electrical signals usable by the control valve.
    b. regulate brake pressure to prevent a skid during landing
    c. prevent application of the brakes prior to touchdown.
11. locked-wheel
12. hydroplaning
13. test
14. wheel-speed sensor.

SECTION 10B

1. angle, attack
2. a. audible tone
    b. red light
3. stagnation point
4. stick-shaker
5. slot, vane
6. synchronous
7. permanent magnet, electromagnet
8. a. on the ground
    b. advanced for takeoff
9. green, red
10. landing, down, locked
11. reducing speed
12. Ground Proximity Warning System (GPWS)
### SECTION 11A

1. a. absolute  
   b. gauge  
   c. differential  
2. 29.92, 14.7  
3. absolute  
4. gauge  
5. Bourdon  
6. a. pitot  
   b. static  
7. absolute  
8. engine pressure ratio  
9. altimeter  
10. indicated  
11. mean sea level  
12. inches, mercury (Hg), millibars  
13. pressure  
14. 32,000  
15. temperature  
16. is not  
17. position  
18. absolute, ground level  
19. 91.411  
20. 24  
21. indicated  
22. true  
23. Machmeter  
24. 0.95  
25. vertical speed  
26. static  
27. Wheatstone bridge, ratiometer  
28. thermocouple  
29. is not  
30. accelerometer (G-meter)  
31. synchroscope  
32. tachometer  
33. a. rigidity in space  
   b. precession  
34. rigidity in space  
35. a. pitch (lateral)  
   b. roll (longitudinal)  
36. vertical  
37. precession  
38. inclinometer  
39. variation  
40. isogonic  
41. aeronautical radio, inc.  
42. deviation  
43. deviation  
44. turning, acceleration  
45. slaved  
46. a. susceptible to icing  
   b. produces no vacuum until the airplane is flying.  
47. carbon  
48. clean  
49. cannot  
50. a. airspeed and/or Mach indicator  
   b. altimeter  
   c. vertical speed  
51. electric  
52. static  
53. resistor  
54. one  
55. two  
56. air, fuel  
57. pounds per square inch (psi)  
58. most  
59. a. Electronic Flight Instrument System  
   b. Cathode Ray Tube  
   c. Electronic Attitude Deviation Indicator  
   d. Aeronautical Radio, Inc.  
   e. Electronic Horizontal Situation Indicator  
60. Zulu or Z

### SECTION 11B

1. a. upper right  
   b. upper center  
   c. lower center  
   d. upper left  
2. low frequency, high amplitude  
3. bonded, return  
4. a. red radial line  
   b. white arc  
   c. yellow arc  
   d. blue radial line  
   e. green arc  
5. removal  
6. 100
37. 4096
38. C
39. TCAS, resolve the potential conflict
40. 24
41. a. localizer
   b. glideslope
   c. marker beacons
   d. approach and runway lighting
42. UHF
43. glideslope
44. 75MHz
45. middle
46. 48, 121.5, 243.0
47. aft
48. rain
49. a. green
   b. yellow
   c. red
50. X-band
51. C-band
52. lightning discharges
53. transponders

SECTION 12B

1. manually control
2. ailerons
3. ailerons, elevator
4. pilot, throttle
5. Flight Management Systems
6. takeoff, landing, rollout
7. attitude, rate
8. servo
9. a. precess
   b. wear out
10. a. pneumatic
    b. electric
11. b.

SECTION 12C

1. bonding jumper
2. is
3. above, clamped
4. surge, spikes
5. snap-action
6. trip-free
7. 0.003
8. shielding
9. dischargers, wicks, trailing, atmosphere
10. Co-axial
11. dented, kinked, distorted, crushed, exposed

CHAPTER 13

AIRFRAME ICE AND RAIN CONTROL

SECTION 13A

1. known
2. anti-icing
3. deicing
4. spoiler
5. does not
6. bleed
7. bleed air
8. electrical heaters
9. alternate
10. electrically
11. heated
12. a. chemicals
   b. thermal (hot air)
   c. electrical heaters
13. a. carburetors
    b. propellers
    c. windshields
14. isopropyl
15. suction
16. vacuum
17. a. adhesives
   b. Rivnuts and screws
18. mild soap, water
19. electrothermal
20. slip-rings, brushes
21. on a sequenced cycle
22. holdover
23. takeoff, holdover
24. may not
25. ethylene glycol, isopropyl alcohol

SECTION 13B

1. a. mechanical wipers
   b. chemical rain repellant
   c. pneumatic rain-removal systems
2. a. electrically
   b. hydraulically
   c. is not
3. heavy
4. bleed

CHAPTER 14

CABIN ATMOSPHERE CONTROL SYSTEMS

SECTION 14A

1. a. 14.7
   b. 29.92
   c. 59
   d. 15
2. a. Nitrogen
   b. Oxygen
3. hypoxia
4. performance, judgment
5. Carbon monoxide
6. 10,000

SECTION 14B

1. will not
2. Aviator’s Breathing
3. liquid
4. molecular sieve
5. green
6. a. DOT 3AA
   b. DOT 3HT
7. five-thirds, five
8. a. manual type
   b. automatic type
9. diluter-demand
10. continuous flow
11. continuous flow (rebreather)
12. stainless steel
13. LOX
14. 70
15. Sodium chlorate
16. does
17. long
18. cannot
19. opposite
20. 50, 100
21. lowest
22. 1725 p.s.i.
23. 50
24. allowed to leak out
25. engine turbocharger

26. a. cabin altitude
   b. cabin rate-of-climb (vertical speed)
   c. differential pressure indicator
27. a. automatic  
b. manual  
28. outflow  

SECTION 14C  
1. exhaust shroud  
2. combustion  
3. fuel valve  
4. higher  
5. fuel  
6. C  
7. a. ram air heat exchangers  
b. expanding air across a turbine  
8. after  
9. a. air-cycle machines  
vapor-cycle systems  
10. latent  
11. a. compressor  
b. expansion valve  
12. receiver-dryer  
13. dessicant  
14. evaporator  
15. R-12  
16. control  
17. condenser  
18. a. soapy water  
b. electronic oscillator  
19. sight glass  
20. purged  
21. vapor  

SECTION 15A  
1. will  
2. detonation, catastrophic failure  
3. gasoline, kerosene  
4. more  
5. volatility  
6. knock  
7. lean  
8. a. Avgas 80  
b. Avgas 100  
c. Avgas 100LL  
9. a. red  
b. green  
c. blue  
10. a. Jet A  
b. Jet A-1  
c. Jet B  
11. a. dissolved  
b. free  
12. water  
13. a. solids  
b. microorganisms  
c. surfactants  
d. water  
e. contamination caused by human error  
14. is not  
15. 150  
16. 125  
17. 2  
18. jettison  

SECTION 15C  
1. steam cleaning  
2. 3.5  
3. lead, tin  
4. argon, carbon dioxide  
5. one-half  
6. 30  
7. should not  
8. is not  
9. ground  
10. a. Formation of sludge or slime.  
b. Emulsification of the fuel  
c. Creation of corrosive compounds and offensive odors.  
11. Millipore  
12. parallel  
13. correct grade (type)  

SECTION 15B  
1. cannot  
2. a. Supply fuel pressure for starting  
b. Provide a backup for the engine-driven pump  
c. Assure fuel flow when switching tanks.  
3. a. welded or riveted  
b. integral  
c. bladder  
4. 3003, 5052  
5. sloshing  
6. integral  
7. chafe-resisting  
8. engine-oil  
9. forward  
10. 5052, stainless  
11. sixth, third  
12. lay  
13. above  
14. true  
15. a. cone-type  
b. poppet-type  
16. detent  
17. a. electric motors  
b. solenoids  
18. double  
19. centrifugal  
20. low  
21. venturi  
22. parallel  
23. constant  
24. series  
25. a. bypass valve  
b. relief valve  
26. valve, plug  

SECTION 16A  
1. a. Fuel  
b. Oxygen  
c. A source of ignition (heat)  
2. a. C  
b. B  
c. D  
d. A  
3. D  
4. a. Spot-detection type  
b. Continuous-loop type  
5. spot  
6. pre-set  
7. parallel  
8. fault, short, open  
9. spot-type  
10. rate of temperature rise  
11. reference  
12. a. sensitive relay  
b. slave relay  

CHAPTER 15  

AIRCRAFT FUEL SYSTEMS  

SECTION 15A  

SECTION 15B  

SECTION 15C  

CHAPTER 16  

FIRE PROTECTION SYSTEMS  

SECTION 16A
13. continuous loop
14. Kidde
15. continuous loop
16. a. Lindberg
    b. Systron-Donner
17. a. Carbon Monoxide
    b. Nitrous Oxides
18. Ionization
19. a. The Light Refraction type
    b. The Ionization type
    c. The Solid-State type

SECTION 16B

1. is
2. five digit Halon
3. a. Weighing the container
    b. Checking the pressure gauge
4. squib
5. yellow
6. weighing
7. five
8. may not

SECTION 17A

1. airworthy
   a. aircraft specifications
   b. Type Certificate Data Sheets
   c. Airworthiness Directives
   d. Other FAA approved data
2. cycle
3. 43, D
4. a. Airworthiness Certificate
    b. Registration Certificate
    c. Weight and Balance information
   d. Operating Limitations(POH & Placards).
5. inoperative
6. 12 calendar
7. 100
8. midnight, May 31st
9. manufacturer
10. may not
11. discrepancies, unairworthy
12. major
13. special flight permit
14. 10
15. 1,427
16. may
17. Inspection Authorization
18. may not
19. Progressive
20. a. Large Airplanes (over 12,500 lbs gross takeoff weight)
    b. Turbine powered multi-engine aircraft
21. conformity
22. 337
23. conformity
24. Continuous
25. letter
26. work cards
27. Approved
28. 24
29. special
30. 12
31. conditional

SECTION 17B

1. a. weather
    b. friction
    c. stress overloads
    d. heat
    e. vibration
2. weather
3. friction
4. stress
5. indirect
6. pre-inspection
7. work order
8. a. pre-inspection
    b. examination
    c. service and repair
    d. functional check
    e. return to service
9. mandatory
10. examination
11. functional
12. paperwork
13. appropriately rated

SECTION 17C

1. will
2. a. 43.9
   b. 43.11
3. a. A description of the work performed
   b. The date the work was completed
   c. The name of the person performing the work if different from the person approving the return to service.
   d. The signature of the person approving the return to service.
   e. The certificate number of the person approving the return to service.
   f. The type of certificate of the person approving the return to service.
4. owner
5. time in service
6. may