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

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**ANSWERS****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. 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. 1xxx
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<sup>th</sup>, 1/32<sup>nd</sup>
- 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. blind
- 25. rivnut
- 26. 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<sup>th</sup> (same size)
- 8. An aircraft grade bolt and self-locking nut.
- 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<sup>th</sup>
- 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, floc
- 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. Seal the surface.
- b. Create a moisture an ultra-violet light barrier.
- 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. tap test
- 39. ultrasonic tester
- 40. may
- 41. Thermography
- 42. Aramid
- 43. backed up
- 44. should not
- 45. Carbide
- 46. respirators
- 47. Aramid
- 48. should not
- 49. cannot
- 50. unairworthy
- 51. a. negligible
- b. repairable
- c. non-repairable
- 52. routers
- 53. Step sanding
- 54. Scarf
- 55. oil, grease
- 56. warp clock
- 57. a. Remove excess resin
- b. Compact the fiber layers
- c. Remove trapped air
- d. Maintain the original contour
- e. Prevents shifting
- 58. Vacuum bagging
- 59. a. Room temperature curing

- b. Heat curing.
- 60. is not
- 61. heating blankets
- 62. Step
- 63. Parting, release
- 64. Bleeder materials
- 65. should not
- 66. potting
- 67. potted
- 68. delamination
- 69. temporary, permanent
- 70. balsa wood, composite honeycomb

### 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. 150
- 10. Ethylene dichloride
- 11. does
- 12. heat treating
- 13. brass safety wire, screws, washers
- 14. mild soap
- 15. 1/8<sup>th</sup>, expansion

## CHAPTER 4

### AIRCRAFT WELDING

#### SECTION 4A

- 1. Fusion
- 2. Adhesion
- 3. a. gas
- b. electric arc
- c. electrical resistance
- 4. a. oxygen
- b. acetylene

- 5. 5,600 to 6,300
- 6. infrared, ultraviolet, burn
- 7. a. arc welding helmet
- b. gloves
- c. proper clothing
- 8. stick
- 9. gas metal
- 10. MIG
- 11. tungsten inert gas, TIG
- 12. tungsten
- 13. 11,000
- 14. straight
- 15. a. spot
- b. seam
- 16. a. current
- b. pressure
- c. dwell time
- 17. a. butt
- b. tee
- c. lap
- d. corner
- e. edge
- 18. a. uniform width
- b. good penetration
- c. adequate reinforcement
- d. uniform ripples
- 19. 100
- 20. capillary
- 21. b
- 22. tin, lead
- 23. silver

#### SECTION 4B

- 1. does not
- 2. hydrogen
- 3. cleaner
- 4. carburizing
- 5. inert gas
- 6. oxygen, nitrogen
- 7. DC
- 8. 1/10<sup>th</sup>, 1/4<sup>th</sup>
- 9. lap
- 10. scarf, fish-mouth
- 11. heat treated, difficult, impossible

#### 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.  
c. Holding the work too close.  
d. 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. zinc chromate  
b. epoxy
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

## 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)

- 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
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

**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

**CHAPTER****8****HYDRAULIC AND PNEUMATIC POWER SYSTEMS****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
6. pressure
7.  $F = AP$  ( $F = A \times P$ )
8.  $V = AD$  ( $V = A \times D$ )
9. a. Force can be easily transmitted over large distances.  
b. Large gains in mechanical advantage are possible.
10. a. 225 pounds (approx.)  
b. 2.25 inches (approx.)  
c. 445 pounds (approx.)  
d. 500 psi
11. 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, naphtha or varsol  
c. Trichlorethylene
14. a. natural rubber  
b. neoprene or Buna-N  
c. butyl rubber or ethylene-propylene elastomers

**SECTION 8C**

1. brakes
2. a. A suitable fluid  
b. A fluid reservoir

- c. A pump  
d. Actuators
3. power pack
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 deboosters
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)

13. Engine Indication, Crew Alerting
14. alert, status, maintenance

## CHAPTER 11

### AIRCRAFT INSTRUMENT SYSTEMS

#### 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. agonic
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

## CHAPTER 12

### AIRCRAFT AVIONICS SYSTEMS

#### SECTION 12A

1. a. An electric field  
b. A magnetic field
2. shorter
3. oscillations, one
4. cycle, cycles, Hertz (Hz)
5. light
6. carrier, one-quarter, one-half
7. carrier, modulation
8. a. Amplitude Modulation (AM)  
b. Frequency Modulation (FM)
9. sky, long-range
10. a. generate a signal at the correct frequency  
b. modulate the carrier wave  
c. amplify the signal
11. oscillator
12. amplifier
13. shorter
14. Hertz dipole
15. ground plane
16. vertically
17. tuning
18. oceanic
19. VHF
20. is
21. UHF, voice, data
22. SELCAL
23. digital data link
24. airborne, ground
25. LF/MF
26. a. loop  
b. sense
27. VHF
28. phase
29. 30
30. is
31. direct to a destination
32. VORTAC
33. do not
34. acceleration
35. space
36. four

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 repellent  
c. pneumatic rain-removal systems
2. a. electrically  
b. hydraulically
3. is not
4. heavy
5. 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. desiccant
14. evaporator
15. R-12
16. control
17. condenser
18. a. soapy water  
b. electronic oscillator
19. sight glass
20. purged
21. vapor

## CHAPTER 15

### AIRCRAFT FUEL SYSTEMS

#### 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 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

27. will not
28. capacitance
29. pressure

### 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)

## CHAPTER 16

### FIRE PROTECTION SYSTEMS

#### 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

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

## CHAPTER 17

### AIRCRAFT AIRWORTHINESS INSPECTION

#### 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 31<sup>st</sup>
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 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

#### 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