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AIRCRAFT ELECTRONICS
ASSOCIATION



- Based on *Avionics News* issues from 2011.
- Grade of 85 percent or better required for credit.
- Work individually; choose best available answer.
- Take and submit the test online at www.aea.net. This answer sheet also can be mailed or faxed to *Avionics News* at 816-347-8405. Deadline is March 12, 2012.

JANUARY 2011

Frequently Asked Questions – United States

1. Preventative maintenance is defined in 14 CFR Part 1 and is restricted to the list of specific tasks found in which of the following documents?
 - A. Repair station operation specifications
 - B. Preventative maintenance is not limited to any specific tasks
 - C. 14 CFR Part 65
 - D. 14 CFR Part 43 Appendix A
 - E. Repair station quality control manual

FEBRUARY 2011

News and Regulatory Updates – United States

2. The FAA now recognizes AC 43.13-2 for FAA-approved major alterations on non-pressurized aircraft of 12,500 pounds gross weight or less.
 - A. True
 - B. False

Frequently Asked Questions – Canada

3. Transport Canada Civil Aviation (TCCA) does not have a field approval system.
 - A. True
 - B. False

4. Major alterations approved under the FAA Field Approval system can be installed in Canada on Canadian registered aircraft.

- A. True
- B. False

MARCH 2011

Frequently Asked Questions

5. In addition to an agreement between the contracting repair station and the contracted person, what other criteria are required to satisfy the definition of contract maintenance per AC 145-9 Chg. 1?

- A. Contracted person exercises the privileges of its certificate and assumes responsibility for work performed
- B. Contractor exercises the privileges of its certificate and assumes responsibility for work performed
- C. Both parties must be certified repair stations
- D. All of the above

6. When a repair station sends a component to the equipment manufacturer's repair station for maintenance or repair and the OEM returns the component to service, this process can be defined as contract maintenance per AC 145-9 Chg. 1.

- A. True
- B. False

Wi-Fi Fact or Fiction

7. Which of the following sub-categories of the commonly used Wi-Fi standards is considered to be the fastest and have greater range?

- A. 802.11A
- B. 802.11B
- C. 802.11G
- D. 802.11N

8. The RF field strength of a Wi-Fi transmitter and its impact on an aircraft systems depends on which of the following?

- A. Power of the transmitter
- B. Proximity to aircraft system
- C. The criticality of the aircraft system
- D. Both A and B
- E. Both A and C

9. A 100 mW Wi-Fi transmitter with a 6dBi antenna creates on the order of 10 volts per meter at a distance of 30cm and would be considered within FCC authorized power range.

- A. True
- B. False

10. Aircraft systems determined to have potentially catastrophic failure conditions tend to have high verified RF immunity based on HIRF requirements on the order of:

- A. 10 v/m at a distance of 30cm
- B. 30 v/m at a distance of 30cm
- C. 50 to 100 v/m
- D. .5 to 20 v/m

Airborne Weather Radar

11. Weather radar is a popular method of alerting the flight crew to the presence and location of:
- A. Hail
 - B. Windshear
 - C. Turbulence
 - D. Thunderstorms
12. An airborne weather radar system will provide the pilot with the necessary information to penetrate severe weather.
- A. True
 - B. False
13. An airborne weather radar system poses many hidden hazards. Which of the following are safety hazards in airborne weather radar systems?
- A. High Voltage
 - B. RF Radiation
 - C. Magnets
 - D. All of the above
14. The magnetron is considered to be the heart of most modern airborne weather radar systems. Who is responsible for its invention?
- A. German scientist during WWI
 - B. America's "rad lab" at MIT
 - C. British scientists
 - D. The Soviet Union during the Cold War

APRIL 2011

Airborne Weather Radar

15. Modern x-band airborne weather radar systems operate in what frequency range?
- A. 5.325GHz to 7.575GHz
 - B. 5.325MHz to 7.575MHz
 - C. 9.345GHz to 9.375GHz
 - D. 9.345MHz to 9.375MHz
16. A radar pulse will travel at the speed of light, 186,282 miles per second. A radar mile is the time it takes for the RF pulse to travel one nautical mile out and back. How long (in time) is a radar mile?
- A. 8.36 micro seconds
 - B. 12.36 micro seconds
 - C. 8.36 milli seconds
 - D. 123.6 micro seconds
17. Sensitivity Time Constant (STC) refers to the smallest signal detected by the radar system. This will be measured in dbm.
- A. True
 - B. False
18. A radar is similar to a flashlight in that its beam of radiation gets wider the farther it travels from the source.
- A. True
 - B. False
19. Which of the following radar arrays will have the tightest and most focused radar beam?
- A. 10-inch array
 - B. 12-inch array
 - C. 18-inch array
 - D. 24-inch array

20. Map and search modes in modern radar systems can be used for weather detection.
- A. True
 - B. False
21. Which of the following are considered basic components of an aircraft radar system?
- A. Receiver/transmitter, display, controller, waveguide
 - B. Antenna, display, indicator, controller
 - C. Receiver/transmitter, indicator, magnetron, mixer/duplexer
 - D. Receiver/transmitter, indicator, controller, antenna
22. Waveguides are similar to coaxial cables and share which of the following characteristics?
- A. They are considered transmission devices
 - B. Should not be bent or flexed beyond manufacture specifications
 - C. They experience signal loss
 - D. All of the above
 - E. Both A and C only
23. Azimuth refers to the scan of an antenna array where elevation refers to the tilt of the array.
- A. True
 - B. False
24. At high altitudes, waveguides must be pressurized to prevent _____.
- A. Moisture buildup
 - B. Freezing of the electrical pulse
 - C. Static discharge
 - D. Arcing of the RF pulse

MAY 2011

Frequently Asked Questions – United States

25. A radio-rated repair station is required to own maintenance manuals for every airframe it holds a limited rating.
- A. True
B. False
26. According to the regulations for Part 145 repair stations, examples of specific data that must be current and accessible when work is being performed include which of the following?
- A. Code of Federal Regulations, service bulletins, maintenance manuals, airframe manuals
B. Service difficulty reports, advisory circulars, overhaul manuals, service bulletins
C. Airworthiness directives, maintenance manuals, service bulletins, instructions for continued airworthiness
D. Supplemental type certificates, field approvals, aircraft logbooks, 14 CFR Part 43
27. For repair stations performing altimetry checks per 14 CFR 91.411 or transponder checks per 14 CFR 91.413, airframe manuals may not be required unless the repair station is required to repair either system.
- A. True
B. False

A Clearer Picture of Combined Vision Systems

28. Heads down displays, such as primary-flight displays, are not considered combined vision system (CVS) technologies.
- A. True
B. False
29. In order to gain operational credit, such as lower landing limits, which CVS technologies must be combined under FAR 91.175?
- A. Synthetic Vision System (SVS) with Head Down Display (HDD)
B. Enhanced Flight Vision System (EFVS) with Head Down Display (HDD)
C. Synthetic Vision System (SVS) with Head Up Display (HUD)
D. Enhanced Flight Vision System (EFVS) with Head Up Display (HUD)
30. A non-precision approach with CVS allows for a landing limit _____ feet lower than a CAT 1 ILS without EFVS.
- A. operational credit is not allowed
B. 200
C. 150
D. 100
31. EFVS and SVS are similar in that they are both driven by GPS and include terrain databases.
- A. True
B. False
32. With CVS, operations are not limited to certain airports' or runways' ground infrastructure, the limit is the type of approach and aircraft equipage.
- A. True
B. False

Airborne Weather Radar

33. An airborne weather radar system will detect which of the following types of weather?
- A. Dry Snow
B. Rain
C. Tornadoes
D. Poor visibility
34. Airborne weather radar systems are very good at detecting lightning.
- A. True
B. False
35. Which of the following meteorological conditions provides the greatest reflectivity to an airborne weather radar system?
- A. Wet hail
B. Rain
C. Wet snow
D. Dry hail
E. Ice crystals
36. Airborne weather radar systems are capable of detecting traffic hazards such as other aircraft.
- A. True
B. False
37. Tilt management is considered by many to be the single most important factor for effective use of an airborne weather radar system. At 10nm, how many feet will the center of the radar beam move up/down for every 1° of tilt?
- A. 10 feet
B. 100 feet
C. 1,000 feet
D. 10,000 feet

38. At high altitude cruise, the tilt must be adjusted _____ as the storm gets closer to the aircraft.

- A. Up
- B. Down
- C. No adjustment is required

39. Radar stabilization errors can be caused by failures or calibration errors in which of the following aircraft systems?

- A. Aircraft inverter
- B. Aircraft directional gyro system
- C. Aircraft vertical gyro system
- D. Both A and C

40. Stabilization errors will be more apparent in roll than pitch.

- A. True
- B. False

41. Which of the following will create the largest radar return?

- A. Smooth water
- B. Choppy water
- C. Kansas farmland
- D. Colorado Rocky Mountains

42. As the angle of incidence between a weather radar beam and its target increase, the reflected return will be _____.

- A. smaller
- B. larger
- C. does not change
- D. saturated

43. Vertical profile was developed by?

- A. Bendix
- B. Bendix/King
- C. Collins
- D. RCA

44. If a pilot sees a symmetrical mirrored image in the vertical profile view, he/she is most likely looking at:

- A. ground returns
- B. weather
- C. a very large thunderstorm with cell heights above 30,000 feet
- D. a malfunctioning display

JUNE 2011

Frequently Asked Questions

45. If a repair station borrows tools and equipment from another facility in order to perform maintenance, preventative maintenance or alterations, it must show a contract including the price paid to rent or lease the tools and equipment.

- A. True
- B. False

Airborne Weather Radar

46. "Weak returns" or "fails to paint" are common pilot weather radar complaints that often can be related to the antenna gain control (AGC) not being preset in detent.

- A. True
- B. False

47. Any abnormalities that radiate from the apex to the outer edge of the radar indicator can be referred to as:

- A. noisy display
- B. stabilization error
- C. indicator failure
- D. spoking

48. If a pilot refers to the radar indicator "painting ground on one side," he/she may be referring to an anomaly caused by:

- A. delaminated radome
- B. a failure of the RT
- C. stabilization error
- D. RF arcing

49. Which of the following act as a "window" to the RF in a weather radar system?

- A. array
- B. waveguides
- C. radome
- D. parabolic dish

50. During operational checks, it is possible for radar systems to exhibit errors when the source voltage is below 26VDC, so ground test is not recommended on aircraft batteries.

- A. True
- B. False

51. Do airborne weather radar systems transmit in "Test" mode?

- A. Yes
- B. No
- C. When airborne – yes, never on the ground
- D. Consider them to always transmit in test unless you have verified otherwise

52. Benefits of bench-checking all weather radar system components together versus testing just a single component include:

- A. condition and performance of one LRU can be masked by failure in a different LRU
- B. gets the entire system on the same maintenance schedule
- C. with share low voltage power supply in many systems it eliminates possibility of diagnosing the incorrect LRU as failed
- D. All of the above

JULY 2011

Frequently Asked Questions

53. The FAA encourages, but does not require, the use of Form 8130-3 for return to service of an article and recommends its use for return to service of an article after maintenance.

- A. True
- B. False

Electronic Flight Bags

54. Class 1 EFBs have which of the following characteristics?

- A. no connection to the aircraft or its systems
- B. FAA certification is generally not required
- C. can host GPS navigation function
- D. All of the above
- E. Both A and B only

55. Class 2 EFBs are installed devices and require approval from the FAA for the hardware, software and installation.

- A. True
- B. False

Getting on Board

56. Guidance and approval for inspections, maintenance and upgrades to S-LSAs doesn't come from the Federal Aviation Regulations (FARs).

- A. True
- B. False

57. An avionics shop needs what authority in order to perform maintenance, upgrades or alterations to an S-LSA?

- A. Certified Repair Station Certificate
- B. A properly rated repairman
- C. Letter of authority from LSA manufacturer
- D. No authority is needed

AUGUST 2011

Frequently Asked Questions

58. The FAA Aircraft Maintenance Division (AFS-300) in the Office of Flight Standards has expressed the view that the installation of a TSO ELT in a small airplane using AC 43.13-2B:

- A. is a major change
- B. is a minor alteration
- C. requires an FAA Form 337
- D. is not a major alteration

59. FAA design approvals include but are not limited to:

- A. type certificates
- B. supplemental type certificates
- C. parts manufacturer approvals
- D. All of the above
- E. None of the above

60. FAA-approved data may or may not contain the methods, techniques and practices needed for installation, as they usually define a design and may not contain the how-to instructions.

- A. True
- B. False

SEPTEMBER 2011

Frequently Asked Questions

61. 14 CFR 145.203 allows for mobile repair station operations only if the work is necessary due to a special circumstance as determined by the FAA.

- A. True
- B. False

406 MHz ELTs

62. It is legal to use the older 121.5 MHz ELT even though its signals are no longer monitored by satellite.

- A. True
- B. False

63. Because current 406 MHz ELTs are so accurate, there is no need for an additional GPS or 121.5 MHz signal to help guide ground crews the few final yards to the accident.

- A. True
- B. False

OCTOBER 2011

Frequently Asked Questions

64. The language and authority in pre-2001 Appendix A of Part 145, section (d)(4) is still valid today and provides:
- A. a list of job functions for radio rated repair stations
 - B. the basis for defining the authority of a radio rating
 - C. authority for radio-rated repair stations to remove and reinstall radios in order to perform bench-level maintenance on the units
 - D. All of the above
65. U.S. equipment manufacturers apply for ETSO approval through which of the following offices?
- A. EASA
 - B. The FAA ACO that issued the original TSO
 - C. Any ACO
 - D. FSDO

GPS and LightSquared

66. The "lower band" frequencies targeted by LightSquared for wireless internet services covers which of the following ranges?
- A. 1227.6 to 1575.42 MHz
 - B. 1545.2 to 1555.2 MHz
 - C. 1526 to 1536 MHz
 - D. None of the above
67. GPS signal acquisition is more susceptible to interference with LightSquared's lower band transmissions than GPS signal tracking.
- A. True
 - B. False

68. The organization responsible for spectrum use policy is:
- A. FAA
 - B. RTCA
 - C. FCC
 - D. LightSquared

NOVEMBER 2011

Frequently Asked Questions

69. According to the "FAA Administrator's Fact Book" (dated March 2011), the total number of air carrier aircraft for calendar year 2010 was:
- A. 18,651
 - B. 157,100
 - C. 223,900
 - D. 199,500
70. According to the "FAA Administrator's Fact Book" (dated March 2011), the total general aviation aircraft fleet in 2009 was:
- A. 18,651
 - B. 78,500
 - C. 223,900
 - D. 1,210,000

Legal Ease: Aviation Law Made Simple

71. Which of the following design approval holders are required to create instructions for continued airworthiness?
- A. PMA applicants
 - B. STC applicants
 - C. Field approval applicants
 - D. All of the above
 - E. Both A and B only

72. Service bulletins are a means by which manufacturers can distribute maintenance manual changes.
- A. True
 - B. False

DECEMBER 2011

Frequently Asked Questions

73. According to AC 145-10, repair station training must originate at a formal course, such as OEM technical training or through a commercial training provider.
- A. True
 - B. False
74. Who determines the training method of instruction that best fits a repair station's needs?
- A. FAA Administrator
 - B. FAA Inspector
 - C. Trainee
 - D. The repair station
75. Based on the training delivery methods listed in AC 145-10, which can be used to meet the requirements of 14 CFR section 145.163, repair stations can use AEA Regional Meetings and Conventions and even this *Avionics News* Technical Training Exam as a training delivery method.
- A. True
 - B. False

Full Name: _____ Date: _____
(please print legibly)

Company: _____

Address: _____ City: _____ State/Province: _____ Zip/Postal Code: _____

Phone: _____ Email Address: _____

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(T) (F)

(T) (F)

(T) (F)

1. [A] [B] [C] [D] [E]

26. [A] [B] [C] [D] [E]

51. [A] [B] [C] [D] [E]

2. [A] [B] [C] [D] [E]

27. [A] [B] [C] [D] [E]

52. [A] [B] [C] [D] [E]

3. [A] [B] [C] [D] [E]

28. [A] [B] [C] [D] [E]

53. [A] [B] [C] [D] [E]

4. [A] [B] [C] [D] [E]

29. [A] [B] [C] [D] [E]

54. [A] [B] [C] [D] [E]

5. [A] [B] [C] [D] [E]

30. [A] [B] [C] [D] [E]

55. [A] [B] [C] [D] [E]

6. [A] [B] [C] [D] [E]

31. [A] [B] [C] [D] [E]

56. [A] [B] [C] [D] [E]

7. [A] [B] [C] [D] [E]

32. [A] [B] [C] [D] [E]

57. [A] [B] [C] [D] [E]

8. [A] [B] [C] [D] [E]

33. [A] [B] [C] [D] [E]

58. [A] [B] [C] [D] [E]

9. [A] [B] [C] [D] [E]

34. [A] [B] [C] [D] [E]

59. [A] [B] [C] [D] [E]

10. [A] [B] [C] [D] [E]

35. [A] [B] [C] [D] [E]

60. [A] [B] [C] [D] [E]

11. [A] [B] [C] [D] [E]

36. [A] [B] [C] [D] [E]

61. [A] [B] [C] [D] [E]

12. [A] [B] [C] [D] [E]

37. [A] [B] [C] [D] [E]

62. [A] [B] [C] [D] [E]

13. [A] [B] [C] [D] [E]

38. [A] [B] [C] [D] [E]

63. [A] [B] [C] [D] [E]

14. [A] [B] [C] [D] [E]

39. [A] [B] [C] [D] [E]

64. [A] [B] [C] [D] [E]

15. [A] [B] [C] [D] [E]

40. [A] [B] [C] [D] [E]

65. [A] [B] [C] [D] [E]

16. [A] [B] [C] [D] [E]

41. [A] [B] [C] [D] [E]

66. [A] [B] [C] [D] [E]

17. [A] [B] [C] [D] [E]

42. [A] [B] [C] [D] [E]

67. [A] [B] [C] [D] [E]

18. [A] [B] [C] [D] [E]

43. [A] [B] [C] [D] [E]

68. [A] [B] [C] [D] [E]

19. [A] [B] [C] [D] [E]

44. [A] [B] [C] [D] [E]

69. [A] [B] [C] [D] [E]

20. [A] [B] [C] [D] [E]

45. [A] [B] [C] [D] [E]

70. [A] [B] [C] [D] [E]

21. [A] [B] [C] [D] [E]

46. [A] [B] [C] [D] [E]

71. [A] [B] [C] [D] [E]

22. [A] [B] [C] [D] [E]

47. [A] [B] [C] [D] [E]

72. [A] [B] [C] [D] [E]

23. [A] [B] [C] [D] [E]

48. [A] [B] [C] [D] [E]

73. [A] [B] [C] [D] [E]

24. [A] [B] [C] [D] [E]

49. [A] [B] [C] [D] [E]

74. [A] [B] [C] [D] [E]

25. [A] [B] [C] [D] [E]

50. [A] [B] [C] [D] [E]

75. [A] [B] [C] [D] [E]

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