Questions

1. When would VDF be used for a position fix?

a. When an aircraft declares an emergency on any frequency
b. When first talking to an FIR on crossing an international boundary
c. When joining controlled airspace from uncontrolled airspace
d. When declaring an emergency on 121.500 MHz

2. What equipment does an aircraft need when carrying out a VDF let-down?

a. VHF radio
b. VOR
c. VOR/DME
d. None

3. Which of the following is an advantage of a VDF let-down?

a. No equipment required in the aircraft
b. No special equipment required in the aircraft or on the ground
c. Only a VHF radio is needed in the aircraft
d. It is pilot interpreted, so ATC is not required

4. What is the maximum range at which a VDF station at 325 ft can provide a service to an aircraft at FL080?

a. 134 NM
b. 107 NM
c. 91 NM
d. 114 NM

5. Which of the following statements regarding VHF direction finding (VDF) is most accurate?

a. It is simple and only requires a VHF radio on the ground
b. It is simple and requires a VHF radio and DF equipment in the aircraft
c. It is simple requiring only VHF radios on the ground and in the aircraft
d. It uses line of sight propagation

6. What is the wavelength corresponding to a frequency of 375 kHz?

a. 8 m
b. 80 m
c. 800 m
d. 8000 m

7. An NDB transmits a signal pattern which is:

a. a 30 Hz polar diagram
b. omni-directional
c. a bi-lobal pattern
d. a beam rotating at 30 Hz

8. The accuracy of ADF within the DOC by day is:

a. +/- 1°
b. +/- 2°
c. +/- 5°
d. +/- 10°

9. Given that the compass heading is 270°, the deviation is 2°W, the variation is 30°E and the relative bearing of a beacon is 316°, determine the QDR:

a. 044
b. 048
c. 074
d. 224

10. Two NDBs, one 20 NM from the coast and the other 50 NM further inland. Assuming coastal error is the same for each, from which NDB will an aircraft flying over the sea receive the greatest error?

a. The NDB at 20 NM
b. The NDB at 50 NM
c. Same when the relative bering is 090/270
d. Same when the relative bearing is 180/360

11. Which of the following is likely to have the greatest effect on the accuracy of ADF bearings?

a. Interference from other NDBs particularly by day
b. Interference between aircraft aerials
c. Interference from other NDBs, particularly at night
d. Frequency drift at the ground station

12. Which of the following are all errors associated with ADF?

a. Selective availability, coastal refraction, night effect
b. Night effect, quadrantal error, lane slip
c. Mountain effect, station interference, static interference
d. Selective availability, coastal refraction, quadrantal error

13. What action must be taken to receive a bearing from an ADF?

a. BFO on
b. Select the loop position
c. Both the loop and sense aerials must receive the signal
d. Select the LOOP position

14. When is coastal error at its worst for an aircraft at low level?

a. Beacon inland at an acute angle to the coast
b. Beacon inland at 90° to the coast
c. Beacon close to the coast at an acute angle to the coast
d. Beacon close to the coast at 90° to the coast

15. A radio beacon has a range of 10 NM. By what factor should the power be increased to achieve a range of 20 NM?

a. 16
b. 2
c. 4
d. 8

16. Which of the following is the most significant error in ADF?

a. Quadrantal error
b. Coastal refraction
c. Precipitation static
d. Static from Cb

17. Which of the following may cause inaccuracies in ADF bearings?

a. Static interference, height effect, lack of failure warning
b. Station interference, mountain effect, selective availability
c. Coastal refraction, slant range, night effect
d. Lack of failure warning, station interference, static interference

18. The allocated frequency coverage of NDBs is:

a. 250 – 450 kHz
b. 190 – 1750 kHz
c. 108 – 117.95 MHz
d. 200 – 500 kHz

19. The principle used to measure VOR bearings is:

a. phase comparison
b. switched cardioids
c. difference in depth of modulation
d. pulse technique

20. When converting VOR and ADF bearings to true, the variation at the ..... should be used for VOR and at the ..... for ADF.

a. aircraft aircraft
b. aircraft station
c. station aircraft
d. station station

21. An aircraft flies from a VOR at 61N 013W to 58N 013W. The variation at the beacon is 13W and the variation at the aircraft is 5W. What radial is the aircraft on?

a. 013
b. 005
c. 193
d. 187

22. In a conventional VOR the reference signal and the variable signal have a 30 Hz modulation. The variable signal modulation is produced by:

a. adding 30 Hz to the transmitted signal
b. a 30 Hz rotation producing a 30 Hz modulation
c. varying the amplitude up and down at +/-30 Hz
d. using Doppler techniques to produce a 30 Hz amplitude modulation

23. If the VOR accuracy has a limit of 1.0°, what is the maximum cross-track error at 200 NM?

a. 3.0 NM
b. 2.5 NM
c. 2.0 NM
d. 3.5 NM

24. What is the maximum distance apart a VOR and TACAN can be located and have the same identification?

a. 2000 m
b. 60 m
c. 600 m
d. 6 m

25. What is the maximum distance between VOR beacons designating the centre line of an airway (10 NM wide), if the expected VOR bearing error is 5.5°?

a. 120 NM
b. 109 NM
c. 60 NM
d. 54 NM

26. In a certain VORTAC installation the VOR is coding STN and the DME is coding STZ. This means that the distance between the two beacons is in excess of:

a. 600 m
b. 100 m
c. 2000 m
d. 300 m

27. Using a 5 dot CDI, how many dots would show for an aircraft on the edge of an airway at 100 NM from the VOR beacon?

a. 5
b. 2.5
c. 1.5
d. 3

28. The maximum range an aircraft at FL370 can receive transmissions from a VOR/DME at 800 ft is:

a. 275 NM
b. 200 NM
c. 243 NM
d. 220 NM

29. When tracking a VOR radial inbound the aircraft would fly:

a. a constant track
b. a great circle track
c. a rhumb line track
d. a constant heading

30. Which of the following is a valid frequency (MHz) for a VOR?

a. 107.75
b. 109.90
c. 118.35
d. 112.20

31. Using a VOR beyond the limits of the DOC may result in:

a. loss of signal due to line of sight limitations
b. interference from other VORs operating on the same frequency
c. sky wave contamination of the VOR signal
d. scalloping errors

32. An aircraft is flying a heading of 090° along the equator, homing to a VOR. If variation at the aircraft is 10°E and 15°E at the VOR, what is the inbound radial?

a. 075
b. 105
c. 255
d. 285

33. When identifying a co-located VOR/DME the following signals are heard in the Morse code every 30 seconds:

a. 4 identifications in the same tone
b. 4 identifications with the DME at a higher tone
c. 4 identifications with the DME at a lower tone
d. no DME identification, but if the VOR identification is present and a range is indicated then this shows that both are serviceable

34. What is the maximum range a transmission from a VOR beacon at 169 ft can be received by an aircraft at FL012?

a. 60 NM
b. 80 NM
c. 120 NM
d. 220 NM

35. An aircraft is tracking inbound to a VOR beacon on the 105 radial. The setting the pilot should put on the OBS and the CDI indications are:

a. 285, TO
b. 105, TO
c. 285, FROM
d. 105, FROM

36. When tracking the 090 radial outbound from a VOR, the track flown is:

a. a straight line
b. a rhumb line
c. a great circle
d. a constant true heading

37. The frequency band of VOR is:

a. VHF
b. UHF
c. HF
d. LF & MF

38. On which radial from a VOR at 61N025E (VAR 13°E) is an aircraft at 59N025E (VAR 20°E)?

a. 160
b. 347
c. 193
d. 167

39. What is the minimum height an aircraft must be to receive signals from a VOR at 196 ft AMSL at a range of 175 NM?

a. 26 000 ft
b. 16 000 ft
c. 24 000 ft
d. 20 000 ft

40. For a conventional VOR a phase difference of 090° would be achieved by flying ..... from the beacon:

a. west
b. north
c. east
d. south

41. At a range of 200 NM from a VOR, if there is an error of 1°, how far off the centre line is the aircraft?

a. 3.5 NM
b. 1.75 NM
c. 7 NM
d. 1 NM

42. The quoted accuracy of VOR is valid:

a. at all times
b. by day only
c. at all times except night
d. at all times except dawn and dusk

43. Which of the following provides distance information?

a. DME
b. VOR
c. ADF
d. VDF

44. Which of the following would give the best indication of speed?

a. A VOR on the flight plan route
b. A VOR off the flight plan route
c. A DME on the flight plan route
d. A DME off the flight plan route

45. What happens when a DME in the search mode fails to achieve lock-on?

a. It stays in the search mode, but reduces to 60 pulse pairs per second (ppps) after 100 seconds
b. It stays in the search mode, but reduces to 60 ppps after 15 000 pulse pairs
c. It stays in the search mode at 150 ppps
d. It alternates between search and memory modes every 10 seconds

46. The most accurate measurement of speed by DME for an aircraft at 30 000 ft will be when the aircraft is:

a. tracking towards the beacon at 10 NM
b. overhead the beacon
c. tracking away from the beacon at 100 NM
d. passing abeam the beacon at 5 NM

47. A DME beacon will become saturated when more than about ..... aircraft are interrogating the transponder.

a. 10
b. 50
c. 100
d. 200

48. A typical DME frequency is:

a. 1000 MHz
b. 1300 MHz
c. 1000 kHz
d. 1575 MHz

49. The DME in an aircraft, cruising at FL210, fails to achieve lock-on a DME at MSL at a range of 210 NM. The reason for this is:

a. the beacon is saturated
b. the aircraft is beyond the maximum usable range for DME
c. the aircraft is beyond line of sight range
d. the aircraft signal is too weak at that range to trigger a response

50. The aircraft DME receiver accepts replies to its own transmissions but rejects replies to other aircraft transmissions because:

a. the PRF of the interrogations is unique to each aircraft
b. the pulse pairs from each aircraft have a unique amplitude modulation
c. the interrogation frequencies are 63 MHz different for each aircraft
d. the interrogation and reply frequencies are separated by 63 MHz

51. When an aircraft at FL360 is directly above a DME, at mean sea level, the range displayed will be:

a. 6 NM
b. 9 NM
c. 0
d. 12 NM

52. A DME frequency could be:

a. 10 MHz
b. 100 MHz
c. 1000 MHz
d. 10 000 MHz

53. An aircraft at FL360 is 10 NM plan range from a DME. The DME reading in the aircraft will be:

a. 8 NM
b. 11.7 NM
c. 10 NM
d. 13.6 NM

54. A DME transceiver does not lock onto its own reflections because:

a. the PRF of the pulse pairs is jittered
b. it uses MTI
c. the interrogation and reply frequencies differ
d. the reflections will all fall within the flyback period

55. What information does military TACAN provide for civil aviation users?

a. Magnetic bearing
b. DME
c. Nothing
d. DME and magnetic bearing

56. The DME in an aircraft flying at FL430 shows a range of 15 NM from a beacon at an elevation of 167 ft. The plan range is:

a. 13.5 NM
b. 16.5 NM
c. 15 NM
d. 17.6 NM

57. What are the DME frequencies?

a. 1030 & 1090 MHz
b. 1030 – 1090 MHz
c. 960 &1215 MHz
d. 960 – 1215 MHz

58. The time from the transmission of the interrogation pulse to the receipt of the reply from the DME ground station is 2000 microseconds (ignore the delay at the DME). The slant range is:

a. 330 NM
b. 185 NM
c. 165 NM
d. 370 NM

59. The DME counters are rotating continuously. This indicates that:

a. the DME is unserviceable
b. the DME is trying to lock onto range
c. the DME is trying to lock onto frequency
d. the DME is receiving no response from the ground station

60. On a DME presentation the counters are continuously rotating. This indicates:

a. the DME is in the search mode
b. the DME is unserviceable
c. the DME is receiving no response from the transponder
d. The transponder is unserviceable

61. An aircraft at FL200 is 220 NM from a DME at MSL. The aircraft equipment fails to lock on to the DME. This is because:

a. DME is limited to 200 NM
b. the aircraft is too high to receive the signal
c. the aircraft is too low to receive the signal
d. the beacon is saturated

62. On an ILS approach you receive more of the 90 Hz modulation than the 150 Hz modulation. The action you should take is:

a. fly left and up
b. fly left and down
c. fly right and up
d. fly right and down

63. The errors of an ILS localizer (LLZ) beam are due to:

a. emission side lobes
b. ground reflections
c. spurious signals from objects near the runway
d. interference from other systems operating on the same frequency

64. The amplitude modulation of the ILS outer marker is ..... and it illuminates the .....light in the cockpit.

a. 400 Hz blue
b. 1300 Hz amber
c. 400 Hz amber
d. 1300 Hz blue

65. The principle of operation of the ILS localizer transmitter is that it transmits two overlapping lobes on:

a. different frequencies with different phases
b. the same frequency with different phases
c. the same frequency with different amplitude modulations
d. different frequencies with different amplitude modulations

66. The ILS glide slope transmitter generates false glide paths because of:

a. ground returns from the vicinity of the transmitter
b. back scattering of the signals
c. multiple lobes in the radiation pattern
d. reflections from obstacles in the vicinity of the transmitter

67. A category III ILS system provides accurate guidance down to:

a. the surface of the runway
b. less than 50 ft
c. less than 100 ft
d. less than 200 ft

68. A HSI compass rose is stuck on 200°. When the aircraft is lined up on the centre line of the ILS localizer for runway 25, the localizer needle will be:

a. left of the centre
b. centred
c. right of the centre
d. centred with the fail flag showing

69. The coverage of the ILS glide slope with respect to the localizer centre line is:

a. +/-10° to 8 NM
b. +/-10° to 25 NM
c. +/-8° to 10 NM
d. +/-35° to 17 NM

70. The middle marker is usually located at a range of ....., with an audio frequency of ..... and illuminates the ..... light.

a. 4-6 NM 1300 Hz white
b. 1 km 400 Hz white
c. 1 km 1300 Hz amber
d. 1 km 400 Hz amber

71. The sequence of marker colours when flying an ILS approach is:

a. white, blue, amber
b. blue, white, amber
c. blue, amber, white
d. amber, blue, white

72. The sensitive area of an ILS is the area aircraft may not enter when:

a. ILS operations are in progress
b. category I ILS operations are in progress
c. category II/III ILS operations are in progress
d. the ILS is undergoing calibration

73. The ILS localizer is normally positioned:

a. 300 m from the downwind end of the runway
b. 300 m from the threshold
c. 300 m from the upwind end of the runway
d. 200 m abeam the threshold

74. The audio frequency of the outer marker is:

a. 3000 Hz
b. 400 Hz
c. 1300 Hz
d. 1000 Hz

75. An aircraft is flying downwind outside the coverage of the ILS. The CDI indications will be:

a. unreliable in azimuth and elevation
b. reliable in azimuth, unreliable in elevation
c. no indications will be shown
d. reliable in azimuth and elevation

76. The frequency band of the ILS glide path is:

a. UHF
b. VHF
c. SHF
d. VLF

77. In which band does the ILS glide path operate?

a. metric
b. centimetric
c. decimetric
d. hectometric

78. The coverage of MLS is ..... either side of the centre line to a distance of .....

a. 40° 40 NM
b. 40° 20 NM
c. 20° 20 NM
d. 20° 40 NM

79. Distance on MLS is measured by:

a. measuring the time taken for the primary radar pulse to travel from the MLS transmitter to the aircraft receiver
b. measuring the time taken for the secondary radar pulse to travel from the MLS transmitter to the aircraft receiver
c. phase comparison between the azimuth and elevation beams
d. co-located DME

80. Which of the following is an advantage of MLS?

a. Can be used in inhospitable terrain
b. Uses the same aircraft equipment as ILS
c. Has a selective access ability
d. Is not affected by heavy precipitation

81. The frequency band of MLS is:

a. UHF
b. VHF
c. SHF
d. VLF

82. Primary radar operates on the principle of:

a. transponder interrogation
b. pulse technique
c. phase comparison
d. continuous wave emission

83. The definition of a radar display will be best with:

a. narrow beamwidth and narrow pulsewidth
b. narrow beamwidth and wide pulsewidth
c. wide beamwidth and narrow pulsewidth
d. wide beamwidth and wide pulsewidth

84. The main advantage of a continuous wave radar over a pulsed radar is:

a. more complex equipment but better resolution and accuracy
b. removes the minimum range restriction
c. smaller more compact equipment
d. permits measurement of Doppler in addition to improved range and bearing

85. Which of the following systems use pulse technique?

1. secondary surveillance radar
2. airborne weather radar
3. distance measuring equipment
4. primary radar

a. all the above
b. 2 and 4 only
c. 2 only
d. 1 and 3 only

86. To double the range of a primary radar, the power must be increased by a factor of:

a. 2
b. 4
c. 8
d. 16

87. In a primary pulsed radar the ability to discriminate in azimuth is a factor of:

a. pulse width
b. beamwidth
c. pulse recurrence rate
d. rate of rotation

88. The maximum range of a ground radar is limited by:

a. pulse width
b. peak power
c. average power
d. pulse recurrence rate

89. What does pulse recurrence rate refer to?

a. the number of cycles per second
b. the number of pulses per second
c. the ratio of pulse width to pulse repetition period
d. the delay known as flyback or dead time

90. The maximum PRF required for a range of 50 NM is:

a. 300 pulses per second (pps)
b. 600 pps
c. 1620 pps
d. 3280 pps

91. The best radar for measuring very short ranges is:

a. a continuous wave primary radar
b. a pulsed secondary radar
c. a pulsed primary radar
d. a continuous wave secondary radar

92. Which is the most suitable radar for measuring short ranges?

a. Millimetric pulse
b. Continuous wave primary
c. Centimetric pulse
d. Continuous wave secondary

93. The main advantage of a slotted scanner is:

a. reduces side lobes and directs more energy into the main beam
b. removes the need for azimuth slaving
c. side lobe suppression
d. can produce simultaneous map and weather information

94. The maximum unambiguous (theoretical) range for a PRF of 1200 pps is:

a. 134 NM
b. 180 NM
c. 67 NM
d. 360 NM

95. The PRF of a radar is 450 pps. If the speed of light is 300 000 km/s, what is the maximum range of the radar?

a. 150 km
b. 333 km
c. 666 km
d. 1326 km

96. The best picture on a primary radar will be obtained using:

a. low frequency, narrow beam
b. short wavelength, narrow beam
c. high frequency, wide beam
d. long wavelength, wide beam

97. Which of the following is a primary radar system?

a. SSR
b. DME
c. GPS
d. AWR

98. On what principle does primary ATC radar work?

a. Pulse technique
b. Pulse comparison
c. Continuous wave
d. Transponder interrogation

99. The airborne weather radar (AWR) cannot detect:

a. snow
b. moderate rain
c. dry hail
d. wet hail

100. The frequency of AWR is:

a. 9375 MHz
b. 937.5 MHz
c. 93.75 GHz
d. 9375 GHz

101. The use of the AWR on the ground is:

a. not permitted
b. permitted provided reduced power is used
c. permitted provided special precautions are taken to safeguard personnel and equipment
d. only permitted to assist movement in low visibility conditions

102. Which type of cloud does the AWR detect?

a. Cirrocumulus
b. Altostratus
c. Cumulus
d. Stratus

103. The AWR uses the cosecant squared beam in the ..... mode.

a. WEA
b. CONT
c. MAP
d. MAN

104. On the AWR display the most severe turbulence will be shown:

a. in flashing red
b. by a black hole
c. by a steep colour gradient
d. alternating red and white

105. On an AWR colour display, the sequence of colours indicating increasing water droplet size is:

a. blue, green, red
b. green, yellow, red
c. black, amber, red
d. blue, amber, green

106. In an AWR with a 5° beamwidth, how do you orientate the scanner to receive returns from clouds at or above your level?

a. 0° tilt
b. 2.5° uptilt
c. 2.5° downtilt
d. 5° uptilt

107. The ISO-ECHO circuit is incorporated in the AWR:

a. to allow ground mapping
b. to alert pilots to the presence of cloud
c. to display areas of turbulence in cloud
d. to allow simultaneous mapping and cloud detection

108. The main factors which affect whether an AWR will detect a cloud are:

a. the size of the water droplets and the diameter of the antenna reflector
b. the scanner rotation rate and the frequency/wavelength
c. the size of the water droplets and the wavelength/frequency
d. the size of the water droplets and the range of the cloud

109. In an AWR with a colour CRT, areas of greatest turbulence are indicated by:

a. iso-echo areas coloured black
b. large areas of flashing red
c. iso-echo areas with no colour
d. most rapid change of colour

110. As a storm intensifies, the colour sequence on the AWR display will change:

a. black, yellow, amber
b. green, yellow, red
c. blue, green, orange
d. green, yellow, amber

111. The cosecant squared beam is used for mapping in the AWR because:

a. a greater range can be achieved
b. a wider beam is produced in azimuth to give a greater coverage
c. a larger area of ground is illuminated by the beam
d. it allows cloud detection to be effected whilst mapping

112. The AWR can be used on the ground provided:

1. the aircraft is clear of personnel, buildings and vehicles
2. conical beam is selected
3. maximum uptilt is selected
4. the AWR must never be operated on the ground

a. 4
b. 1 and 3
c. 1, 2 and 3
d. 2 and 3

113. Doppler navigation systems use ..... to determine the aircraft ground speed and drift.

a. DVOR
b. phase comparison of signals from ground stations
c. frequency shift in signals reflected from the ground
d. DME range measurement

114. Which axes is the AWR stabilized in?

a. Pitch, roll and yaw
b. Roll and yaw
c. Pitch and roll
d. Pitch only

115. With normal SSR mode C altitude coding the aircraft replies by sending back a train of up to 12 pulses contained between 2 framing pulses with:

a. 4096 codes in 4 blocks
b. 2048 codes in 3 blocks
c. 4096 codes in 3 blocks
d. 2048 codes in 4 blocks

116. Why is the effect of returns from storms not a problem with SSR?

a. The frequency is too high
b. SSR does not use the echo principle
c. The PRF is jittered
d. By the use of MTI to remove stationary and slow moving returns

117. The advantages of SSR mode S are:

a. improved resolution, TCAS
b. data link, reduced voice communications
c. TCAS, no RT communications
d. better resolution, selective interrogation

118. The accuracy of SSR mode C altitude as displayed to the air traffic controller is:

a. +/-25 ft
b. +/-50 ft
c. +/-75 ft
d. +/-100 ft

119. The SSR ground transceiver interrogates on ..... and receives responses on .....

a. 1030 MHz 1030 MHz
b. 1030 MHz 1090 MHz
c. 1090 MHz 1030 MHz
d. 1090 MHz 1090 MHz

120. The vertical position provided by SSR mode C is referenced to:

a. QNH unless QFE is in use
b. 1013.25 hPa
c. QNH
d. WGS84 datum

121. Why is a secondary radar display free from weather clutter?

a. The frequencies are too low to detect water droplets
b. The frequencies are too high to detect water droplets
c. Moving target indication is used to suppress the static generated by water droplets
d. The principle of the return of echoes is not used

122. The availability of 4096 codes in SSR is applicable to mode:

a. A
b. C
c. S
d. all

123. With reference to SSR, what code is used to indicate transponder altitude failure?

a. 9999
b. 0000
c. 4096
d. 7600

124. In NAVSTAR/GPS the PRN codes are used to:

a. reduce ionospheric and tropospheric errors
b. determine satellite range
c. eliminate satellite clock and ephemeris errors
d. remove receiver clock error

125. The MDA for a non-precision approach using NAVSTAR/GPS is based on:

a. barometric altitude
b. radio altimeter
c. GPS altitude
d. GPS or barometric altitude

126. If, during a manoeuvre, a satellite being used for position fixing is shadowed by the wing, the effect on position will be:

a. none
b. the position will degrade
c. another satellite will be selected, so there will be no degradation of position
d. the GPS will maintain lock using reflections of the signals from the fuselage

127. The time required for a GNSS receiver to download the satellite almanac for the NAVSTAR/GPS is:

a. 12.5 minutes
b. 12 hours
c. 30 seconds
d. 15 minutes

128. The effect of the ionosphere on NAVSTAR/GPS accuracy is:

a. only significant for satellites close to the horizon
b. minimized by averaging the signals
c. minimized by the receivers using a model of the ionosphere to correct the signals
d. negligible

129. The height derived by a receiver from the NAVSTAR/GPS is:

a. above mean sea level
b. above ground level
c. above the WGS84 ellipsoid
d. pressure altitude

130. The NAVSTAR/GPS constellation comprises:

a. 24 satellites in 6 orbits
b. 24 satellites in 4 orbits
c. 24 satellites in 3 orbits
d. 24 satellites in 8 orbits

131. Selective availability may be used to degrade the accuracy of the NAVSTAR/GPS position. This is achieved by:

a. introducing an offset in the satellites clocks
b. random dithering of the broadcast satellites clock time
c. random dithering of the broadcast satellites X, Y & Z coordinates
d. introducing an offset in the broadcast satellites X, Y & Z coordinates

132. The positioning of a GNSS aerial on an aircraft is:

a. in the fin
b. on the fuselage as close as possible to the receiver
c. on top of the fuselage close to the centre of gravity
d. under the fuselage

133. The NAVSTAR/GPS space segment:

a. provides X, Y & Z coordinates and monitoring of the accuracy of the satellite data
b. provides X, Y, Z & T coordinates and the constellation data
c. monitors the accuracy of the satellite data and provides system time
d. provides geographic position and UTC

134. Concerning NAVSTAR/GPS orbits, which of the following statements is correct?

a. The inclination of the orbits is 55° with an orbital period of 12 hours
b. The inclination of the orbits is 55° with an orbital period of 24 hours
c. The orbits are geostationary to provide global coverage
d. The orbits are inclined at 65° with an orbital period of 11 hours 15 minutes

135. NAVSTAR GPS receiver clock error is removed by:

a. regular auto-synchronization with the satellite clocks
b. adjusting the pseudo-ranges to determine the error
c. synchronization with the satellite clocks on initialization
d. having an appropriate atomic time standard within the receiver

136. The contents of the navigation and systems message from NAVSTAR/GPS SVs include:

a. satellite clock error, almanac data, ionospheric propagation information
b. satellite clock error, almanac data, satellite position error
c. position accuracy verification, satellite clock time and clock error
d. ionospheric propagation information, X, Y & Z coordinates and corrections, satellite clock time and error

137. The NAVSTAR/GPS segments are:

a. space, control, user
b. space, control, ground
c. space, control, air
d. space, ground, air

138. The preferred GNSS receiver for airborne application is:

a. multiplex
b. multi-channel
c. sequential
d. fast multiplex

139. The orbital height of geostationary satellites is:

a. 19 330 km
b. 35 800 km
c. 10 898 NM
d. 10 313 NM

140. The best accuracy from satellite systems will be provided by:

a. NAVSTAR/GPS and TNSS transit
b. GLONASS and COSPAS/SARSAT
c. GLONASS and TNSS transit
d. NAVSTAR/GPS and GLONASS

141. The azimuth and elevation of the satellites is:

a. determined by the satellite and transmitted to the receiver
b. determined by the receiver from the satellite almanac data
c. transmitted by the satellite as part of the almanac
d. determined by the receiver from the broadcast satellite X, Y, Z & T data

142. The skysearch carried out by a GNSS receiver:

a. is done prior to each fix
b. is done when the receiver position is in error
c. involves the receiver downloading the almanac from each satellite before determining which satellites are in view
d. is the procedure carried out by the monitoring stations to check the accuracy of the satellite data

143. An aircraft GNSS receiver is using 5 satellites for RAIM. If the receiver deselects one satellite then the flight should be continued:

a. using 4 satellites with the pilot monitoring the receiver output
b. using alternative navigation systems
c. using alternative radio navigation systems only
d. using inertial reference systems only

144. The WGS84 model of the earth is:

a. a geoid
b. a sphere
c. an exact model of the earth
d. an ellipse

145. The frequency band of the NAVSTAR/GPS L1 and L2 frequencies is:

a. VHF
b. UHF
c. EHF
d. SHF

146. The number of satellites required to produce a 4D fix is:

a. 3
b. 4
c. 5
d. 6

147. How many satellites are needed for a 2D fix?

a. 4
b. 2
c. 3
d. 5

148. Which of the following statements concerning ionospheric propagation errors is true?

a. They are significantly reduced by the use of RAIM
b. They are eliminated using differential techniques
c. They are significantly reduced when a second frequency is available
d. Transmitting the state of the ionosphere to the receivers enables the error to reduced to less than one metre

149. Using differential GNSS for a non-precision approach, the height reference is:

a. barometric
b. GNSS
c. radio
d. radio or GNSS

150. The number of satellites required to provide a 3D fix without RAIM is:

a. 4
b. 5
c. 6
d. 3

151. The number of satellites required for a fully operational NAVSTAR/GPS is:

a. 21
b. 18
c. 24
d. 30

152. 'Unauthorized' civilian users of NAVSTAR/GPS can access:

a. the P and Y codes
b. the P code
c. the C/A and P codes
d. the C/A code

153. When using GPS to fly airways, what is the vertical reference used?

a. Barometric
b. GPS height
c. Radio altitude
d. Average of barometric and GPS

154. The nav/system message from GLONASS and NAVSTAR/GPS is found in the ..... band.

a. SHF
b. UHF
c. VHF
d. EHF

155. Which GNSS system can be used for IFR flights in Europe?

a. NAVSTAR/GPS
b. GLONASS
c. COSPAS/SARSAT
d. TNSS transit

156. During flight using NAVSTAR/GPS and conventional navigation systems, you see a large error between the positions given by the systems. The action you should take is:

a. continue the flight in VMC
b. continue using the conventional systems
c. continue using the GPS
d. switch off the faulty system after determining which one is in error

157. What information can a GPS fix using four satellites give you?

a. Latitude and longitude
b. Latitude, longitude, altitude and time
c. Latitude, longitude and altitude
d. Latitude, longitude and time

158. What are the basic elements transmitted by NAVSTAR/GPS satellites?

1. offset of the satellite clock from GMT
2. ephemeris data
3. health data
4. ionospheric delays
5. solar activity

a. 1, 2, 3, 4 and 5
b. 1, 2 and 3
c. 1, 2 and 4
d. 2, 3 and 4

159. What is the purpose of the GPS control segment?

a. To control the use of the satellites by unauthorized users
b. To monitor the satellites in orbit
c. To maintain the satellites in orbit
d. Degrade the accuracy of satellites for unauthorized users

160. In GNSS a fix is obtained by:

a. measuring the time taken for signals from a minimum number of satellites to reach the aircraft
b. measuring the time taken for the aircraft transmissions to travel to a number of satellites in known positions and return to the aircraft
c. measuring the pulse lengths of the sequential signals from a number of satellites in known positions
d. measuring the phase angle of the signals from a number of satellites in known positions

161. The inclination of a satellite is:

a. the angle between the SV orbit and the equator
b. the angle between the SV orbit and the polar plane
c. 90° minus the angle between the SV orbit and the equator
d. 90° minus the angle between the SV orbit and the polar plane

162. How is the distance between the NAVSTAR/GPS SV and the receiver determined?

a. By referencing the SV and receiver positions to WGS84
b. By synchronizing the receiver clock with the SV clock
c. By measuring the time from transmission to reception and multiplying by the speed of light
d. By measuring the time from transmission to reception and dividing by the speed of light

163. The distance measured between a satellite and a receiver is known as a pseudo-range because:

a. it is measured using pseudo-random codes
b. it includes receiver clock error
c. satellite and receiver are continually moving in relation to each other
d. it is measured against idealized Keplerian orbits

164. The task of the control segment is to:

a. determine availability to users
b. monitor the SV ephemeris and clock
c. apply selective availability
d. all of the above

165. To provide 3D fixing with RAIM and allowing for the loss of one satellite requires ..... SVs:

a. 4
b. 5
c. 6
d. 7

166. In NAVSTAR/GPS the PRN codes are used to:

a. differentiate between satellites
b. pass satellite ephemeris information
c. pass satellite time and ephemeris information
d. pass satellite time, ephemeris and other information

167. An 'all in view' satellite navigation receiver is one which:

a. monitors all 24 satellites
b. tracks selected satellites
c. selects and tracks all (in view) satellites and selects the best four
d. tracks the closest satellites

168. Which GPS frequencies are available for commercial air transport?

a. 1227.6 MHz only
b. 1575.42 MHz only
c. 1227.6 MHz and 1575.42 MHz
d. 1227.6 MHz or 1575.42 MHz

169. Which GNSS is authorized for use on European airways?

a. GLONASS
b. NAVSTAR/GPS
c. Galileo
d. COSPAS/SARSAT

170. In GPS on which frequencies are both the C/A and P codes transmitted?

a. Both frequencies
b. The higher frequency
c. Neither frequency
d. The lower frequency

171. The orbits of the NAVSTAR GPS satellites are inclined at:

a. 55° to the earth's axis
b. 55° to the plane of the equator
c. 99° to the earth's axis
d. 99° to the plane of the equator

172. RAIM is achieved:

a. by ground monitoring stations determining the satellite range errors which are relayed to receivers via geo-stationary satellites
b. by ground stations determining the X, Y & Z errors and passing the corrections to receivers using pseudolites
c. within the receiver
d. any of the above

173. The function of the receiver in the GNSS user segment is to:

a. interrogate the satellites to determine range
b. track the satellites to calculate time
c. track the satellites to calculate range
d. determine position and assess the accuracy of that position

174. In which frequency band are the L1 and L2 frequencies of GNSS?

a. SHF
b. VHF
c. UHF
d. EHF

175. Which of the following statements concerning differential GPS (DGPS) is true?

a. Local area DGPS gives the same improvement in accuracy regardless of distance from the station
b. DGPS removes SV ephemeris and clock errors and propagation errors
c. DGPS can improve the accuracy of SA affected position information
d. Wide area DGPS accuracy improves the closer the aircraft is to a ground station

176. The visibility of GPS satellites is:

a. dependent on the location of the user
b. greatest at the equator
c. greatest at the poles
d. the same at all points on and close to the surface of the earth

177. In an RNAV approach phase with a two dot lateral deviation HSI display, a one dot deviation from track would represent:

a. 5 NM
b. 0.5 NM.
c. 5°.
d. 0.5°.

178. The required accuracy of a precision RNAV (P-RNAV) system is:

a. 0.25 NM standard deviation or better
b. 0.5 NM standard deviation or better
c. 1 NM standard deviation or better
d. 1.5 NM standard deviation or better

179. The ETA generated by the FMS will be most accurate:

a. when the forecast W/V equals the actual W/V and the FMS calculated Mach No. equals the actual Mach No.
b. if the ground speed and position are accurate
c. if the forecast W/V at take-off is entered
d. if the ground speed is correct and the take-off time has been entered

180. When is the FMS position likely to be least accurate?

a. TOD
b. TOC
c. Just after take-off
d. On final approach

181. For position fixing the B737-800 FMC uses:

a. DME/DME
b. VOR/DME
c. DME/DME or VOR/DME
d. any combination of VOR, DME and ADF

182. When using a two dot HSI, a deviation of one dot from the computed track represents approximately:

a. 2°
b. 5°
c. 5 NM
d. 2 NM

183. An aircraft, using a 2D RNAV computer, is 12 NM from the phantom station, 25 NM from the VOR/DME designating the phantom station and the phantom station is 35 NM from the VOR/DME. The range read-out in the aircraft will be:

a. 12 NM
b. 25 NM plan range
c. 35 NM
d. 25 NM slant range

184. The FMC position is:

a. the average of the IRS positions
b. the average of the IRS and radio navigation positions
c. computer generated from the IRS and radio navigation positions
d. computer generated from the radio navigation positions

185. When midway between two waypoints, how can the pilot best check the progress of the aircraft?

a. By using the ATD at the previous waypoint
b. By using the computed ETA for the next waypoint
c. By using the ATA at the previous waypoint
d. By using the ETA at the destination

186. Which of the following can be input manually to the FMC using a maximum of 5 alphanumerics?

a. Waypoints, latitude and longitude, SIDs and STARs
b. ICAO aerodrome designators, navigation facilities, SIDs and STARs
c. Waypoints, airways designators, latitude and longitude
d. Navigation facilities, reporting points, airways designators

187. The inputs to the EHSI display during automatic flight include:

a. auto-throttle, IRS and FMC
b. FCC, FMC and ADC
c. IRS, FMC and radio navigation facilities
d. IRS, ADC and FCC

188. The inputs the pilot will make to the FMC during the pre-flight initialization will include:

a. ETD, aircraft position, and planned route
b. planned route, aircraft position, and departure runway
c. navigation data base, aircraft position and departure aerodrome
d. departure runway, planned route and ETD

189. In RNAV mode one dot on the EHSI represents:

a. 2 NM
b. 2°
c. 5 NM
d. 5°

190. The phantom station in a 2D RNAV system may be generated by:

a. VOR/DME
b. twin VOR
c. twin DME
d. any of the above

191. The operation of a 2D RNAV system may be seriously downgraded:

a. because the computer cannot determine if the aircraft is within the DOC of the programmed facilities
b. because the computer cannot determine if the heading and altitude input are in error
c. because the pilot cannot verify the correct frequency has been selected
d. if the selected navigation facility is in excess of about 70 NM

192. The FMS database can be:

a. altered by the pilots between the 28 day updates
b. read and altered by the pilots
c. only read by the pilots
d. altered by the pilots every 28 days

193. Refer to Appendix A diagram C. What is the current drift?

a. 4° left
b. 12° left
c. 4° right
d. 12° right

194. In the B737-400 EFIS which component generates the visual display?

a. Flight control computer (FCC)
b. FMC
c. Symbol generator
d. Navigation database

195. When is the IRS position updated?

a. Continuously by the FMC
b. At VOR beacons on route by the pilots
c. At significant waypoints only
d. On the ground only

196 Refer to Appendix A. Which diagram is the MAP mode?

a. D
b. F
c. E
d. C

197. Refer to diagram E of Appendix A. The track from ZAPPO to BURDY is:

a. 205°(T)
b. 205°(M)
c. 064°(T)
d. 064°(M)

198. Refer to diagram B of Appendix A. The aircraft is:

a. right of the centre line and above the glide path
b. left of the centre line and below the glide path
c. right of the centre line and below the glide path
d. left of the centre line and above the glide path

199. Refer to Appendix A. Diagram F represents:

a. MAP
b. EXP VOR
c. VOR
d. ILS

200. The navigation database in the FMS:

a. may be modified by the pilot to meet routing requirements
b. is read only
c. may be modified by the operations staff to meet routing requirements
d. may be modified by national aviation authorities to meet national requirements

201. In an EHSI the navigation information comes from:

a. INS, weather mapping, radio navigation
b. FMC, radio navigation
c. IRS, radio navigation, TAS and drift
d. FMC, weather mapping, radio navigation

202. On an EFIS display the pictured symbol represents:

a. DME
b. VOR/DME
c. VORTAC
d. aerodrome

203. According to ICAO (Annex 11), the definition of an RNAV system is:

a. one which enables the aircraft to navigate on any desired flight path within the coverage of appropriate ground based navigation aids or within the specified limits of self-contained on-board systems or a combination of the two
b. one which enables the aircraft to navigate on any desired flight path within the coverage of appropriate ground based navigation aids or within the specified limits of self-contained on-board systems but not a combination of the two
c. one which enables the aircraft to navigate on any desired flight path within the coverage of appropriate ground based navigation aids only
d. one which enables the aircraft to navigate on any desired flight path within the specified limits of self-contained on-board systems

204. Which of the following is independent of external inputs?

a. INS
b. Direct reading magnetic compass
c. VOR/DME
d. ADF

205. The track line on an EFIS display indicates:

a. that a manual track has been selected
b. that a manual heading has been selected
c. the actual aircraft track over the ground, which will coincide with the aircraft heading when there is zero drift
d. the aircraft actual track which will coincide with the planned track when there is zero drift

206. The EHSI is showing 5° fly right with a TO indication. The aircraft heading is 280°(M) and the required track is 270°. The radial is:

a. 275
b. 265
c. 085
d. 095

207. On the B737-400 EHSI what happens if the selected VOR fails?

a. The display blanks and a fail warning appears
b. The deviation bar is removed
c. A fail flag is displayed alongside the display bar
d. The display flashes

208. In an RNAV system which combination of external reference will give the most accurate position?

a. GPS/rho
b. Rho/theta
c. Rho/rho
d. GPS/theta

209. If the signal from a VOR is lost, how is this shown on the B737-400 EHSI display?

a. By removal of the deviation bar and pointer
b. By showing a fail flag alongside the deviation bar
c. A flashing red FAIL message appears in the frequency location
d. An amber FAIL message appears in the frequency location

210. The colour used on the B737-400 EHSI weather display to show turbulence is:

a. magenta
b. flashing red
c. white or magenta
d. high colour gradient

211. Refer to diagram D of Appendix A. The current aircraft track is:

a. 130°
b. 133°
c. 156°
d. 165°

212. Refer to appendix A diagram C. The wind velocity is:

a. 129°(M)/20 ms^{-1}
b. 129°(T)/20 kt
c. 129°(M)/20 kt
d. 129°(T)/20 ms^{-1}

213. In order that a waypoint designated by a VOR can be used by a RNAV system:

a. the VOR must be identified by the pilot
b. the VOR must be within range when the waypoint is input
c. the VOR need not be in range when input or used
d. the VOR need not be in range when input but must be when used

214. Which EHSI modes cannot show AWR information?

a. FULL VOR/ILS and MAP
b. PLAN, MAP and EXP VOR/ILS
c. MAP and PLAN
d. PLAN and FULL VOR/ILS

215. Refer to appendix A, diagram C. The symbol annotated KXYZ is:

a. destination aerodrome
b. a diversion aerodrome
c. an en route aerodrome
d. a top of climb/descent point

216. Refer to Appendix B. The distance displayed on the EHSI will be:

a. 10 NM
b. 11 NM
c. 12 NM
d. 21 NM

217. The NAVSTAR/GPS constellation comprises:

a. 6 SVs each in 4 orbits
b. 4 SVs each in 6 orbits
c. 8 SVs each in 3 orbits
d. 3 SVs each in 8 orbits

218. Comparing the L1 and L2 signals helps with the reduction of which GNSS error?

a. Tropospheric propagation
b. SV ephemeris
c. SV clock
d. Ionospheric propagation

219. The normal maximum range for an ATC surveillance radar is:

a. 50 NM
b. 150 NM
c. 250 NM
d. 350 NM

220. The cause of a RNAV giving erratic readings would be:

a. the aircraft is in the cone of confusion of the phantom station
b. the aircraft is beyond line of sight range of the phantom station
c. the aircraft is beyond line of sight range of the reference station
d. the aircraft is outside the DOC of the reference station

221. Flying an ILS approach with a 3° glide slope referenced to 50 ft above the threshold, an aircraft at 4.6 NM should be at an approximate height of:

a. 1 400 ft
b. 1 380 ft
c. 1 500 ft
d. 1 450 ft

222. The height of the GPS constellation is:

a. 19 300 km
b. 20 200 km
c. 10 900 km
d. 35 800 km

223. What are the ground components of MLS?

a. Separate azimuth and elevation antennae with DME
b. Separate azimuth and elevation antennae with middle and outer markers
c. Combined azimuth and elevation antennae with DME
d. Combined azimuth and elevation antennae with middle and outer markers

224. The accuracy required of a basic area navigation (B-RNAV) system is:

a. +/-5 NM on 90% of occasions
b. all the time
c. +/-5 NM on 95% of occasions
d. +/-5 NM on 75% of occasions

225. What function does the course line computer perform?

a. Uses VOR/DME information to direct the aircraft to the facility
b. Uses VOR/DME information to direct the aircraft along a specified track
c. Converts VOR/DME information into HSI directions to maintain the planned track
d. Uses VOR/DME information to determine track and distance to a waypoint

226. The emissions from a non-directional beacon (NDB) are:

a. a cardioid with a 30 Hz rotation rate
b. omni-directional
c. a phase-compared signal
d. a frequency modulated continuous wave (FMCW)

227. How does night effect affect ADF?

a. Causes false bearings as the goniometer locks onto the sky wave
b. Sky wave interference which affects the null and is worst at dawn and dusk
c. Interference from other NDBs which is worst at dusk and when due east of the station
d. Phase shift in the received signal giving random bearing errors

228. What is an ADC input to the FMC?

a. Heading
b. VOR/DME position
c. TAS
d. Ground speed and drift

229. A typical frequency for DME would be:

a. 300 MHz
b. 600 MHz
c. 900 MHz
d. 1200 MHz

230. When flying under IFR using GPS and a multi-sensor system:

a. if there is a discrepancy between the GPS and multi-sensor positions, then the multi-sensor position must be regarded as suspect
b. the GPS must be operating and its information displayed
c. the multi-sensor system must be operating and its information displayed
d. both systems must be operating but only the primary system information needs to be displayed

231. The indications from a basic RNAV are behaving erratically. The reason is likely to be:

a. the aircraft is in the cone of confusion of the phantom station
b. the aircraft is outside the DOC of the reference VOR/DME
c. the aircraft is below line of sight range of the reference VOR/DME
d. the aircraft is in the cone of confusion of the reference VOR

232. What is the maximum PRF that allows detection of targets to a range of 50 km? (ignore any flyback time).

a. 330 pulses per second (pps)
b. 617 pps
c. 3000 pps
d. 1620 pps

233. In NAVSTAR/GPS the space segment:

a. provides the positional information to the receiver
b. the receiver interrogates the satellite and the satellite provides positional information
c. sends information for receiver to determine latitude, longitude and time
d. relays positional data from the control segment

234. The almanac in the receiver:

a. determines selective availability
b. assigns the PRN codes to the satellites
c. is used to determine receiver clock error
d. is used to determine which satellites are above the horizon

235. In a RNAV system the DME is tuned:

a. by what is selected on the pilots DME and hence is tuned manually
b. automatically by taking pilot's DME selection
c. by selecting DMEs to give suitable angle of cut to get a fix automatically
d. by automatically selecting the nearest suitable DME

236. Which input to the FMC is taken from sources external to the aircraft?

a. INS
b. Pressure altitude
c. Magnetic heading from a direct reading compass
d. VOR/DME

237. In NAVSTAR/GPS range measurement is achieved by measuring:

a. the time difference between the minimum number of satellites
b. the time taken for the signal to travel from the satellite to the receiver
c. the synchronization of the satellite and receiver clocks
d. the time taken for a signal to travel from the receiver to the satellite and return to the receiver

238. Quadrantal error in the ADF is caused by:

a. the metallic structure of the aircraft
b. generative voltages caused by the rotation of the engines
c. the electrical wiring running through the aircraft
d. multipath reception

239. For the FMC the take-off speeds, V_1, V_R and V_2 are found:

a. in the operating manual and input to the FMC
b. in the performance database
c. in the checklist and input manually
d. in the navigation database

240. The optimum climb and descent speeds used by the FMC are found:

a. in the operating manual and input to the FMC
b. in the performance database
c. in the checklist and input manually
d. in the navigation database

241. The optimum cruise speeds used by the FMC are found:

a. in the operating manual and input to the FMC
b. in the performance database
c. in the checklist and input manually
d. in the navigation database

242. Which of the following external inputs is required by the FMC to determine W/V?

a. Magnetic heading
b. Mach No.
c. TAS
d. Track and ground speed

243. Which of the following is true concerning the use of GNSS position in the FMC?

a. It is used to verify and update the IRS position
b. An alternate source of position must be used and displayed
c. GNSS position is usable stand alone
d. GNSS data may only be used in the absence of other positional information

Answers

1	2	3	4	5	6	7	8	9	10	11	12
d	a	c	a	d	c	b	c	a	b	c	c

13	14	15	16	17	18	19	20	21	22	23	24
c	a	c	d	d	b	a	c	c	b	d	c

25	26	27	28	29	30	31	32	33	34	35	36
b	a	c	a	b	d	b	c	b	a	a	c

37	38	39	40	41	42	43	44	45	46	47	48
a	d	b	c	a	a	a	c	b	c	c	a

49	50	51	52	53	54	55	56	57	58	59	60
c	a	a	c	b	c	b	a	d	c	b	a

61	62	63	64	65	66	67	68	69	70	71	72
c	d	b	a	c	c	a	b	c	c	c	c

73	74	75	76	77	78	79	80	81	82	83	84
c	b	a	a	c	b	d	a	c	b	a	b

85	86	87	88	89	90	91	92	93	94	95	96
a	d	b	d	b	c	a	b	a	c	b	b

97	98	99	100	101	102	103	104	105	106	107	108
d	a	a	a	c	c	c	c	b	b	c	d

109	110	111	112	113	114	115	116	117	118	119	120
d	b	c	c	c	c	a	b	b	b	b	b

121	122	123	124	125	126	127	128	129	130	131	132
d	d	b	b	a	b	a	c	c	a	b	c

133	134	135	136	137	138	139	140	141	142	143	144
b	a	b	a	a	b	b	d	b	c	b	a

145	146	147	148	149	150	151	152	153	154	155	156
b	b	c	c	a	a	c	d	a	b	a	b

157	158	159	160	161	162	163	164	165	166	167	168
b	c	b	a	a	c	b	b	c	a	c	b

169	170	171	172	173	174	175	176	177	178	179	180
b	b	b	c	c	c	c	a	b	c	b	a

181	182	183	184	185	186	187	188	189	190	191	192
a	d	a	c	b	d	c	b	a	a	a	c

193	194	195	196	197	198	199	200	201	202	203	204
c	c	d	d	c	c	b	b	b	c	a	a

205	206	207	208	209	210	211	212	213	214	215	216
c	d	b	c	a	a	b	c	d	d	c	c

217	218	219	220	221	222	223	224	225	226	227	228
b	d	c	d	d	b	a	c	d	b	b	c

229	230	231	232	233	234	235	236	237	238	239	240
d	c	b	c	a	d	c	d	b	c	b	b

241	242	243
b	c	b

Specimen Examination Paper

1. Which wavelength corresponds to a frequency of 5035 MHz?

a. 5.96 mm
b. 5.96 cm
c. 59.6 cm
d. 5.96 m

2. The VDF term meaning 'true bearing from the station' is:

a. QDM
b. QDR
c. QTE
d. QUJ

3. A class B VDF bearing will have an accuracy of:

a. ± 2°
b. ± 10°
c. ± 1°
d. ± 5°

4. An error applicable to VDF would be:

a. synchronous transmission
b. scalloping
c. selective availability
d. garbling

5. The maximum range an ATC facility at 1369 ft AMSL can provide a service to an aircraft at FL350 is:

a. 276 NM
b. 200 NM
c. 224 NM
d. 238 NM

6. The Doppler effect is:

a. the change in frequency caused by the movement of a transmitter and receiver
b. the change in frequency caused by the movement of a receiver
c. the change in frequency caused by the movement of a transmitter
d. the change in frequency caused by the relative movement between a transmitter and receiver

7. The least accurate bearing information taken by an aircraft over the sea from a NDB will be from:

a. a coastal beacon at an acute angle
b. an inland beacon at an acute angle
c. a coastal beacon perpendicular to the coast
d. an inland beacon perpendicular to the coast

8. The accuracy of ADF may be affected by:

a. night effect, tropospheric propagation, quadrantal error
b. static interference, siting errors, slant range
c. angle of bank, mountain effect, station interference
d. angle of bank, static from Cb, siting errors

9. The ADF error which will cause the needle to 'hunt' (i.e. oscillate around the correct bearing) is:

a. night effect
b. Cb static
c. station interference
d. coastal refraction

10. The accuracy of ADF by day and excluding compass error is:

a. +/-1°
b. +/-2°
c. +/-5°
d. +/-10°

11. A NDB has emission designator N0NA1A this will require the use of the BFO for:

a. tuning
b. identification
c. identification and monitoring
d. tuning, identification and monitoring

12. The principle of operation of VOR is:

a. bearing by lobe comparison
b. bearing by frequency comparison
c. bearing by searchlight principle
d. bearing by phase comparison

13. The pilot of an aircraft flying at FL240 is 250 NM from a VOR at 16 ft AMSL which he selects. He receives no signal from the VOR. This is because:

a. the VOR is unserviceable
b. the range of VOR is limited to 200 NM
c. the aircraft is beyond line of sight range
d. there are abnormal atmospheric conditions

14. The phase difference measured at the aircraft from a VOR is 235°. The bearing of the beacon from the aircraft is:

a. 055°
b. 235°
c. 145°
d. 325°

15. A pilot intends to home to a VOR on the 147 radial. The setting he should put on the OBS and the CDI indications will be:

a. 147, TO
b. 147, FROM
c. 327, FROM
d. 327, TO

16. An aircraft is 100 NM SW of a VOR heading 080°. The pilot intends to home to the VOR on the 210 radial. The setting he should put on the OBS is ..... and the CDI indications will be:

a. 030, TO, Fly Right
b. 030, TO, Fly Left
c. 210, FROM Fly Right
d. 210, FROM, Fly Left

17. Flying an ILS approach the equipment senses that the 90 Hz modulation predominates on both the localizer and the glide path. The indications the pilot will see are:

a. fly left and fly up
b. fly left and fly down
c. fly right and fly up
d. fly right and fly down

18. On an ILS approach, using a 3° glide path, the height of an aircraft, ground speed 160 kt, at 3.5 NM from touchdown should be:

a. 800 ft
b. 1050 ft
c. 900 ft
d. 1500 ft

19. A category II ILS facility is required to provide guidance to:

a. below 50 ft
b. below 200 ft
c. the surface
d. below 100 ft

20. When flying downwind abeam the upwind end of the runway the indications from the ILS on the CDI will be:

a. in the correct sense for the localizer and no glide path signal
b. erratic on both localizer and glide path
c. erratic on the localizer and in the correct sense on the glide path
d. no localizer signal and in the correct sense for glide path

21. The azimuth coverage of a 3° glide path is:

a. +/-35° to 17 NM
b. +/-10° to 25 NM
c. +/-8° to 10 NM
d. +/-10° to 8 NM

22. The coverage of the approach azimuth and elevation of a MLS is:

a. +/-20° to 40 NM
b. +/-20° to 20 NM
c. +/-40° to 40 NM
d. +/-40° to 20 NM

23. A full MLS system comprises a DME and:

a. 4 elements multiplexing on 2 frequencies
b. 4 elements multiplexing on one frequency
c. 2 elements using 2 frequencies
d. 2 elements multiplexing on one frequency

24. MLS has 200 channels available in the frequency band:

a. 108 – 112 MHz
b. 329 – 335 MHz
c. 960 – 1215 MHz
d. 5031 – 5090 MHz

25. The type of radar which has no minimum range restriction is:

a. primary CW radar
b. primary pulsed radar
c. secondary CW radar
d. secondary pulsed radar

26. The maximum theoretical range of a radar is determined by:

a. power
b. PW
c. beamwidth
d. PRF

27. The time interval between the transmission of a pulse and receipt of the echo from a target is 925.5 microseconds. The range of the target is:

a. 37.5 NM
b. 75 NM
c. 150 NM
d. 300

28. An advantage of a slotted antenna (planar array) over a parabolic reflector are:

a. side lobes removed
b. 360° scan without any rotation requirement
c. less power required
d. higher data rate possible

29. The best resolution will be achieved on a radar display with:

a. high power output and large parabolic reflector
b. narrow beamwidth and narrow pulse width
c. low frequency and small parabolic reflector
d. wide beamwidth and large pulsewidth

30. A radar transmitting on 600 MHz has a PRF of 300 pps and an aerial rotation rate of 5 rpm. This radar will be:

a. an area surveillance radar
b. an aerodrome surface movement radar
c. an aerodrome surveillance radar
d. a terminal area radar

31. The AWR operating frequency is:

a. 9375 MHz
b. 9375 GHz
c. 937.5 MHz
d. 93.75 GHz

32. The AWR frequency is selected because it gives:

a. good returns from water droplets
b. good returns from turbulence
c. good penetration of cloud
d. good returns from water vapour

33. On a colour AWR display, the heaviest precipitation will be displayed in:

a. amber
b. red
c. yellow
d. blue

34. The SSR code to select when the aircraft is being unlawfully interfered with is:

a. 7600
b. 7700
c. 7500
d. 7400

35. In SSR the ground station interrogates the aircraft on ..... MHz and receives replies from the aircraft on ..... MHz

a. 1030 1090
b. 1090 1030
c. 1030 1030
d. 1090 1090

36. The altitude read-out at the ground station from a mode C response will give the aircraft altitude within:

a. 300 ft
b. 100 ft
c. 500 ft
d. 50 ft

37. If the aircraft DME interrogates a ground transponder on a frequency of 1199 MHz, it will look for replies on:

a. 1262 MHz
b. 1030 MHz
c. 1090 MHz
d. 1136 MHz

38. A DME recognizes replies to its own interrogating pulses because:

a. each pulse pair has its own unique modulation which is replicated by the transponder
b. the PRF of the interrogating pulses is jittered
c. each aircraft has a different time interval within the pulses pairs which is replicated by the transponder
d. the transponder uses a selective reply system to respond to the aircraft interrogation pulses

39. The DME in an aircraft at FL630 measures a slant range of 16 NM from a ground station at 1225 ft AMSL. The plan range is:

a. 12.5 NM
b. 19 NM
c. 16 NM
d. 10.5 NM

40. If the identification of a VOR is FKL and the paired DME identification is FKZ, then:

a. the transmitters are co-located
b. the beacons are between 600 m and 6 NM apart
c. the transmitters are within 600 m
d. the transmitters are in excess of 6 NM apart

41. The NAVSTAR/GPS operational constellation comprises:

a. 21 satellites in 6 orbits
b. 24 satellites in 6 orbits
c. 24 satellites in 3 orbits
d. 30 satellites in 6 orbits

42. The model of the earth used for GPS is:

a. WGS90
b. PZ84
c. PZ90
d. WGS84

43. The major limitation in the use of GPS for precision approaches using wide area augmentation systems (WAAS) is:

a. lack of failure warning
b. the height difference between the ellipsoid and the earth
c. global coverage of WAAS is not available
d. degradation of range measurement because of ionospheric propagation errors

44. The number of SVs required to produce a 3D fix is:

a. 3
b. 4
c. 5
d. 6

45. EGNOS provides a WAAS by determining the errors in ..... and broadcasting these errors to receivers using .....

a. X, Y & Z coordinates geostationary satellites
b. X, Y & Z coordinates pseudolites
c. SV range geostationary satellites
d. SV range pseudolites

46. The principle error in GNSS is:

a. ionospheric propagation
b. GDOP
c. receiver clock error
d. SV ephemeris error

47. If the signal from an SV is lost during an aircraft manoeuvre:

a. the receiver will select another SV with no loss in accuracy
b. the receiver will go into a DR mode with no loss of accuracy
c. the receiver will compensate by using the last calculated altitude to maintain positional accuracy
d. the receiver position will degrade regardless of the action taken

48. The purpose of the PRN codes in NAVSTAR/GPS is to:

a. identify the satellites
b. synchronize the receiver clocks with the SV clocks
c. pass navigation and system data to the receiver
d. all of the above

49. If the receiver almanac becomes corrupted it will download the almanac from the constellation. This download will take:

a. 15 minutes
b. 2.5 minutes
c. 12.5 minutes
d. 25 minutes

50. The provision of RAIM requires a minimum of ..... SVs.

a. 3
b. 4
c. 5
d. 6

51. The best position on an aircraft for the GNSS aerial is:

a. in the cockpit as close as possible to the receiver
b. on the fuselage close to the centre of gravity
c. on the aircraft as far as possible from other aerials to reduce reflections
d. close to each wing tip to compensate for manoeuvre errors

52. The NAVSTAR/GPS constellation is inclined at ..... to the equator with an orbital period of .....

a. 55° 11 h 15 min
b. 65° 11 h 15 min
c. 65° 12 h
d. 55° 12 h

53. The NAVSTAR/GPS frequency available to non-authorized users is:

a. 1227.6 MHz
b. 1575.42 MHz
c. 1215.0 MHz
d. 1090.0 MHz

54. The NAV and system data message is contained in the ..... signal.

a. 50 Hz
b. C/A PRN code
c. P PRN code
d. C/A & P PRN code

55. A 2D RNAV system takes fixing inputs from:

a. co-located VOR/DME
b. twin DME
c. VOR and/or DME
d. any of the above

56. The accuracy required of a basic RNAV system is:

a. 5 NM
b. 5°
c. 1 NM
d. 1°

57. An aircraft using a 2D RNAV system is 23 NM from the waypoint on a 50 NM leg. The waypoint is 45 NM from the VOR/DME and the aircraft is 37 NM from the VOR/DME. The range indicated to the pilot will be:

a. 23 NM
b. 27 NM
c. 37 NM
d. 45 NM

58. The navigation database in an FMC:

a. can be modified by the flight crew to meet the route requirements
b. can be modified every 28 days
c. can only be read by the flight crew
d. cannot be accessed by the flight crew

59. The RNAV function of the FMC produces a position which:

a. combines the short term accuracy of the external reference with the long term accuracy of the IRS
b. produces a long term accuracy from the short term accuracy of the external reference and the IRS
c. produces a long term accuracy from the long term accuracy of the external reference and the IRS
d. combines the long term accuracy of the external reference with the short term accuracy of the IRS

60. The most accurate external reference position will be provided by:

a. VOR/DME
b. Twin DME
c. Twin VOR
d. Suitable combination of VOR and DME

61. Refer to Appendix A. Which diagram shows the MAP display?

a. A
b. C
c. D
d. F

62. Refer to Appendix A, diagram E. What is the track from BANTU to ZAPPO?

a. 360°(M)
b. 130°(M)
c. 360°(T)
d. 130°(T)

63. Refer to Appendix A, diagram A. What is the deviation from the required track?

a. 3 NM left
b. 3 NM right
c. 8° left
d. 8° right

64. Refer to appendix A, diagram F. What is the required track?

a. 165°
b. 173°
c. 157°
d. 130°

65. Refer to Appendix A, diagram C. What is the symbol designated DFC which is coloured cyan?

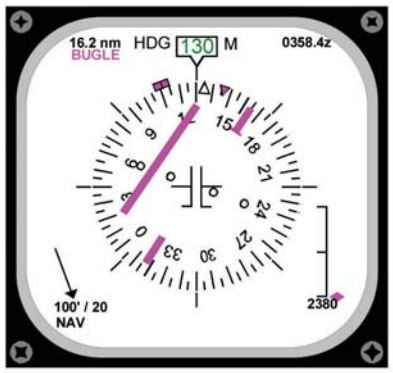
a. an in-use VORTAC
b. an available VORTAC
c. an in-use NDB
d. an available NDB

66 The FMC position is:

a. the selected IRS position updated by external reference using Kalman filtering
b. derived from IRS and external reference positions using the Kalman filtering process
c. derived from external reference position and monitored against the IRS position using the Kalman filtering process
d. the external reference position updated by IRS information through the Kalman filtering process

Appendix A

A



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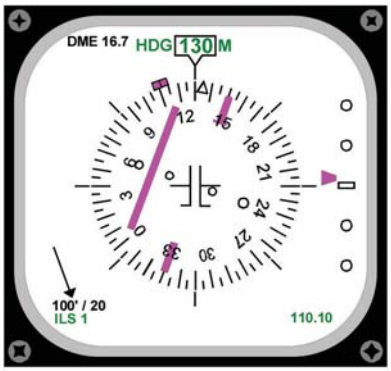

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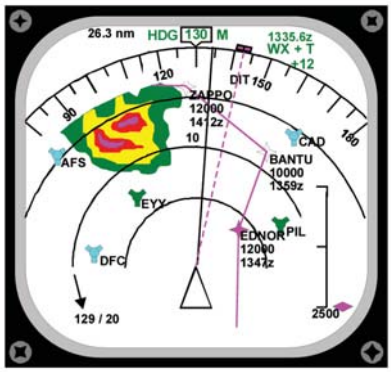
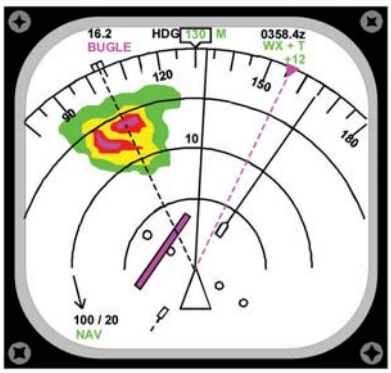
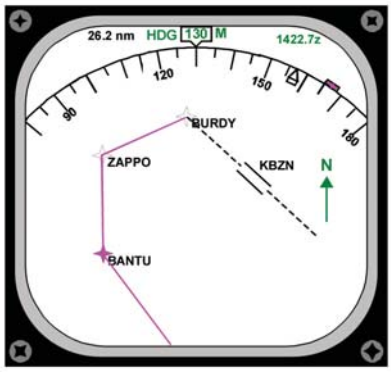


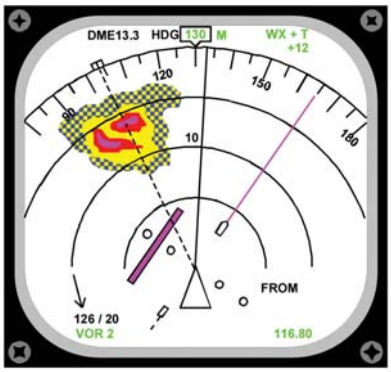
D



E



F



Answers to Specimen Examination Paper

1	2	3	4	5	6	7	8	9	10	11	12
b	c	d	a	a	d	b	c	a	c	d	d

13	14	15	16	17	18	19	20	21	22	23	24
c	a	d	a	d	b	a	b	c	d	b	d

25	26	27	28	29	30	31	32	33	34	35	36
a	d	b	c	b	a	a	a	b	c	a	d

37	38	39	40	41	42	43	44	45	46	47	48
d	b	a	b	b	d	b	b	c	a	d	a

49	50	51	52	53	54	55	56	57	58	59	60
c	c	b	d	b	a	a	a	a	c	d	b

61	62	63	64	65	66
b	c	b	a	b	b

Explanation of Selected Questions

Q1. Use $c = \frac{f}{\lambda}$

Q5. Line of sight formula: *Range* (*NM*) = $1.23\ (\sqrt{h_{TX}} + \sqrt{h_{RX}})$ (height in feet)

Q13. Line of sight formula again! Maximum range at which reception can be achieved is 195 NM.

Q14. The phase difference is the bearing of the aircraft from the beacon (radial).

Q15/16. Draw a diagram!

Q18. *Height = Glide path angle × range* × 100 *ft*

Q27. $Range = \frac{Time\ interval}{2 \times 6.17}\ NM$

Q36. The mode C increments in 100 ft steps.

Q37. 1262 MHz is outside the allocated band for DME.

Q39. Pythagoras!

Q54. The 50 Hz modulation passes the Nav and System Data message. The PRN codes provide a timing function and SV identification.

Q57. The range displayed is to the waypoint.

Q62. Remember the PLAN display is orientated to TRUE north.