62. RADIO NAVIGATION

62.01. RADIO AIDS

62.01.01. Ground D/F

1 id 1420 — What is the approximate maximum theoretical range at which an aircraft at FL130 could receive information from a VDF facility which is sited 1024 FT above MSL?

a **180 NM**

b 220 NM

c 120 NM

d 150 NM

---

2 id 1421 — The maximum theoretical range at which an aircraft at FL80 can obtain bearings from a ground VDF facility sited 325 FT above MSL is:

a 107 NM

b 158 NM

c **134 NM**

d 114 NM

---

3 id 3251 — What is the minimum level that an aircraft, at a range of 113 NM, must fly in order to contact the tower on R/T for a VDF bearing from an airport sited 169 FT above MSL?

a FL100

b FL50

c FL80

d **FL60**

---

4 id 4735 — What airborne equipment, if any, is required to be fitted in order that a VDF let-down may be flown?

a none

b VOR

c **VHF radio**

d VOR/DME

---

5 id 4736 — Which of the following is an advantage of Ground/DF (VDF) let-down?

a It is pilot interpreted and does not require the assistance of ATC

b **It only requires a VHF radio to be fitted to the aircraft**

c It does not require any special equipment to be fitted to the aircraft

d It does not require any special equipment, apart from a VHF radio, to be installed in the aircraft or on the ground

---

6 id 4737 — In which one of the following circumstances is ground direction finding (VDF) likely to be used to fix an aircraft's position?

a On first contact with ATC on crossing an international FIR boundary

b **When using the emergency VHF frequency 121.5 MHz**

c When contacting ATC to join controlled airspace from the open FIR

d When declaring an emergency on any frequency

7 id 7124 VDF for aeronautical use provides service in the frequency band

a 108 - 136 MHz

b **118 - 137 MHz**

c 130 300 MHz

d 108 - 118 MHz

8 id 7125 In the VDF system directional antennas are used

a In the aircraft

b In the aircraft and at the ground installation

c **At the ground installation**

d No directional antennas are used

9 id 7126 The indicator of the ground VDF equipment responds to

a **The carrier wave received**

b The identification transmitted from the aircraft

c The voice modulated signal transmitted by the aircraft

d The signal being reflected from the aircraft

10 id 7127 In VDF service the report "QDR 235, Class C" means

a The magnetic bearing from the aircraft to the station is 235° +/- 10°

b The true bearing from the aircraft to the station is 235 +/- 10°

c The magnetic bearing from the station to the aircraft is 235 +/- 15°

d **The magnetic bearing from the station to the aircraft is 235 +/-10°**

11 id 7128 If, when you are requesting a QDM from an airfield, you are offered a QGH, it means

a **The VDF unit is prepared to give you assistance during an approach to the airfield, based on VDF bearings**

b The VDF service will be handled by a different VDF unit, operating on the same frequency

c The bearing will only be accurate when the aircraft is flying above the QGH level

d The service will be limited to bearings, no positions will be given by the DF station

12 id 7129 Abnormal long ranges may be experienced on VDF channels, caused by

a Efficient VDF antennas

b **Super refraction of signals in the atmosphere**

c The VDF station using a relay station for communication to the aircraft

d Intermodulation with signals on frequencies close to the one used by the VDF station

62.01.02. ADF

13 id 1060 An RMI indicates aircraft heading. To convert the RMI bearings of NDBs and VORs to true bearings the correct combination for the application of magnetic variation is:

a NDB: aircraft position VOR: aircraft position

b NDB: beacon position VOR: beacon position

c NDB: beacon position VOR: aircraft position

d **NDB: aircraft position VOR: beacon position**

14 id 1422 A radio beacon has an operational range of 10 NM. By what factor should the transmitter power be increased in order to achieve an operational range of 20 NM?

a Eight

b Six

c **Four**

d Two

15 id 1423 'Night Effect' which causes loss of signal and fading, resulting in bearing errors from NDB transmissions, is due to:

a **skywave distortion of the null position and is maximum at dawn and dusk**

b interference from other transmissions and is maximum at dusk when east of the NDB

c static activity increasing at night particularly in the lower frequency band

d the effect of the Aurora Borealis

16 id 1424 Quadrantal errors associated with aircraft Automatic Direction Finding (ADF) equipment are caused by:

a misalignment of the loop aerial

b signal bending caused by electrical interference from aircraft wiring

c **signal bending by the aircraft metallic surfaces**

d skywave/groundwave contamination

17 id 1425 Errors caused by the effect of coastal refraction on bearings at lower altitudes are maximum when the NDB is:

a near the coast and the bearing crosses the coast at right angles

b **inland and the bearing crosses the coast at an acute angle**

c inland and the bearing crosses the coast at right angles

d near the coast and the bearing crosses the coast at an acute angle

18 id 2199 An aircraft is "homing" to a radio beacon whilst maintaining a relative bearing of zero. If the magnetic heading decreases, the aircraft is experiencing :

a **right drift**

b left drift

c zero drift

d a wind from the west

19 id 2200 Given : Compass heading 270° Deviation 2°W Variation 30°E Relative bearing 316° What is the QDR?

a 224°

b 226°

c 046°

d **044°**

20 id 2369 What is the wavelength of an NDB transmitting on 375 kHZ?

a 8 m

b 8000 m

c **800 m**

d 80 m

21 id 2371 Which of the following is likely to have the greatest effect on ADF accuracy?

a Interference from other NDBs, particularly during the day

b Frequency drift at the ground station

c **Interference from other NDBs, particularly at night**

d Mutual interference between aircraft aerials

22 id 2378 ADF bearings by an aeroplane by day within the published protection range should be accurate to within a maximum error of:

a +/-10°

b **+/-5°**

c +/-2.5°

d +/-2°

23 id 3055 There are two NDBs, one 20 NM inland, and the other 50 NM inland from the coast. Assuming that the error caused by coastal refraction is the same for both propagations, the extent of the error in a position line plotted by an aircraft that is over water will be:

a the same from both beacons when the aircraft is on a relative bearing of 180° and 360°

b **greater from the beacon that is 50 NM inland**

c greater from the beacon that is 20 NM inland

d the same from both beacons when the aircraft is on a relative bearing of 090° and 270°

24 id 3163 Which of the following is the ICAO allocated frequency band for ADF receivers?

a 255 - 455 kHz

b **200 - 1750 kHz**

c 300 - 3000 kHz

d 200 - 2000 kHz

25 id 3165 In order to obtain an ADF bearing the:

a **signal must be received by both the sense and loop aerials**

b sense aerial must be tuned separately

c mode selector should be switched to 'loop'

d BFO switch must be selected to 'ON'

26 id 3173 Factors liable to affect most NDB/ADF system performance and reliability include:

a height error - station interference - mountain effect

b static interference - station interference - latitude error

c **static interference - night effect - absence of failure warning system**

d coastal refraction - lane slip - mountain effect

27 id 3254 Which one of the following disturbances is most likely to cause the greatest inaccuracy in ADF bearings?

a Coastal effect

b **Local thunderstorm activity**

c Quadrantal error

d Precipitation interference

28 id 5598 The ADF reception loop is always used so that the electromotive force (EMF)

a **induced is zero**

b induced is maximum

c is zero

d is maximum

29 id 5788 The BFO selector on an ADF receiver is used to:

a find the loop 'null' position

b stop loop rotation

c hear the IDENT and must always be switched ON

d **hear the IDENT of some NDB stations radiating a continuous wave signal**

30 id 5789 An NDB transmits a signal pattern in the horizontal plane which is :

a a beam rotating at 30 Hz

b bi-lobal circular

c a cardioid balanced at 30 Hz

d **omnidirectional**

31 id 7130 Consider the following statements on the NDB transmitter:

a It is operating in the MF/HF band

b To overcome the limitations caused by "line of sight" propagation, high-power transmitters must be used

c In Europe, most NDBs operate in the frequency band 455 - 1750 kHz

d **It is very simple, being required to transmit only a carrier wave and an identification**

32 id 7131 A loop aerial, as used in the ADF, will

a Always rotate at constant speed before locking on to a signal from an NDB

b Will provide the most accurate bearing when it is aligned in the direction resulting in highest signal strength to the ADF receiver

c **Receive a minimum or null signal from a transmitter when the plane of the loop is at right angles to the direction of the transmitter**

d Receive a minimum or null signal from a transmitter when the plane of the loop is parallel to the direction of the transmitter

33 id 7132 The basic information given by the ADF is

a **The relative bearing from the aircraft to the NDB**

b The magnetic bearing from the aircraft to the NDB

c The true great circle track from the NDB to the aircraft

d The magnetic direction of the loop aerial with reference to the sense aerial

34 id 7133 The combination of the polar diagrams of the loop and the sense aerial results in

a **A cardoid polar diagram, having only one null or minimum**

b A figure-of-eight diagram in the vertical plane

c A pencil-beam polar diagram

d A polar diagram with many side-lobes

35 Some ADFs have a bandwidth control. Consider the following statements:
id 7134

a Broad or wide bandwidth should be selected when listening to any NDB for it's identification

b **Broad or wide bandwidth should be selected when listening to music or voice**

c Narrow bandwidth should be selected for listening to voice or music

d Broad or wide bandwidth should be used when static from CBs is experienced

36 Of the bearing indicators available for use on ADFs, the most sophisticated one is
id 7135

a The Relative Bearing Indicator

b **The Radio Magnetic Indicator**

c The Deviation Indicator

d The Manually Rotateable Card

37 Using an ADF indicator of the manually rotateable card type
id 7136

a Relative bearing is normally indicated under the pointer needle

b The aircraft heading may be marked on the indicator with a manually controlled "bug"

c May be combined with a VOR indicator

d **The card should be rotated so that the aircraft heading is at the top of the indicator**

38 The heading read on a standard RMI is
id 7137

a The magnetic heading

b The relative heading

c **The compass heading**

d The True heading

39 Homing on an NDB
id 7138

a Calls for an assessment of the drift

b Is most effective in strong winds

c **Will in most situations result in frequent heading changes when approaching the NDB**

d Will result in passing the NDB along the planned track

40 When using ADF, the sky-wave (night) effect
id 7139

a Is most dominant at the darkest time of the day

b Occurs when the signal from the desired NDB is interfered with by a long distant sky- wave signal from another NDB operating at the same or a close frequency

c Occurs when two sky-wave signals from two different NDBs interfere with each other

d **Is most dominant around dusk and dawn**

41 Flying in the vicinity of CB clouds and using ADF
id 7140

a The ANT position of the function switch should be used when listening for NDB ID

b Strong static emitted from the CB may cause the ADF needle to deflect towards the CB

c The static emitted from the CB will fade soon after you have passed it

d **All 3 answers are correct**

62.01.03. VOR and Doppler-VOR

42 id 780 — A VOR is sited at position A (45°00'N, 010°00'E). An aircraft is located at position B (44°00'N, 010°00'E). Assuming that the magnetic variation at A is 10°W and at B is 15°W, the aircraft is on VOR radial:

a 190°

b 195°

c 185°

d 180°

43 id 1061 — An aircraft is flying on the true track 090° towards a VOR station located near the equator where the magnetic variation is 15°E. The variation at the aircraft position is 8°E. The aircraft is on VOR radial:

a 255°

b 278°

c 262°

d 285°

44 id 1062 — Given: Magnetic heading 280° VOR radial 090° What bearing should be selected on the omni-bearing selector in order to centralise the VOR deviation needle with a "TO" indication?

a 100°

b 280°

c 270°

d 090°

45 id 1063 — A VOR is sited at position 58°00'N 073°00'W where the magnetic variation equals 32°W. An aircraft is located at position 56°00'N 073°00'W where the magnetic variation equals 28°W. The aircraft is on VOR radial:

a 360

b 208

c 212

d 180

46 id 1064 — In order to plot a bearing from a VOR station, a pilot needs to know the magnetic variation:

a at the VOR

b at the aircraft location

c at the half-way point between the aircraft and the station

d at both the VOR and aircraft

47 id 1426 — The principle used in VOR bearing measurement is:

a beat frequency discrimination

b envelope matching

c phase comparison

d difference in depth of modulation

48 id 1427 Which frequency band is used by VOR transmissions?

a SHF

b UHF

c **VHF**

d HF

49 id 1428 Transmissions from VOR facilities may be adversely affected by:

a static interference

b **uneven propagation over irregular ground surfaces**

c night effect

d quadrantal error

50 id 1429 If VOR bearing information is used beyond the published protection range, errors could be caused by:

a sky wave interference from the same transmitter

b noise from precipitation static exceeding the signal strength of the transmitter

c **interference from other transmitters**

d sky wave interference from distant transmitters on the same frequency

51 id 1430 An aircraft is 100 NM from a VOR facility. Assuming no error when using a deviation indicator where 1 dot = 2° deviation, how many dots deviation from the centre line of the instrument will represent the limits of the airway boundary? (Assume that the airway is 10 NM wide)

a 6.0

b 3.0

c 4.5

d **1.5**

52 id 1431 An airway 10 NM wide is to be defined by two VORs each having a resultant bearing accuracy of plus or minus 5.5°. In order to ensure accurate track guidance within the airway limits the maximum distance apart for the transmitter is approximately:

a 165 NM

b 50 NM

c **105 NM**

d 210 NM

53 id 1432 An aircraft is required to approach a VOR via the 104° radial. Which of the following settings should be made on the VOR/ILS deviation indicator?

a 284° with the FROM flag showing

b **284° with the TO flag showing**

c 104° with the TO flag showing

d 104° with the FROM flag showing

54 id 1433 An aircraft on a heading of 280°(M) is on a bearing of 090°(M) from a VOR. The bearing you should select on the OMNI bearing selector to centralise the VOR/ILS left/right deviation needle with a 'TO' indication is:

a 100°

b 090°

c **270°**

d 280°

55 id 1434 An aircraft is required to approach a VOR station via the 244° radial. In order to obtain correct sense indications the deviation indicator should be set to:

a 064° with the FROM flag showing

b **064° with the TO flag showing**

c 244° with the FROM flag showing

d 244° with the TO flag showing

56 id 1435 What is the maximum theoretical range that an aircraft at FL150 can receive signals from a VOR situated 609 feet above MSL?

a 156 NM

b 220 NM

c 147 NM

d **184 NM**

57 id 1992 An RMI slaved to a remote indicating compass has gone unserviceable and is locked on to a reading of 090°. The tail of the VOR pointer shows 135°. The available information from the VOR is:

a Radial 315°, relative bearing unknown

b Radial unknown, relative bearing 225°

c Radial unknown, relative bearing 045°

d **Radial 135°, relative bearing unknown**

58 id 2198 The VOR system is limited to about 1° of accuracy. One degree at 200 NM represents a width of:

a 2.0 NM

b **3.5 NM**

c 2.5 NM

d 3.0 NM

59 id 2367 In which frequency band do VOR transmitters operate?

a UHF

b **VHF**

c SHF

d EHF

60 id 2374 The two signals transmitted by a conventional VOR ground station are 90° out of phase on magnetic:

a west

b south

c **east**

d north

61 id 2376 An aircraft is flying on a heading of 270°(M). The VOR OBS is also set to 270° with the full left deflection and FROM flag displayed. In which sector is the aircraft from the VOR ground station?

a SE

b SW

c **NW**

d NE

62 id 2377 An Omni-bearing selector (OBS) shows full deflection to the left when within range of a serviceable VOR. What angular deviation are you from the selected radial?

a less than 10°

b **10° or more**

c 1.5° or more

d 2.5 or more

63 id 2635 Which of the following statements concerning the variable, or directional, signal of a conventional VOR is correct?

a The transmitter varies the amplitude of the variable signal by 30 Hz each time it rotates

b **The rotation of the variable signal at a rate of 30 times per second gives it the characteristics of a 30 Hz amplitude modulation**

c The transmitter changes the frequency of the variable signal by 30 Hz either side of the allocated frequency each time it rotates

d The receiver adds 30 Hz to the variable signal before combining it with the reference signal

64 id 2638 The maximum theoretical range at which an aircraft at FL230 may receive signals from a VOR facility sited at mean sea level is:

a 230 NM

b **190 NM**

c 170 NM

d 151 NM

65 id 3179 The maximum theoretical range at which an aircraft at FL210 may receive signals from a VOR facility sited 340 feet above mean sea level is approximately:

a 163 NM

b 245 NM

c **204 NM**

d 183 NM

66 id 3248 If an aircraft flies along a VOR radial it will follow a:

a rhumbline track

b **great circle track**

c line of constant bearing

d constant magnetic track

67 id 3249 An aircraft at 6400 FT will be able to receive a VOR groundstation at 100 FT above MSL at an approximate maximum range of :

a 90 NM

b **110 NM**

c 100 NM

d 120 NM

68 id 3250 An aircraft at FL 100 should be able to receive a VOR groundstation at 100 FT above MSL at an approximate maximum range of :

a 135 NM

b 123 NM

c 130 NM

d 142 NM

69 id 3252 An aircraft is on radial 120 with a magnetic heading of 300°, the track selector (OBS) reads : 330. The indications on the Course Deviation Indicator (CDI) are 'fly':

a left with 'FROM' showing

b right with 'TO' showing

c right with 'FROM' showing

d left with 'TO' showing

70 id 3255 Given: Course Deviation Indicator (CDI) for a VOR is selected to 090°. From/To indicator indicates "TO". CDI needle is deflected halfway to the right. On what radial is the aircraft?

a 085

b 275

c 265

d 095

71 id 3258 The frequency range of a VOR receiver is :

a 108 to 117.95 MHz

b 108 to 111.95 MHz

c 118 to 135.95 MHz

d 108 to 135.95 MHz

72 id 3259 If the reference phase differs 30° with the variable phase the radial from the VOR station will be :

a 030°

b 330°

c 210°

d 150°

73 id 5564 Given: VOR station position N61° E025°, variation 13°E; Estimated position of an aircraft N59° E025°, variation 20°E. What VOR radial is the aircraft on?

a 167°

b 347°

c 160°

d 193°

74 id 5787 The captain of an aircraft flying at FL100 wishes to obtain weather information at the destination airfield from the airfield's VOR. At what maximum theoretical range will it be possible to obtain this information?

a 1230 km

b 123 km

c 12.3 NM

d 123 NM

75 id 5798 Given: Aircraft heading 160°(M), Aircraft is on radial 240° from a VOR, Selected course on HSI is 250°. The HSI indications are deviation bar:

a ahead of the aeroplane symbol with the TO flag showing

b behind the aeroplane symbol with the TO flag showing

c ahead of the aeroplane symbol with the FROM flag showing

d **behind the aeroplane symbol with the FROM flag showing**

76 id 7141 The information carried by a signal emitted from a VOR is

a The direction from the aircraft to the VOR and the identification of the VOR

b The accurate timing signal and the station identifier

c The Magnetic North reference signal and the identification signal for the correct direction to the aircraft

d **In what magnetic direction the signal left the VOR antenna, and the identification of the station**

77 id 7142 The antenna polar diagram of a conventional VOR

a Is always directed towards the aircraft

b Is like a figure of 8

c Is a pencil beam

d **Rotates at 30 revolutions per second**

78 id 7143 The reference and the variable modulation signals from a VOR

a **Are both at 30 Hz, one frequency modulated and the other amplitude modulated**

b Are both pulse modulated, at 30 Hz

c Are AM and FM, at 9960 Hz

d Always have a frequency difference of 30 Hz

79 id 7144 The TO/FROM indicator of a VOR

a Tells whether you are now flying towards or from the VOR

b **Tells whether a track equal to the selected bearing will bring you to or away from the VOR**

c Tells whether the deviation indicator shows that you should manoeuvre the aircraft towards or from the CDI needle

d Tells whether you should turn the aircraft towards or away from the CDI indication

80 id 7145 OBS 123, TO/FROM showing TO, CDI is indicating 4 dots right on a 5-dot indicator. On what radial is your position?

a Radial 295

b Radial 131

c **Radial 311**

d Radial 115

81 id 7146 In order to establish what radial you are on, you could

a Read the OBS when the CDI is centred and the TO/FROM is showing TO

b **Rotate the OBS until the CDI gets centred and the TO/FROM indicator is showing FROM. Then read the radial on the OBS**

c Turn the OBS to make the TO/FROM change from TO to FROM. The OBS is now indicating the radial you are on

d Turn the aircraft until the CDI is centred. The aircraft magnetic heading is now the reciprocal of the radial you are on

82 id 7147 When the warning flag on a VOR indicator appears, it may indicate

a That no signal is received

b That the received signal is too week to be processed in the receiver

c That the quality of the received signal is so poor that a stable establishment of phase difference between the reference and the variable signal is not possible

d **All 3 answers are correct**

83 id 7148 On an HSI (Horizontal Situation Indicator) used in combination with a VOR receiver

a **A pictorial presentation of aircraft deviation relative to VOR radials is provided**

b The lubber line will indicate the reciprocal value of the received radial

c The lubber line will indicate the selected radial

d There will be no Omni Bearing Selector knob, as this function is automatic on this type of indicator

84 id 7149 When using an RMI as an indicator for the VOR receiver

a You will read the drift as the angle between the OBS bug and the tip of the VOR needle

b **You will read the number of the received radial under the tail of the VOR needle**

c The TO/FROM indication on the RMI will indicate which way to turn the aircraft in order to fly towards the VOR station being received

d You will read the number of the received radial under the tip of the VOR needle

85 id 7150 If the compass providing information to the RMI suddenly gets a 20° deviation

a The relative bearing to the VOR, as observed on the RMI, will jump 20°

b The number of the received radial may still be read on the compass card under the tail of the VOR needle

c The magnetic track to the VOR station may be read on the compass card under the tip of the VOR needle

d **All 3 answers are correct**

86 id 7151 When a maximum range and altitude is published for a VOR

a The signal from the VOR will be too weak to provide information when you are outside this airspace

b The terrain will cause bends and/or scalloping on the VOR signal and make it inaccurate outside standards in the airspace outside the published airspace

c **The reception from this VOR is guaranteed free from harmful interference from other VORs when you are within this airspace**

d You are guaranteed to receive no interference to the VOR signal from other radio transmissions as long as you are within the air space published

62.01.04. DME

87 id 790 — A DME station is located 1000 feet above MSL. An aircraft flying at FL 370, 15 NM away from the DME station, will have a DME reading of:

a 15 NM

b 14 NM

c **16 NM**

d 17 NM

---

88 id 799 — Which of the following will give the most accurate calculation of aircraft ground speed?

a An ADF sited on the flight route

b **A DME station sited on the flight route**

c A VOR station sited on the flight route

d A DME station sited across the flight route

---

89 id 1065 — An aircraft DME receiver does not lock on to its own transmissions reflected from the ground because:

a the pulse recurrence rates are varied

b DME transmits twin pulses

c **they are not on the receiver frequency**

d DME uses the UHF band

---

90 id 1066 — The DME (Distance Measuring Equipment) operates within the following frequencies:

a **962 to 1213 MHz**

b 108 to 118 MHz

c 329 to 335 MHz

d 962 to 1213 kHz.

---

91 id 1067 — A DME is located at MSL. An aircraft passing vertically above the station at flight level FL 360 will obtain a DME range of approximately:

a 11 NM

b 7 NM

c **6 NM**

d 8 NM

---

92 id 1068 — During a flight at FL 210, a pilot does not receive any DME distance indication from a DME station located approximately 220 NM away. The reason for this is that the:

a **aeroplane is below the 'line of sight' altitude**

b aeroplane is circling around the station

c altitude is too high

d range of a DME system is always less than 200 NM

---

93 id 1436 — A typical frequency employed in Distance Measuring Equipment (DME) is:

a 10 MHz

b **1000 MHz**

c 100 MHz

d 100 GHz

94 id 1437 Distance Measuring Equipment (DME) operates in the:

a UHF band and is a primary radar system

b VHF band and uses the principle of phase comparison

c **UHF band and is a secondary radar system**

d SHF band and uses frequency modulation techniques

95 id 1438 For a conventional DME facility 'Beacon Saturation' will occur whenever the number of simultaneous interrogations exceeds:

a 80

b 200

c 60

d **100**

96 id 1439 On a DME, display counters rotating throughout their range indicates:

a ground equipment failure

b airborne equipment failure

c **the airborne receiver is conducting a range search**

d the airborne equipment is conducting a frequency search

97 id 1440 The aircraft DME receiver is able to accept replies to its own transmissions and reject replies to other aircraft interrogations because:

a transmission frequencies are 63 MHz different for each aircraft

b pulse pairs are amplitude modulated with the aircraft registration

c aircraft interrogation signals and transponder responses are 63 MHz removed from each other

d **pulse pairs are discreet to a particular aircraft**

98 id 1441 The aircraft DME receiver cannot lock on to interrogation signals reflected from the ground because:

a **aircraft transmitter and DME ground station are transmitting on different frequencies**

b reflections are subject to doppler frequency shift

c DME transmits twin pulses

d DME pulse recurrence rates are varied

99 id 1442 In which situation will speed indications on an airborne Distance Measuring Equipment (DME) most closely represent the groundspeed of an aircraft flying at FL400?

a When passing abeam the station and within 5 NM of it

b **When tracking directly towards the station at a range of 100 NM or more**

c When overhead the station, with no change of heading at transit

d When tracking directly away from the station at a range of 10 NM

100 id 1443 The time taken for the transmission of an interrogation pulse by a Distance Measuring Equipment (DME) to travel to the ground transponder and return to the airborne receiver was 2000 micro-second. The slant range from the ground transponder was:

a **165 NM**

b 186 NM

c 296 NM

d 330 NM

101 id 3175 What is the maximum distance between VOR and DME/TACAN ground installations if they are to have the same morse code identifier?

a 60 m

b 2000 m

c **600 m**

d 300 m

102 id 3253 A DME in tracking mode subsequently experiences a reduction in signal strength will switch the equipment in the first instance to:

a standby mode

b search mode

c **memory mode**

d signal controlled search

103 id 3256 Of what use, if any, is a military TACAN station to civil aviation ?

a It can provide a DME distance and magnetic bearing

b It is of no use to civil aviation

c **It can provide DME distance**

d It can provide a magnetic bearing

104 id 3257 A DME that has difficulty obtaining a "lock-on": (NOTE: PRF = pulse recurrence frequency, PPS = pulses per second)

a alternates search mode with periods of memory mode lasting 10 seconds

b stays in search mode without a reduction in PRF

c stays in search mode but reduces PRF to max. 60 PPS after 100 seconds

d **stays in search mode but reduces PRF to max. 60 PPS after 15000 pulse pairs have been transmitted**

105 id 5790 DME channels utilise frequencies of approximately:

a 110 MHz

b 300 MHz

c **1000 MHz**

d 600 MHz

106 id 5791 A VOR and DME are co-located. You want to identify the DME by listening to the callsign. Having heard the same callsign 4 times in 30 seconds the:

a VOR and DME callsigns were the same and broadcast with the same pitch

b DME callsign was not transmitted, the distance information is sufficient proof of correct operation

c DME callsign is the one with the lower pitch that was broadcast several times

d **DME callsign is the one with the higher pitch that was broadcast only once**

107 id 7154 In the DME system

a The aircraft equipment is called a transponder

b **The receive and the transmit frequency is always split by 63 MHz**

c The operation is similar to a primary radar system

d The channels are referred to as "X" channels paired with VORs and "Y" channels paired with ILS localizers

108 id 7155 | The reason for using different frequencies for transmitting and receiving in the DME system

a Is to avoid the reception in the aircraft of signals referring to other aircraft

b **Is to prevent self-triggering of the receiving equipment by the transmitter**

c Is to prevent overload of the system

d Is to permit more channels in the system

109 id 7156 | The airborne DME equipment will transmit pulse pairs at a comparatively high PRF

a At all times, except when the panel control "LO" is operated

b When the distance presented is above 50 NM

c Whenever a stable signal is being received from the selected ground station

d **When first switched on and after a channel selection**

110 id 7157 | In the DME system, responses in the aircraft equipment to answers to other aircraft is prevented

a By using a directional aerial in the aircraft

b By carefully selecting the correct channel

c **By an irregular change in pulse-pair PRF in every aircraft installation, and by making the receiver sensitive for reception only in a short period of time of around the anticipated time of arrival of the answer from the ground station**

d By using the "search mode" at frequent intervals

111 id 7158 | System, or beacon, saturation of the DME system

a Occurs when the aircraft DME set has been in operation for an extended period of time, without being put into the STANDBY mode

b Occurs when many aircraft, being at a long distance from the DME, are demanding a reply

c **May occur when more than 100 aircraft are demanding replies from a single ground station**

d All 3 answers are correct

112 id 7159 | When VOR and DME stations are associated

a Their IDs will in all respects be identical

b Their aerials will be mounted on top of each other

c Their signals must be tuned in by VOR and DME sets in the aircraft having common frequency control

d **They may be separated by as much as 600 metres if they are meant for en-route navigation**

113 id 7160 | If a VOR station and a DME station, having different locations, are selected to provide a fix

a Two sets, with separate frequency control, are required in the aircraft

b Two positions, being ambiguous, will be presented

c Two different IDs will have to be checked

d **All 3 answers above are correct**

114 id 7161 Consider the following statements on horizontal/slant distance when using DME:

a The difference between the two is automatically compensated for in all DME equipment

b **The difference between the two distances will be negligible for en-route navigation when the indicated distance in NM is more than the height of the aircraft above the DME site, stated in thousands of feet**

c The horizontal distance is always slightly longer than the slant distance

d The operator in the aircraft should always make a mental increase to the indicated range, in order to compensate for the difference between horizontal and slant distance

115 id 7162 Using modern DME equipment meant for general navigation use, the accuracy expected is

a **+/- 0,2 NM or 0,25% of the slant range, whichever is greater**

b +/- 0,5 NM or 0,25% of the slant range, whichever is greater

c +/- 0,5 NM or 3,0% of the slant range, whichever is greater

d +/- 0,2 NM or 3,0% of the slant range, whichever is greater

116 id 7163 What is the slant range error for an aircraft flying at 9000 feet absolute altitude above a DME located at elevation 2000 ft, when the slant range is 12 NM?

a 0,31 NM

b 1,42 NM

c 0,57 NM

d **0,09 NM**

62.01.05. ILS

117 id 1059 The amplitude modulation and the colour of an outer marker (OM) is:

a **400 Hz, blue**

b 3000 Hz, blue

c 1300 Hz, blue

d 400 Hz, amber

118 id 1069 What is the approximate angular coverage of reliable navigation information for a 3° ILS glide path out to a distance of 10 NM?

a 0.45° above the horizontal to 1.75° above the glide path and 8° each side of the localiser centreline

b **1.35° above the horizontal to 5.25° above the horizontal and 8° each side of the localiser centreline**

c 0.7° above and below the glide path and 2.5° each side of the localiser centreline

d 3° above and below the glide path and 10° each side of the localiser centreline

119 id 1070 ILS is subject to false glide paths resulting from:

a back-scattering of antennas

b spurious signals reflected by nearby obstacles

c **multiple lobes of radiation patterns in the vertical plane**

d ground returns ahead of the antennas

120 id 1444 A Category 1 Instrument Landing System (ILS) ground installation provides accurate guidance from coverage limit down to:

a 50 feet above ILS reference point

b **200 feet above the runway threshold**

c runway surface

d 200 feet above the inner marker

121 id 1445 The reason why pre take-off holding areas are sometimes further from the active runway when ILS Category 2 and 3 landing procedures are in progress than during good weather operations is:

a heavy precipitation may disturb guidance signals

b **aircraft manoeuvring near the runway may disturb guidance signals**

c to increase distance from the runway during offset approach operations

d to increase aircraft separation in very reduced visibility conditions

122 id 1446 An aircraft tracking to intercept the Instrument Landing System (ILS) localiser inbound on the approach side, outside the published ILS coverage angle:

a will receive signals without identification coding

b **will not normally receive signals**

c may receive false course indications

d can expect signals to give correct indications

123 id 1447 The MIDDLE MARKER of an Instrument Landing System (ILS) facility is identified audibly and visually by a series of:

a **alternate dots and dashes and an amber light flashing**

b two dashes per second and a blue light flashing

c dots and a white light flashing

d dashes and an amber light flashing

124 id 1448 The OUTER MARKER of an Instrument Landing System (ILS) facility transmits on a frequency of:

a 300 MHz and is modulated by morse at two dashes per second

b 200 MHz and is modulated by alternate dot/dash in morse

c 75 MHz and is modulated by alternate dot/dash in morse

d **75 MHz and is modulated by morse at two dashes per second**

125 id 1449 What approximate rate of descent is required in order to maintain a 3° glide path at a groundspeed of 120 kt?

a 550 FT/MIN

b **600 FT/MIN**

c 800 FT/MIN

d 950 FT/MIN

126 id 1450 The outer marker of an ILS with a 3° glide slope is located 4.6 NM from the threshold. Assuming a glide slope height of 50 FT above the threshold, the approximate height of an aircraft passing the outer marker is:

a 1350 FT

b 1400 FT

c **1450 FT**

d 1300 FT

127 id 2370 In which frequency band does an ILS glide slope transmit?

a VHF

b **UHF**

c SHF

d EHF

128 id 2372 Assuming a five dot display, what does each of the dots on either side of the ILS localizer cockpit display represent :

a 2.0 degrees

b 1.5 degrees

c 2.5 degrees

d **0.5 degrees**

129 id 2373 Outer marker transmits on 75 MHz and has an aural frequency of:

a 1300 Hz

b **400 Hz**

c 2000 Hz

d 3000 Hz

130 id 2622 What is the colour sequence when passing over an Outer, Middle and Inner Marker beacon?

a white - amber - blue

b amber - white - green

c **blue - amber - white**

d blue - green - white

131 id 3051 The principle of operation of an ILS localiser transmitter is based on two overlapping lobes that are transmitted on (i)..... frequencies and carry different (ii).....

a (i) the same (ii) phases

b **(i) the same (ii) modulation frequencies**

c (i) different (ii) modulation frequencies

d (i) different (ii) phases

132 id 3053 Where, in relation to the runway, is the ILS localiser transmitting aerial normally situated?

a **On the non-approach end of the runway about 300 m from the runway on the extended centreline**

b At the approach end of the runway about 300 m from touchdown on the centreline

c At the non-approach end about 150 m to one side of the runway and 300 m along the extended centreline

d At the approach end about 150 m to one side of the runway and 300 m from touchdown

133 id 3166 Every 10 kt decrease in groundspeed, on a 3° ILS glidepath, will require an approximate:

a increase in the aircraft's rate of descent of 50 FT/MIN

b **decrease in the aircraft's rate of descent of 50 FT/MIN**

c decrease in the aircraft's rate of descent of 100 FT/MIN

d increase in the aircraft's rate of descent of 100 FT/MIN

134 id 3170 Instrument Landing Systems (ILS) Glide Paths provide azimuth coverage (i) .....° each side of the localiser centre-line to a distance of (ii) ..... NM from the threshold.

a (i) 8 (ii) 10

b (i) 25 (ii) 17

c (i) 35 (ii) 25

d (i) 5 (ii) 8

135 id 3171 The rate of descent required to maintain a 3.25° glide slope at a groundspeed of 140 kt is approximately:

a 850 FT/MIN

b 800 FT/MIN

c 670 FT/MIN

d 700 FT/MIN

136 id 3180 An aircraft carrying out an ILS approach is receiving more 90 Hz than 150 Hz modulation notes from both the localiser and glidepath transmitters. The ILS indication will show:

a Fly right and fly down

b Fly left and fly down

c Fly right and fly up

d Fly left and fly up

137 id 3181 An aircraft carrying out a 3° glidepath ILS approach experiences a reduction in groundspeed from 150 kt at the outer marker to 120 kt over the threshold. The effect of this change in groundspeed on the aircraft's rate of descent will be a decrease of approximately:

a 150 FT/MIN

b 250 FT/MIN

c 50 FT/MIN

d 100 FT/MIN

138 id 3260 A Cat III ILS glidepath transmitter provides reliable guidance information down to:

a the surface of the runway

b a maximum height of 200 ft above the runway

c a maximum height of 100 ft above the runway

d a maximum height of 50 ft above the runway

139 id 3261 Which of the following is an ILS localiser frequency?

a 112.10 MHz

b 108.25 MHz

c 110.20 MHz

d 109.15 MHz

140 id 3331 What approximate rate of descent is required in order to maintain a 3° glidepath at a groundspeed of 90 kt?

a 450 FT/MIN

b 400 FT/MIN

c 600 FT/MIN

d 700 FT/MIN

141 id 5792 The heading rose of an HSI is frozen on 200°. Lined up on the ILS of runway 25, the localizer needle will be:

a right of centre

b left of centre

c **centred**

d centred with the 'fail' flag showing

142 id 7164 Consider the following statements on ILS:

a An ILS-approach may be flown if the localizer, glide path and marker beacons/DME are operational

b If the localizer is out of service, an ILS approach with increased decision height (DH) may be carried out

c **ILS is the primary precision approach facility for civil aviation**

d When the pilot is reaching the decision height (DH) he may only continue the approach if both localizer and glidepath indications are within one dot from the centre positions

143 id 7165 The function of a locator beacon in an ILS procedure

a Is to give steering information to guide the pilot during the final section of the ILS approach

b Is to locate the airfield position

c Is to provide the pilot, flying the localizer course, with a check that he is on the localizer centre line

d **Is to provide a navigation aid that will clearly indicate that the aircraft is within the coverage of the ILS localizer and glide path**

144 id 7166 Which of the following frequencies are used by ILS?

a 109,35 MHz

b 111,10 MHz

c 108,45 MHz

d **a and b above**

145 id 7167 At a distance of 20 NM from the localizer transmitter, the horizontal extent of the localizer coverage is

a +/- 10 NM wide

b 10 NM wide

c **+/- 10° from the runway extended centre line**

d +/- 2,5°

146 id 7168 The ILS glidepath transmitter is located

a No more than 600 meters from the localizer transmitter

b About 150 meters upwind from the threshold and about 300 meters from the centre line of the runway

c **About 300 meters upwind from the threshold and about 150 meters from the centre line of the runway**

d As close to the runway threshold as possible without causing an obstruction to aircraft

147 id 7169 The ILS glidepath is 2,8°. At what altitude above the threshold level is the upper limit of the glide path coverage at a distance of 1,5 NM from the touchdown point?

a 425 feet

b **745 feet**

c 865 feet

d 610 feet

148 id 7170 The glide path transmitter operates on

a 36 VHF frequencies, paired with localizer frequencies

b The frequencies 90 and 150 MHz

c On frequencies found by multiplying the localizer frequency by 3

d **40 frequencies from 329,15 MHz to 335,00 MHz**

149 id 7171 Scalloping of an ILS beam means

a That the beam slowly leaves the intended approach line

b That the beam is intermittent, and is received only now and then during an approach

c That false beams (sidelobes) appear from time to time during the approach

d **That the guidance beam direction varies from side to side of the intended approach path**

150 id 7172 Consider the following statements on ILS back beam approach:

a Using a standard ILS indicator, a back beam approach must be flown with heading adjustments from the localizer needle

b Only when a published procedure is at hand, a back beam approach must be flown

c Using an HSI the course selector should be set to the inbound track of the localizer front beam, in order to get normal sensing

d **All 3 statements are correct**

151 id 7173 ILS Cat II will permit instrument approaches down to

a DH 100 ft, RVR 200 m

b **DH 100 ft, RVR 350 m**

c DH 50 ft, RVR 200 m

d DH 150 ft RVR 400 m

152 id 7174 If the ILS monitoring equipment senses a shift or change outside set limits in the basic transmission

a The Tower control will inform any inbound aircraft about the inaccuracy

b The technicians on duty will switch on the stand-by ILS equipment

c The pilot on ILS approach will be notified by the ident disappearing

d **The transmissions on a Cat I ILS will be stopped within 6 seconds**

153 id 7175 In an ILS system, the identification

a Is transmitted with a tone of 1450 Hz

b **Is transmitted in morse by the localizer transmitter with a tone of 1020 Hz**

c Is transmitted by the localizer and the glidepath transmitters

d Is transmitted alternatively by the localizer and the glidepath transmitters using morse code (In some countries voice identification is also used)

154 id 7176 Flying a 3° glidepath ILS approach, at a ground speed of 100 Kt., the "rule of thumb" gives a required rate of descent of

a **500 ft/min**

b 600 ft/min

c 450 ft/min

d 400 ft/min

155 id 7177 There are four types of marker beacons, all transmitting on the same carrier frequency:

a Airway marker (fan marker), Outer marker, Middle marker, Intersection marker

b Intersection marker, Outer marker, Middle marker, Inner marker

c **Airway marker (fan marker) Outer marker, Middle marker, Inner marker**

d Boundary marker, Outer marker, Middle marker, Inner marker

156 id 7178 The middle marker is identified by

a **Audible alternate dots and dashes with tone 1300 Hz and an amber light**

b Audible alternate dots and dashes with tone 800 Hz and an amber light

c Audible alternate dots and dashes with tone 800 Hz and a white light

d Audible alternate dots and dashes with tone 1300 Hz and a white light

157 id 7179 Flying an ILS approach, the middle marker is positioned so as to be passed

a **At about 200 ft AAL**

b About 1500 meters from the threshold

c At about 350 ft AAL

d At about 100 ft above DH

62.01.06. MLS

158 id 2627 Which one of the following is an advantage of a Microwave Landing System (MLS) compared with an Instrument Landing System (ILS)?

a It does not require a separate azimuth (localiser) and elevation (azimuth) transmitter

b **It is insensitive to geographical site and can be installed at sites where it is not possible to use an ILS**

c The installation does not require to have a separate method (marker beacons or DME) to determine range

d There is no restriction on the number of ground installations that can be operated because there is an unlimited number of frequency channels available

159 id 2631 The azimuth transmitter of a Microwave Landing System (MLS) provides a fan-shaped horizontal approach zone which is usually:

a + or - 50° of the runway centre-line

b **+ or - 40° of the runway centre-line**

c + or - 60° of the runway centre-line

d + or - 30° of the runway centre-line

160 id 3167 MLS installations notified for operation, unless otherwise stated, provide azimuth coverage of:

a + or - 20° about the nominal courseline out to a range of 10 NM

b + or - 20° about the nominal courseline out to a range of 20 NM

c + or - 40° about the nominal courseline out to a range of 30 NM

d **+ or - 40° about the nominal courseline out to a range of 20 NM**

161 id 4738 In which frequency band does the Microwave Landing System (MLS) operate?

a EHF

b **SHF**

c VHF

d UHF

162 id 5747 Which one of the following methods is used by a Microwave Landing System (MLS) to indicate distance from the runway threshold?

a Timing the interval between the reception of sequential secondary radar pulses from the MLS station to the aircraft

b Timing the interval between the transmission and reception of primary radar pulses from the aircraft to MLS station

c Measurement of the frequency shift between the MLS azimuth and elevation transmissions

d **A DME co-located with the MLS transmitters**

163 id 5748 Which one of the following correctly lists the major ground based components of a Microwave Landing System (MLS)?

a Combined azimuth and elevation transmitter, outer and inner marker beacons

b Separate azimuth and elevation transmitters, outer and middle marker beacons

c Combined azimuth and elevation transmitter, DME facility

d **Separate azimuth and elevation transmitters, DME facility**

164 id 7180 Compared to the ILS, MLS has the following advantages:

a No special receivers are required in the aircraft

b **Many different approaches to the same runway may be defined by 1 set of ground equipment**

c Aircraft separation will automatically be arranged by the ground equipment

d All approaches to all airfields will use the same channel, which means that the aircraft equipment will be a single-channel receiver

165 id 7181 The MLS use a technique based on

a "Frequency Modulated Duplex"

b "Pulse interrogation"

c **"Time Reference Scanning Beam"**

d "Analogue Scanning Beam"

166 id 7182 In an MLS the azimuth information is available in the approach sector

a To a distance of 10 NM in an 80 degree wide sector

b **To a distance of 20 NM in an 80 degree wide sector**

c To a distance of 10 NM in a 110 degree wide sector

d To a distance of 20 NM in a 40 degree wide sector

167 id 7183 Making an MLS approach, the aircraft

a Receives elevation information 2 times a second

b Receives elevation information 13 times a second

c **Receives elevation information three times as frequent as azimuth information**

d Receives elevation and azimuth information 39 times a second

62.01.07. Homing and Intercepts

168 id 8859 A Homing you prefer with a difference of angle greater then

a 50°

b **70°**

c 90°

d 120°

169 id 8860 Which interception do you choose with a difference of angle of 15° and an EET of 4 minutes?

a Homing

b 90°/45° Interception

c Correction

d **45° Interception**

170 id 8862 act QDM 140° act HDG 020° req QDM 110° First turn?

a **Left HDG 155°**

b Left HDG 190°

c Right HDG 065°

d Right HDG 110°

171 id 8863 act QDM 330° act HDG 060° req QDM 350° Intercept HDG?

a 260°

b 315°

c **305°**

d 350°

172 id 8864 act QDM 150° act HDG 330° req QDM 120° Kind of interception?

a Homing

b Correction

c **45° Interception**

d 80°/260° Interception

173 id 8865 act QDM 210° act HDG 060° req QDM 260° First turn?

a left HDG 170°

b right HDG 215°

c **right HDG 170°**

d right HDG 260°

174 id 8866 act QDM 095° act HDG 090° req QDM 090° EET 5Min. Correction?

a 5°

b 10°

c **15°**

d 20°

175 id 8867 | act QDM 120° act HDG 120° req QDR 060° Int-HDG?

a **040°**

b 045°

c 065°

d 030°

176 id 8868 | act QDR 285° act HDG 290° req QDR 290° Time passed the station 2Min. Correction HDG?

a 305°

b 290°

c 285°

d **300°**

62.02. BASIC RADAR PRINCIPLES

62.02.01. Pulse techniques and associated terms

177 id 2368 A Primary radar operates on the principle of:

a transponder interrogation

b **pulse technique**

c phase comparison

d continuous wave transmission

178 id 3161 The main factor which determines the minimum range that can be measured by a pulsed radar is pulse:

a repetition rate

b amplitude

c **length**

d frequency

179 id 3162 Ignoring pulse length, the maximum pulse repetition frequency (PRF) that can be used by a primary radar facility to detect targets unambiguously to a range of 200 NM is: (pps = pulses per second)

a 375 pps

b 782 pps

c 308 pps

d **405 pps**

180 id 3182 The minimum range of a primary radar, using the pulse technique, is determined by the (i)..... ; the maximum unambiguous range by the (ii).....

a (i) transmission frequency (ii) pulse recurrence frequency

b (i) transmission frequency (ii) transmitter power output

c (i) pulse length (ii) length of the timebase

d **(i) pulse length (ii) pulse recurrence frequency**

181 id 3183 Which one of the following statements is correct concerning the use in primary radar of continuous wave transmissions as compared with pulse transmissions?

a A smaller common transmitter and receiver aerial can be used

b **It eliminates the minimum target reception range**

c It is less effective in short range radars but more effective in long range radars

d The equipment required is more complex in continuous wave radar but this is offset by greater reliability and accuracy

182 id 3262 The maximum range of primary radar depends on :

a **pulse recurrence frequency**

b wave length

c frequency

d pulse length

183 id 4774 For any given circumstances, in order to double the effective range of a primary radar the power output must be increased by a factor of:

a 2

b **16**

c 4

d 8

184 id 4775 The prime factor in determining the maximum unambiguous range of a primary radar is the:

a **pulse recurrence rate**

b power output

c size of parabolic receiver aerial

d height of the transmitter above the ground

185 id 5749 In which frequency band do most airborne weather, and ground based ATC, radar systems operate?

a **SHF**

b UHF

c EHF

d VHF

186 id 5793 In relation to radar systems that use pulse technology, the term 'Pulse Recurrence Rate (PRR)' signifies the:

a ratio of pulse period to pulse width

b delay after which the process re-starts

c the number of cycles per second

d **number of pulses per second**

187 id 7059 Consider the following statements on a freely suspended magnetic needle in the terrestrial magnetic field:

a The needle will align itself along the magnetic meridian

b **The needle will align itself with the direction of the magnetic lines of force**

c The needle will not be influenced by the magnetic inclination (dip)

d All answers are correct

188 id 7184 In a primary radar system

a The aircraft plays the secondary role, just listening to the radar signals from the ground radar

b **All radio frequency energy is produced by the radar located at the radar site**

c The radar is primarily used for range-finding

d The radar is the primary aid for ATC

189 id 7187 In a primary radar the maximum range requires

a Long PRI and high PRF

b Short PRI and high PRF

c **High pulse effect and long PRI**

d High pulse effect and short PRI

190 id 7188 Minimum useful range of a primary radar requires

a Long pulses and high PRI

b Short pulses and long PRI

c **Short pulses**

d High PRF

191 id 7189 For a parabolic reflector to make a narrow beam

a The power from the transmitter must be evenly distributed on the antenna

b **The size must be large compared to the wavelength**

c The size of the antenna has only minor importance

d The antenna must rotate at a high speed

192 id 7190 The receiver in a primary radar

a Must be very sensitive in order to detect weak signals

b Must be protected from the influence of the high-power transmitter pulse

c Must have a short recovery time in order to receive echoes from near-by aircraft

d **All 3 answers are correct**

193 id 7191 On a standard radar display (PPI)

a The time base is a sine curve

b The time base is a cosine curve

c The time base is a linear, straight scale

d **The time base is made to rotate synchronously with the antenna in order to display bearing as well as range**

194 id 7192 Using primary radar, super refraction may play a role, because

a **Super refraction may cause the direct wave range to be considerably increased**

b Other radar signals may be received due to super refraction of signals

c Super refraction may cause shadows, in which no target will be observed

d Super refraction will cause a sort of "night effect" also on radar frequencies

195 id 7193 Using a primary radar,

a Target size will influence the maximum range

b Detection of targets in the area close to the radar will be difficult

c Precipitation may reduce the useful range

d **All 3 answers are correct**

62.02.02. Ground radar

196 id 1075 Assuming sufficient transmission power, the maximum range of a ground radar with a pulse repetition frequency of 450 pulses per second is: (Given: velocity of light is 300 000 km/second)

a 150 km

b 666 km

c 1333 km

d **333 km**

197 id 2637 A radar facility transmitting at a Pulse Recurrence Frequency (PRF) of 1200 pulses/second will have a maximum unambiguous range of approximately:

a 135 NM

b **69 NM**

c 270 NM

d 27 NM

198 id 3050 A ground radar transmitting at a PRF of 1200 pulses/second will have a maximum unambiguous range of approximately:

a 270 NM

b 135 NM

c **67 NM**

d 27 NM

199 id 3169 Complete the following statement. Aircraft Surface movement Radar operates on frequencies in the (i) ..... band employing an antenna that rotates at approximately (ii) ..... revolutions per minute; it is (iii) ..... possible to determine the type of aircraft from the return on the radar screen.

a (i) SHF (ii) 10 (iii) always

b (i) EHF (ii) 30 (iii) never

c **(i) SHF (ii) 60 (iii) sometimes**

d (i) EHF (ii) 100 (iii) never

200 id 3174 The maximum pulse repetition frequency (PRF) that can be used by a primary radar facility in order to detect targets unambiguously at a range of 50 NM is: (pps = pulses per second)

a 610 pps

b 3240 pps

c **1620 pps**

d 713 pps

201 id 3176 Ignoring pulse length and fly-back, a radar facility designed to have a maximum unambiguous range of 50 km will have a PRF (pulses per second) of:

a 330

b 6000

c 167

d **3000**

202 id 3177 Which combination of characteristics gives best screen picture in a primary search radar?

a **short pulse length and narrow beam**

b long pulse length and wide beam

c long pulse length and narrow beam

d short pulse length and wide beam

203 id 5750 The maximum range obtainable from an ATC Long Range Surveillance Radar is approximately:

a 100 NM

b 200 NM

c **300 NM**

d 400 NM

204 id 7185 A simple schematic diagram of a typical primary radar set, will show that

a The timer is feeding timing signals directly to the magnetron

b The modulator receive the same input as the receiver

c **The Display unit is fed information from the receiver and the timebase generator**

d The TR.-switch provides signals both to the Timebase and the Receiver

205 id 7186 A long-range surveillance radar will typically use a frequency of

a **1000 MHz**

b 600 MHz

c 3000 MHz

d 10 GHz

206 id 7196 A radar used by ATC has the following characteristics: Long wavelength, aerial rotation speed 5 RPM. Most likely this is

a **An en route surveillance radar**

b Precision Approach Radar

c Terminal Surveillance Radar

d Airfield Surface Movement Indicator

207 id 7197 Two types of radar approaches may be available

a Surveillance approach and Final approach

b Final approach and Precision approach

c **Surveillance approach and Precision approach**

d Terminal approach and surveillance approach

208 id 7198 A Surveillance Radar installation will often consist of

a **A Primary radar and a Secondary Surveillance Radar (SSR)**

b A primary Radar and a VDF

c A Primary Radar and a Precision Radar

d An SSR and a Precision Radar

62.02.03. Airborne weather radar

209 id 1451 Airborne weather radar systems use a wavelength of approximately 3 cm in order to:

a **detect the larger water droplets**

b transmit at a higher pulse repetition frequency for extended range

c obtain optimum use of the Cosecant squared beam

d detect the smaller cloud formations as well as large

210 id 1452 The ISO-ECHO facility of an airborne weather radar is provided in order to:

a give an indication of cloud tops

b **detect areas of possible severe turbulence in cloud**

c inhibit unwanted ground returns

d extend the mapping range

211 id 1453 In the MAPPING MODE the airborne weather radar utilises a:

a fan shaped beam effective up to a maximum of 50 NM to 60 NM range

b fan shaped beam effective up to a range of 150 NM

c pencil beam to a maximum range of 60 NM

d pencil beam effective from zero to 150 NM

212 id 1454 Which of the following cloud types is most readily detected by airborne weather radar when using the 'weather beam'?

a stratus

b cirrocumulus

c cumulus

d altostratus

213 id 2628 A frequency of 10 GHz is considered to be the optimum for use in an airborne weather radar system because:

a the larger water droplets will give good echoes and the antenna can be kept relatively small

b greater detail can be obtained at the more distant ranges of the smaller water droplets

c static interference is minimised

d less power output is required in the mapping mode

214 id 2632 Which of the following is a complete list of airborne weather radar antenna stabilisation axes?

a roll, pitch and yaw

b roll and pitch

c pitch and yaw

d roll and yaw

215 id 2633 In an Airborne Weather Radar that has a colour cathode ray tube (CRT) increasing severity of rain and turbulence is generally shown by a change of colour from:

a green to yellow to red

b yellow to amber to blue

c green to red to black

d yellow to orange to red

216 id 3054 In which mode of operation does the aircraft weather radar use a cosecant radiation pattern.

a MAPPING

b CONTOUR

c WEATHER

d MANUAL

217 id 3168 In general the operation of airborne weather radar equipment on the ground is:

a permitted anywhere

b only permitted with certain precautions, to safeguard health of personnel and to protect equipment

c totally prohibited

d unrestrictedly permitted in aerodrome maintenance areas

218 id 3172 The pencil shaped beam of an airborne weather radar is used in preference to the mapping mode for the determination of ground features:

a when approaching coast-lines in polar regions

b beyond 100 NM because insufficient antenna tilt angle is available with the mapping mode

c beyond 150 NM because the wider beam gives better definition

d beyond 50 to 60 NM because more power can be concentrated in the narrower beam

219 id 3263 A frequency of airborne weather radar is :

a 9375 MHz

b 9375 GHz

c 9375 kHz

d 93.75 MHz

220 id 5591 A weather radar, set to the 100 NM scale, shows a squall at 50NM. By changing the scale to 50 NM, the return on the radar screen should:

a decrease in area and move to the top of the screen

b increase in area and appear nearer to the bottom of the screen

c decrease in area but not change in position on the screen

d increase in area and move to the top of the screen

221 id 5593 In weather radar the use of a cosecant beam in 'Mapping' mode enables:

a better reception of echos on contrasting terrain such as ground to sea

b scanning of a large ground zone producing echos whose signals are practically independent of distance

c a greater radar range to be achieved

d higher definition echoes to be produced giving a clearer picture

222 id 5751 In Airborne Weather Radar (AWR), the main factors which determine whether a cloud will be detected are:

a size of the water drops; wavelength/frequency used

b range from cloud; wavelength/frequency used

c size of the water drops; diameter of radar scanner

d rotational speed of radar scanner; range from cloud

223 id 5752 In order to ascertain whether a cloud return on an Aircraft Weather Radar (AWR) is at or above the height of the aircaft, the tilt control should be set to: (Assume a beam width of 5°)

a 5° up

b 0°

c 2.5° down

d 2.5° up

224 id 5794 When switching on the weather radar, after start-up, a single very bright line appears on the screen. This means that the:

a scanner is not rotating

b transmitter is faulty

c scanning of the cathode ray tube is faulty

d receiver is faulty

225 id 5795 The advantage of the use of slotted antennas in modern radar technology is to:

a simultaneously transmit weather and mapping beams

b **virtually eliminate lateral lobes and as a consequence concentrate more energy in the main beam**

c have a wide beam and as a consequence better target detection

d eliminate the need for azimuth slaving

226 id 5797 Which of the following lists phenomena that CANNOT be detected by weather radar?

a dry hail; clear air turbulence

b **snow; clear air turbulence**

c clear air turbulence; turbulence in cloud with precipitation

d snow; turbulence in clouds with precipitation

227 id 7209 Airborne weather radar uses a particularly high frequency radar signal, at 9 - 12 GHz, in order to

a Get the most accurate range and bearing information

b **Get good returns from droplets of water and other sorts of precipitation**

c Making it possible to present a colour display of the weather situation

d All 3 answers are correct

228 id 7210 The stabilisation of the weather radar, aerial is effective

a For up to +/- 5° roll and pitch

b **For up to +/- 20° of combined roll and pitch**

c For up to +/- 30° of combined roll and pitch

d For up to +/- 45° of combined roll and pitch

229 id 7211 When the airborne weather radar is operating in it's primary mode, to detect precipitation,

a Maximum tilt of the aerial will often be used

b The range will be limited, compared to the range obtainable in the mapping mode

c **The radar beam is pencil-shaped**

d The radar beam is a cosec-beam

230 id 7212 On the airborne weather radar display, different colours are used

a **To display different intensity of precipitation**

b High ground

c Echoes from other aircraft

d Clouds, indicating different levels of visibility

231 id 7213 You want to use your airborne weather radar to detect areas with turbulence. Consider the following statements:

a **If you are flying at low altitude, the detection of turbulence at levels below the aircraft may difficult because of ground returns**

b You should select the cosec beam and carefully adjust the aerial tilt

c Using the cosec beam, the height of top of clouds, with possible turbulence, may be calculated using the 1 : 60 rule.

d All 3 answers are correct

232 id 7214 Using the airborne weather radar, before take-off

a The contrast control should be adjusted to maximum contrast

b **The radar transmitter should not be operated when personnel is observed in the sector ahead of the aircraft**

c The antenna tilt control should be set to max negative tilt

d The gain control should be adjusted according to the light conditions expected when airborne

62.02.04. SSR secondary surveillance radar and transp.

233 id 1072 When Mode C is selected on the aircraft SSR transponder the additional information transmitted is:

a height based on QFE

b altitude based on regional QNH

c aircraft height based on sub-scale setting

d **flight level based on 1013.25 hPa**

234 id 1073 The ground Secondary Surveillance Radar (SSR) equipment incorporates a transmitter and receiver respectively operating in the following frequencies:
Transmitter Receiver

a 1090 MHz 1090 MHz

b 1090 MHz 1030 MHz

c **1030 MHz 1090 MHz**

d 1030 MHz 1030 MHz

235 id 1455 Why is a secondary radar display screen free of storm clutter?

a **The principle of 'echo' return is not used in secondary radar**

b The frequencies employed are too high to give returns from moisture sources

c A moving target indicator facility suppresses the display of static or near static returns

d The frequencies employed are too low to give returns from moisture sources

236 id 1456 In order to indicate radio failure the aircraft SSR transponder should be selected to code:

a 7000

b 7700

c **7600**

d 7500

237 id 1457 In order to indicate unlawful interference with the planned operation of the flight, the aircraft Secondary Surveillance Radar (SSR) transponder should be selected to:

a 7600

b **7500**

c 7700

d 7000

238 id 2626 The two main design functions of Secondary Surveillance Radar (SSR) Mode S are:

a the elimination of ground to air communications and the introduction of automatic separation between aircraft using TCAS II

b collision avoidance using TCAS II and improved long range (HF) communication capability.

c continuous automatic position reporting using Global Positioning System (GPS) satellites and collision avoidance using TCAS II

d **air to ground and ground to air data link communications and improved ATC aircraft surveillance capability**

239 id 2634 When an aircraft is operating its Secondary Surveillance Radar in Mode C an air traffic controller's presentation gives information regarding the aircraft's indicated flight level that is accurate to within:

a **+ or - 50 FT**

b + or - 75 FT

c + or - 100 FT

d + or - 25 FT

240 id 2916 The frequency of an SSR ground transmission is:

a 1050 +/- 0.5 Mhz

b **1030 +/- 0.2 Mhz**

c 1090 +/- 0.3 Mhz

d 1120 +/- 0.6 Mhz

241 id 3264 The ATC transponder system,excluding Mode S, contains :

a four modes, each 1024 codes

b **two modes, each of 4096 codes**

c four modes, each 4096 codes

d two modes, each 1024 codes

242 id 5592 A secondary radar can provide up to 4096 different codes. These 4096 codes can be used in:

a mode C only

b mode A only

c **all modes**

d mode S

243 id 5594 The code transmitted by a SSR transponder consists of:

a phase differences

b **pulses**

c frequency differences

d amplitude differences

244 id 5753 Which of the following Secondary Surveillance Radar (SSR) codes is used to indicate transponder malfunction?

a 7600

b **0000**

c 4096

d 9999

245 id 5754 Which one of the following Secondary Surveillance Radar (SSR) codes should be used by aircraft entering airspace from an area where SSR operation has not been required?

a 0000

b 5000

c 7000

d **2000**

246 id 5796 What is the maximum number of usable Secondary Surveillance Radar (SSR) transponder codes?

a **4096**

b 3600

c 1000

d 760

247 id 7199 The frequencies used by SSRs are

a **Interrogations are transmitted on 1030 MHz and transponder responses are transmitted on 1090 MHz**

b Interrogations are transmitted on 1030 MHz and transponder responses are transmitted on 1030 MHz

c Interrogations are transmitted on 1090 MHz and transponder responses are transmitted on 1090 MHz

d Interrogations are transmitted on 1090 MHz and transponder responses are transmitted on 1030 MHz

248 id 7200 The spacing between the two pulses transmitted by an SSR interrogator decides

a The identification of that SSR

b **What mode is used**

c What service may be provided by the SSR

d The ATC code to be set in the aircraft

249 id 7201 What SSR modes are currently in use by ATC?

a Mode C and Mode D

b Mode A and Mode B

c **Mode A and Mode C**

d Mode A, Mode B and Mode C

250 id 7202 Using SSR, the normal transmission from the ATC transponder in the aircraft consists of

a The two pulses received plus the aircraft identification

b **The two pulses received plus an additional number of pulses between them**

c The aircraft identification plus pulses giving the altitude

d Pulses giving the altitude, plus any ident pulse

251 id 7203 The transponder code set in an SSR system consists of

a 2 digits and 2 letters, forming any of 4096 different codes

b 4 digits, forming any of 9999 different codes

c **4 digits, forming any of 4096 different codes**

d 4 digits, forming any of 7777 different codes

252 id 7204 When the ATC transponder "IDENT" button is pressed by the pilot

a The airplane's identification will be sent to all SSRs within range

b **The airplane's echo on the controller's display will flash or "fill in"**

c Mode A will automatically be selected

d The controller will be urged to identify this airplane

253 id 7205 When both SSR and primary radar is presented on the controller's display

a The SSR information is more accurate in bearing and distance

b The primary radar information is superfluous

c **The primary radar information is more accurate in bearing and distance**

d Altitude information is presented for all targets

254 id 7206 On a typical computer generated SSR display the following data on a particular flight will be shown:

a **Squawk code, Flight level , Ground speed, Airplane callsign**

b Destination, Flight level , Ground speed, Airplane callsign

c Squawk code, Magnetic heading , Ground speed, Airplane callsign

d Squawk code, Flight level , True heading, Airplane callsign

255 id 7207 In the SSR terminology "de-fruiting" means

a Removing all different colours from the display, making it a mono-colour display

b Displaying only airplanes with a selected destination

c Displaying only airplanes changing their altitude

d **The removal from the display of random responses**

256 id 7208 Consider the following statements on SSR Mode S:

a Mode S will have the ability to transmit short messages from the ground to a particular aircraft

b A mode S interrogator, when installed, will also collect data from old mode A and C transponders

c Mode S will be able to address any particular of some 16 million aircraft

d **All 3 statements are correct**

62.03. Wind corrections

257 id 8895 | Act Hdg 270° Wind 245/ 12Kt WCA ?

a 4°to the Right

b 4° to the Left

c 2° to the Right

d **2° to the Left**

258 id 8896 | Act Hdg 250° TAS 140 Kts Wind 180/60Kt GS?

a 170 Kts

b 160 Kts

c **120 Kts**

d 130 Kts

259 id 8897 | You intercept a QDM with a right crosswind component. Is your intercept Hdg greater or smaller then without wind influence

a **Greater**

b Smaler

c Remains the same

d No enough information to give an answer

260 id 8898 | Act Hdg 150° Wind 245/ 12Kt WCA ?

a **6°to the Right**

b 6° to the Left

c 12°to the Right

d 12°to the Left

261 id 8899 | Act Hdg 290° TAS 250 Kts Wind 135/75Kt GS?

a **325 Kts**

b 300 Kts

c 175 Kts

d 200 Kts

62.05. AREA NAVIGATION SYSTEMS

62.05.01. General philosophy

262 id 4693 ICAO Annex 11 defines Area Navigation (RNAV) as a method of navigation which permits aircraft operation on any desired flight path:

a **within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained aids, or a combination of these**

b outside the coverage of station-referenced navigation aids provided that it is equipped with a minimum of one serviceable self-contained navigation aid

c within the coverage of station-referenced navigation aids provided that it is equipped with a minimum of one serviceable self-contained navigation aid

d outside the coverage of station-referenced navigation aids provided that it is equipped with a minimum of two serviceable self-contained navigation aids

263 id 4694 Precision RNAV (P-RNAV) requires a track-keeping accuracy of:

a 0.25 NM standard deviation or better

b 0.5 NM standard deviation or better

c **1.0 NM standard deviation or better**

d 1.5 NM standard deviation or better

264 id 4695 Basic RNAV requires a track-keeping accuracy of:

a **+/- 5NM or better for 95% of the flight time**

b +/- 3NM or better for 90% of the flight time

c +/- 2NM or better for 75% of the flight time

d +/- 5NM or better throughout the flight

265 id 4701 Under JAR-25 colour code rules, features displayed in red on an Electronic Flight Instrument System (EFIS), indicate:

a warnings; cautions and abnormal sources

b flight envelope and system limits; engaged modes

c **warnings; flight envelope and system limits**

d cautions and abnormal sources; engaged modes

266 id 4702 Under JAR-25 colour code rules, features displayed in amber/yellow on an Electronic Flight Instrument System (EFIS), indicate:

a **cautions, abnormal sources**

b flight envelope and system limits

c warnings

d engaged modes

267 id 4703 Under JAR-25 colour code rules, features displayed in green on an Electronic Flight Instrument System (EFIS), indicate:

a **engaged modes**

b cautions, abnormal sources

c the earth

d the ILS deviation pointer

268 id 4704 Under JAR-25 colour code rules features displayed in cyan/blue, on an Electronic Flight Instrument Systems (EFIS), indicate:

a **the sky**

b engaged modes

c the flight director bar(s)

d flight envelope and system limits

269 id 4705 Under JAR-25 colour code rules for Electronic Flight Instrument Systems (EFIS), current data and values are coloured:

a red

b cyan

c **white**

d magenta

270 id 4706 Under JAR-25 colour code rules for Electronic Flight Instrument Systems (EFIS), armed modes are coloured:

a **white**

b green

c magenta

d amber/yellow

271 id 4707 Under JAR-25 colour code rules for Electronic Flight Instrument Systems (EFIS), selected data and values are coloured:

a **green**

b white

c magenta

d yellow

272 id 4708 Under JAR-25 colour code rules for Electronic Flight Instrument Systems (EFIS), a selected heading is coloured:

a white

b green

c **magenta**

d yellow

273 id 4710 Under JAR-25 colour code rules for Electronic Flight Instrument Systems (EFIS), increasing intensity of precipititation are coloured in the order:

a **green, amber/yellow, red, magenta**

b green, red, magenta, black

c black, amber/yellow, magenta, red

d amber/yellow, magenta, black

274 id 4711 Under JAR-25 colour code rules for Electronic Flight Instrument Systems (EFIS), turbulence is coloured:

a cyan

b red

c black

d **white or magenta**

275 id 7237 In a hybrid navigation system

a Data from two or more of sources is electronically compared and the best information is used

b The aircrew has limited control over the navigation

c The aircrew has full control of all navigational matters, because all navigation is executed by the aircrew

d The information obtained from ATC and ground radar's plays a dominant role

276 id 7240 RNAV equipment will

a Allow frequent changes in flight plan and ATC clearances to be executed by the air crew

b Lead to a more economic air transport

c Permit airplanes to be navigated along direct tracks between predetermined as well as chosen waypoints, with a high order of accuracy

d All 3 answers are correct

62.05.02. Typical flight deck equipment and operation

277 id 2917 Which of the following gives the best information about the progress of a flight between 2 en-route waypoints from a RNAV equipment?

a Elapsed time on route.

b ETD

c ATA

d ETO

278 id 4697 The Flight Management Computer (FMC) position is:

a another source of aircraft position; it is independent of other position sources (IRS, Radio, ILS etc)

b the actual position of the aircraft at any point in time

c the same as that given on the No. 1 IRS

d the computed position based on a number of sources (IRS, Radio, ILS, GPS etc)

279 id 4699 The track-line on the Electronic Horizontal Situation Indicator (EHSI) or Navigation Display of an Electronic Flight Instrument System:

a indicates to the pilot that a manually selected heading is being flown

b corresponds to the calculated IRS TH and is correct during turns

c indicates that the pilot has made a manual track selection

d represents the track of the aircraft over the ground. When it co-incides with the desired track, wind influence is compensated for

280 id 4700 In which of the following cases would ETOs and ETA at destination calculated by the Flight Management Computer (FMC) be correct?

a When the ETOs and ETA are based on the forecast winds calculated from the actual take-off time

b When the FMC computes each ETO and ETA using the correct GS

c When the FMC positions and GS are accurate

d When the actual winds match the forecast winds, and the actual cruising Mach number is equal to the FMC calculated Mach number

281 id 4712 Which of the figures depicts an Electronic Flight Instrument System (EFIS) display in MAP mode?

a Figure 1

b Figure 4

c Figure 3

d Figure 2

282 id 4713 Which of the figures depicts an Electronic Flight Instrument System (EFIS) display in PLAN mode?

a Figure 1

b Figure 3

c Figure 4

d Figure 2

283 id 4714 Which of the figures depicts an Electronic Flight Instrument System (EFIS) display in Expanded (EXP) VOR/ILS mode with an ILS frequency selected?

a Figure 3

b Figure 2

c Figure 1

d Figure 4

284 id 4715 Which of the figures depicts an Electronic Flight Instrument System (EFIS) display in Expanded (EXP) VOR/ILS mode with a VOR frequency selected?

a Figure 2

b Figure 1

c Figure 4

d Figure 3

285 id 4716 Which of the figures depicts an Electronic Flight Instrument System (EFIS) display in FULL VOR/ILS mode with an VOR frequency selected?

a Figure 4

b Figure 2

c Figure 1

d Figure 3

286 id 4717 Which of the figures depicts an Electronic Flight Instrument System (EFIS) display in PLAN mode?

a Figure 2

b Figure 3

c Figure 4

d Figure 1

287 id 4718 Which of the figures depicts an Electronic Flight Instrument System (EFIS) display in MAP mode?

a Figure 4

b Figure 3

c Figure 1

d Figure 2

288 id 4719 Which of the figures depicts an Electronic Flight Instrument System (EFIS) display in Expanded (EXP) VOR/ILS mode with an VOR frequency selected?

a Figure 2

b Figure 4

c Figure 3

d Figure 1

289 id 4721 Which of the figures depicts an Electronic Flight Instrument System (EFIS) display in FULL VOR/ILS mode with an ILS frequency selected?

a Figure 1

b Figure 2

c Figure 3

d Figure 4

290 id 4731 Radar returns, on a B737-400, can be displayed on all Electronic Horizontal Situation Indicator (EHSI) screen modes of an Electronic Flight Instrument System (EFIS) WITH THE EXCEPTION OF:

a FULL NAV, FULL VOR/ILS and PLAN

b EXP VOR/ ILS, PLAN and MAP

c FULL NAV, PLAN and MAP

d FULL VOR/ILS, EXP VOR/ILS and PLAN

291 id 5596 The database of an FMS (Flight Management System) is organised in such a way that the pilot can:

a can modify the database every 28 days

b only read the database

c insert navigation data between two updates

d read and write at any time in database

292 id 5597 The following flight plan has been inserted into the navigation system : WPT1, WPT2, WPT3, WPT4, WPT5. Between WPT1 and WPT2, a clearance is given to proceed directly to WPT5. In order to achieve this the pilot must:

a use the automatic pilot in the heading mode (HDG) as it is not possible to modify the flight plan in flight

b erase (with CLR) WPT3 and WPT4

c erase the flight plan and retype a new one

d type DIR TO WPT5 on his keyboard

62.05.04. Types of area navigation system inputs

293 id 2636 Which of the following combinations is likely to result in the most accurate Area Navigation (RNAV) fixes?

a VOR/DME

b DME/DME

c NDB/VOR

d VOR/VOR

62.05.05. VOR/DME area navigation

294 id 2375 | In order to enter a waypoint that is designated by a VOR into an RNAV, the VOR:

a has to be positively identified by one of the pilots

b does not have to be in range when entered or used

c must be in range

d **does not have to be in range when entered but must be when used**

295 id 4436 | Which of the following is one of the functions of the Course-Line-Computer in a basic Area Navigation (RNAV) system?

a It calculates cross track information for NDB approaches

b It checks the ground station accuracy using a built-in test programme

c It automatically selects the two strongest transmitters for the Area-Nav-Mode and continues working by memory in case one of the two necessary station goes off the air

d **It transfers the information given by a VOR/DME station into tracking and distance indications to any chosen Phantom Station/waypoint**

296 id 4758 | In an Electronic Flight Instrument System (EFIS) data relating primarily to navigation is provided by:

a Inertial Reference Systems, Aircraft Mapping Radar, Navigation radios

b **Navigation radios, Flight Management Computer, Inertial Reference Systems**

c Flight Management Computer, Aircraft Mapping Radar, Navigation radios

d Inertial Reference Systems, Navigation radios, True airspeed and drift inputs

297 id 4759 | In an Electronic Flight Instrument System (EFIS) data relating primarily to automatic flight is provided by:

a **Flight Control Computers, Flight Management Computers, Autothrottle**

b Flight Control Computers, Inertial Reference Systems, Autothrottle

c Flight Management Computers, Flight Control Computers, Air Data Computers

d Air Data Computer, Inertial Reference Systems, Autothrottle

298 id 4760 | How does the Electronic Flight Instrument System display of a B737-400 respond to the failure of a VHF navigation (VOR) receiver?

a The deviation bar and/or pointer change colour to red and flash intermittently

b The pointer rotates around the display and a VOR 1 or 2 failure warning bar appears

c **It removes the associated magenta deviation bar and/or pointer from the display**

d The pointer flashes and a VOR 1 or 2 failure warning bar appears

299 id 4761 | Which component of the B737-400 Electronic Flight Instrument System generates the visual displays on the EADI and EHSI?

a Flight Control Computer

b Flight Management Computer

c **Symbol Generator**

d Navigation database

300 id 5767 | Which one of the following lists information given by a basic VOR/DME-based Area Navigation System?

a **Crosstrack distance; alongtrack distance; angular course deviation**

b Aircraft position in latitude and longitude

c Wind velocity

d True airspeed; drift angle

301 id 5768 Which of the following lists information required to input a waypoint or 'Phantom Station' into a basic VOR/DME-based Area Navigation System?

a Radial and distance from a VOR/DME to the waypoint or 'Phantom Station'

b Magnetic track and distance from the aircraft to the waypoint or 'Phantom Station'

c Magnetic track and distance to a VOR/DME from the waypoint or 'Phantom Station'

d Radials from a minimum of two VORs to the waypoint or 'Phantom Station'

302 id 5771 Erratic indications may be experienced when flying towards a basic VOR/DME-based Area Navigation System 'Phantom Station':

a because, under adverse conditions (relative bearing to the Phantom Station other than 180°/360°) it takes the computer more time to calculate the necessary information

b when operating at low altitudes close to the limit of reception range from the reference station

c when in the cone of silence overhead the Phantom Station

d when the Phantom Station is out of range

303 id 5772 What is the deviation per dot on the HSI when using a 2-dot basic RNAV system in the en-route mode?

a 1 NM

b 5 NM

c 2 NM

d 10 NM

304 id 7239 In it's simplest form, RNAV may consist of

a At least one VOR and 2 DME sets

b A VOR/DME receiver with an associated navigation computer

c ADF and VOR receivers with an associated navigation computer

d At least 3 DME sets and an associated navigation computer

62.05.06. Flight director and autopilot coupling

305 id 7241 Typically the following sources of information are used by the FMS to establish the aircraft's position

a VOR/DME, ADF, LORAN C, Radio altimeter

b VOR/DME, ILS, IRS, GNSS, Radio altimeter

c Map reading Weather radar, ILS, IRS, GNSS, Radio altimeter

d VOR/DME, ILS, ADF, GNSS, Radio altimeter

306 id 7242 The FMC database is divided into two broad sections, namely

a The CPU database and the Flight Engineer's database

b The Performance database and the ATC information database

c The Navigation database and the Performance database

d The Navigation database and the FMS database

62.06. SELF-CONTAINED AND EXTERNAL-REFNAV

62.06.01. Doppler

307 id 1074 The major source of cross-track error in a doppler navigation system is:

a **compass error**

b altitude error

c latitude error

d manoeuvring error

308 id 1459 An apparent increase in the transmitted frequency which is proportional to the transmitter velocity will occur when:

a the transmitter moves away from the receiver

b **the transmitter moves towards the receiver**

c the receiver moves towards the transmitter

d both transmitter and receiver move towards each other

309 id 2918 The Doppler Navigation System is based on:

a doppler VOR (DVOR) Navigation System

b radio waves refraction in the ionosphere

c **radar principles using frequency shift**

d phase comparison from ground station transmissions

310 id 3184 Due to 'Doppler' effect an apparent decrease in the transmitted frequency, which is proportional to the transmitter's velocity, will occur when:

a the transmitter and receiver move towards each other

b **the transmitter moves away from the reciever**

c the transmitter moves toward the reciever

d both transmitter and receiver move away from each other

311 id 7215 A Doppler shift will occur

a If a transmitter is moving during transmission to a fixed position receiver

b When the distance between a transmitter and a receiver is changing during a transmission

c If a receiver is moving during reception of transmissions from a fixed position transmitter

d **All 3 answers are correct**

312 id 7216 In the normal applications using Doppler shift registered in aircraft equipment

a The Doppler shift will only be detectable when a ground station is within range

b **The Doppler shift will be doubled, because it is based on measuring the frequency of a reflected signal from the ground**

c The Doppler shift, indicating ground speed, will always indicate a speed higher than the actual ground speed of the aircraft, due to depression of the beams

d The Doppler shift frequency will normally be displayed

313 id 7217 In using an airborne Doppler navigation system, the Doppler shift is proportional to

a Aircraft speed and aerial depression

b Aircraft speed and absolute altitude

c **Aircraft speed and transmitter frequency**

d Aircraft speed, transmitter frequency and aircraft absolute altitude

314 id 7218 In using an airborne Doppler navigation system, the expected accuracy

a Will be higher for cross-track movements than for movement along track

b Will be improved with careful adjustment of the antenna tilt

c **Is 0,1% in ground speed**

d Will be high when flying over a calm sea

62.06.03. Loran-C

315 id 2380 In which navigation system does the master station transmit a continuous string of pulses on a frequency close to 100 kHz?

a **Loran C**

b GPS

c Decca

d Doppler

316 id 2623 Which of the following statements concerning LORAN-C is correct?

a It is a hyperbolic navigation system that works on the principle of range measurement by phase comparison

b It is a navigation system based on secondary radar principles; position lines are obtained in sequence from up to eight ground stations

c **It is a hyperbolic navigation system that works on the principle of differential range by pulse technique**

d It is a navigation system based on simultaneous ranges being received from a minimum of four ground stations

317 id 2639 Which of the following correctly gives the principle of operation of the Loran C navigation system?

a Differential range by phase comparison

b Frequency shift between synchronised transmissions

c **Differential range by pulse technique**

d Phase comparison between synchronised transmissions

318 id 3327 Which of the following frequency-bands is used by the Loran C navigation system?

a 10.2 - 13.6 kHz

b 1750 - 1950 kHz

c **90 - 110 kHz**

d 978 - 1213 MHz

319 id 5385 Loran C coverage is:

a global

b **confined to certain limited areas of the world**

c unrestricted between latitudes 70°N and 70°S

d unrestricted over the oceans and adjacent coastlines but limited over the major continental land masses

320 id 7219 When using hyperbolic navigation systems to provide lines of position, the basic measurements are

a Angular displacement

b Speed changes

c Of actual speed at short intervals of time

d **Timing**

321 id 7220 In a hyperbolic navigation system the area of highest accuracy of a single line of position is

a On the perpendicular to the base-line

b **Along the base-line**

c Along the base-line extension

d At equidistance from the two ground stations

322 id 7221 To produce a two-position line fix, the ground elements of a hyperbolic navigation system must consist of at least

a 3 master stations and 3 slave stations

b 2 master stations and 3 slave stations

c 1 master and 1 slave station

d **2 slave stations and a master station serving them both**

323 id 7222 Within the area of coverage of a hyperbolic navigation system, the highest accuracy of a two-positionline fix will be achieved when

a **The 2 position lines intersect at right angles, and the distances to the ground stations are not too long**

b The 2 position lines are parallel and the distances to the ground are within the published area of coverage

c The 2 position lines intersect on the base-line of one of them

d The Master and the slave station are both located on the same base-line

324 id 7223 LORAN C use a radio frequency of

a Around 1000 MHz

b Around 30 kHz

c **Around 100 kHz**

d Around 260 kHz

325 id 7224 The base-line between the LORAN C master and slave station is typically

a 1200 - 1500 NM

b 50 - 150 NM

c 200 - 400 NM

d **600 - 1000 NM**

326 id 7225 In a LORAN C system the spacing between lines of position having a 10 msec time difference

a Is most narrow along the base-line

b Is most narrow along the perpendicular to the base-line

c Is most narrow along the base-line extension

d Is widest along the perpendicular to the base-line, equidistant from the master and slave stations

327 id 7226 In a LORAN C system you will detect a constant time difference when moving

a Along the Base line

b Along the Base line extension

c Along any hyperbola

d All 3 answers are correct

328 id 7227 In the LORAN C system a single master station may trigger two or more slave stations. The pulses transmitted from each of the slave stations may be identified by

a The identification signal they transmit

b The carrier frequency used by each slave station

c The delay in time introduced at each slave station

d The direction of the signal from the slave stations

329 id 7228 All modern LORAN C receivers intended for use in aircraft

a Call for the user to identify the received Master and Slave station before any positional information is displayed

b Have a built-in navigation computer, programmed for great circle navigation

c Also have facilities to receive NDBs

d Presents the aircraft position as bearing and distance from the master or slave stations

330 id 7243 When data are published for an hyperbolic navigation system, they are valid

a For all users at ground speeds up to 500 Kt

b For all propagation situations, also when night effect is dominant

c For a period of up to 5 years

d For users at sea level

62.06.04. Decca navigation system

331 id 4743 What is the normal range of accurate fixing using Decca by day?

a 300 NM

b 400 NM

c 100 NM

d 200 NM

332 id 4744 In which frequency band does the Decca navigation system operate?

a MF

b LF

c HF

d VLF

333 id 4745 Which of the following statements accurately describes the availability of Decca navigation system coverage?

a It is available throughout the world without restriction

b **It is limited to very specific local areas of Europe and the Middle East**

c It is limited to Europe and parts of Africa

d It is only available in Europe where it is confined to areas of the North Sea

334 id 4746 In relation to Decca ground transmitters, hyperbolic position lines are lines on which all points will always have the same:

a phase angle from both signals

b **difference in range from both**

c range from both

d difference in signal amplitude from both

335 id 4747 Which of the following statements most correctly describes the Decca navigation system?

a **It is a medium range (200-300 NM) constant wave hyperbolic navigation system**

b It is a short range (100-200 NM) pulsed radar navigation system

c It is a long range (over 1000 NM) hyperbolic navigation system

d It is a world wide navigation system based on geostationery satellites

336 id 7229 DECCA is

a A long range hyperbolic navigation system, based on measuring the phase difference of carrier waves

b Using airborne equipment measuring phase difference between two received carrier waves, and is operating at Medium frequencies

c Is a low frequency hyperbolic navigation system, being very accurate and based on measuring the difference in time of arrival of two pulses, one from a master and the other from a slave station.

d **A short range hyperbolic navigation system, operating at Low frequencies**

62.06.05. Satellite assisted navigation :

337 id 2379 What is the minimum number of satellites required by a GPS in order to obtain a three dimensional fix?

a **4**

b 3

c 5

d 6

338 id 2624 In a Satellite-Assisted Navigation system (GNSS/GPS) a position line is obtained by:

a **timing the period that is taken for a satellite's transmission to reach the aircraft's receiver**

b the aircraft's receiver measuring the phase angle of the signal received from a satellite in a known position

c timing the period that is taken for a transmission from the aircraft's transmitter/receiver to reach and return from a satellite in a known position

d the aircraft's receiver measuring the time difference between signals received from a minimum number of satellites

339 id 2625 In which frequency band do Satellite-Assisted Navigation systems (GNSS/GPS) provide position information that is available to civil aircraft?

a EHF

b SHF

c **UHF**

d VHF

340 id 2629 What is the minimum number of satellites required for a Satellite-Assisted Navigation System (GNSS/GPS) to carry out two dimensional operation?

a 5

b 4

c **3**

d 2

341 id 3052 Signal reception is required from a minimum number of satellites that have adequate elevation and suitable geometry in order for a Satellite-Assisted Navigation System (GPS) to carry out independent three dimensional operation without the Receiver Autonomous Integrity Monitoring (RAIM) function. The number of satellites is:

a 3

b 5

c 6

d **4**

342 id 3178 Which of the following lists are all errors that affect the accuracy and reliability of the Satellite-Assisted Navigation system (GNSS/GPS)?

a Satellite to ground time lag; atmospheric propagation; satellite clock

b Satellite mutual interference; satellite ephemeris; atmospheric propagation

c **Satellite clock; satellite ephemeris; atmospheric propagation**

d Satellite mutual interference; frequency drift; satellite to ground time lag

343 id 3185 Signal reception is required from a minimum number of satellites that have adequate elevation and suitable geometry in order for a Satellite-Assisted Navigation System (GNSS/GPS) to carry out independent three dimensional operation, Receiver Autonomous Integrity Monitoring (RAIM) and to isolate any faulty satellite and remove it from contributing to the navigation solution. The number of

a **6**

b 7

c 4

d 5

344 id 3274 In a Satellite-Assisted Navigation System (GNSS/GPS), a fix is obtained by:

a **measuring the time taken for a minimum number of satellites' transmissions, in known positions, to reach the aircraft's receiver**

b the aircraft's receiver measuring the phase angle of signals received from a number of satellites in known positions

c measuring the time taken for an aircraft's transmissions to travel to a number of satellites, in known positions, and return to the aircraft's receiver

d measuring the pulse lengths of signals received from a minimum number of satellites received in a specific sequential order

345 id 3328 GPS satellites transmit on two L-band frequencies with different types of signals. Which of these are generally available for use by civil aviation?

a L1-coarse acquisition (C/A) with selected availability (S/A)

b L2-coarse acquisition (C/A)

c L1-precise (P)

d L2-selected availability (S/A)

346 id 3329 Which of the following coordinate systems is used by the GPS receiver to determine position (Latitude, longitude and altitude)?

a EUREF 92

b ED 87

c ED 50

d WGS 84

347 id 3330 Which of the following lists all the parameters that can be determined by a GPS receiver tracking signals from 4 different satellites?

a Latitude, longitude and altitude

b Latitude and longitude

c Latitude, longitude and time

d Latitude, longitude, altitude and time

348 id 4437 Which of the following combinations of satellite navigation systems provide the most accurate position fixes in air navigation?

a GLONASS and COSPAS-SARSAT

b NAVSTAR/GPS and NNSS-Transit

c NNSS-Transit and GLONASS

d NAVSTAR/GPS and GLONASS

349 id 4438 The required 24 NAVSTAR/GPS operational satellites are located on:

a 6 orbital planes with 3 satellites in each plane plus 6 reserve satellites positioned in a geostationary orbital plane

b 3 orbital planes with 8 satellites in each plane

c 4 orbital planes with 6 satellites in each plane

d 6 orbital planes with 4 satellites in each plane

350 id 4439 Which of the following statements about the 'visibility' of NAVSTAR/GPS satellites is correct?

a It is greatest at the poles

b It is the same throughout the globe

c It is greatest at the equator

d It varies, depending on the time and observer's location

351 id 4440 How many operational satellites are required for Full Operational Capability (FOC) of the satellite navigation system NAVSTAR/GPS?

a 30

b 18

c 12

d 24

352 id 4441 Which of the following satellite navigation systems has Full Operational Capability (FOC) and is approved for specified flights under IFR conditions in Europe?

a NNSS-Transit

b **NAVSTAR/GPS**

c COSPAS-SARSAT

d GLONASS

353 id 4442 The distance between a NAVSTAR/GPS satellite and receiver is:

a **determined by the time taken for the signal to arrive from the satellite multiplied by the speed of light**

b calculated from the Doppler shift of the known frequencies

c calculated, using the WGS-84 reference system, from the known positions of the satellite and the receiver

d determined by the phase shift of the Pseudo Random Noise code multiplied by the speed of light

354 id 4443 In relation to the satellite navigation system NAVSTAR/GPS, 'All in View' is a term used when a receiver:

a is receiving the signals of all visible satellites but tracking only those of the 4 with the best geometric coverage

b **is tracking more than the required 4 satellites and can instantly replace any lost signal with another already being monitored**

c is receiving and tracking the signals of all 24 operational satellites simultaneously

d requires the signals of all visible satellites for navigation purposes

355 id 4444 The reason why the measured distance between a NAVSTAR/GPS satellite navigation system satellite and a receiver is called a 'Pseudo-Range' is because the:

a measured distance is based on the Pseudo Random Noise code

b **calculated range includes receiver clock error**

c movement of satellite and receiver during the distance calculation is not taken into account

d calculated range is based on an idealised Keplerian orbit

356 id 4445 What type of satellite navigation system NAVSTAR/GPS receiver is most suitable for use on board an aircraft?

a Sequential

b **Multichannel**

c Multiplex

d Any hand held type

357 id 4446 What is the minimum number of NAVSTAR/GPS satellites required to produce an accurate independent 3-D position fix?

a 3

b 5

c 24

d **4**

358 The receiver aerial for a NAVSTAR/GPS system should be mounted:
id 4447

a under the fuselage in order to receive correction data transmitted by D-GPS stations

b inside the tail fin to minimise the influence of reflections from the wing and fuselage

c in the vicinity of the receiver to avoid long transmission lines

d **on the upper side of the fuselage in the vicinity of the centre of gravity**

359 In the NAVSTAR/GPS satellite navigation system, 'Selective Availability' (SA) is the artificial degradation of the navigation accuracy by:
id 4448

a shutting off selected satellites

b **dithering the satellite clock**

c using a less accurate atomic clock in a satellite for signal processing

d offsetting satellite atomic clocks by a predetermined constant amount

360 How does 'Selective Availability' (SA), if at all, affect the navigation accuracy of the NAVSTAR/GPS satellite navigation system?
id 4449

a It increases because only signals from satellites in the most suitable geometric constellation are selected by the receiver

b **It degrades position accuracy by manipulating satellite signals**

c It has no influence because, by selecting of the most suitable signals, the computing process in the receiver is quicker

d It degrades accuracy by reducing the number of available satellites

361 In the NAVSTAR/GPS satellite navigation system, receiver clock error:
id 4450

a is the biggest part of the total error; it cannot be corrected

b **is corrected by using signals from four satellites**

c can be minimised by synchronisation of the receiver clock with the satellite clocks

d is negligible small because of the great accuracy the atomic clocks installed in the satellites

362 The navigation accuracy for civil users of the NAVSTAR/GPS satellite navigation system is mainly influenced by:
id 4451

a clock error inside the receiver

b receiver noise

c **the 'Selective Availability' (SA) function**

d movement of the receiver during the computation process

363 The influence of the ionosphere on the accuracy of the satellite navigation system NAVSTAR/GPS is:
id 4452

a only significant if the satellites are located at a small elevation angle above the horizon

b minimised by computing the average of all signals

c **minimised by the receiver using a model of the atmosphere and comparing signals transmitted by the satellites**

d negligible

364 Which satellite NAVSTAR/GPS navigation system error(s) are corrected for by the differential (D-GPS) technique?
id 4453

a Clock; receiver noise

b **Clock; Selective Availability (SA)**

c Receiver noise

d Ephemeris

365 id 4454 Which one of the following is an advantages of a multi-sensor system using inputs from a global navigation satellite system (GNSS) and an inertial navigational system (INS)?

a The average position calculated from data provided by both systems increases overall accuracy

b The activation of 'Selective Availability' can be recognised by the INS

c **The GNSS can be used to update a drifting INS**

d The only advantage of coupling both systems is double redundancy

366 id 5461 The basic elements of the satellite navigation system NAVSTAR/GPS are the:

a **control, space and user segments**

b main control station, the monitoring station and the ground antennas

c antenna, the receiver and the central control unit (CDU)

d atomic clock, power supply and transponder

367 id 5462 One of the tasks of the control segment of the satellite navigation system NAVSTAR/GPS is to:

a manipulate the signals of selected satellites to reduce the precision of the position fix (Selective Availability SA)

b manufacture and launch the satellites

c **monitor the status of the satellites**

d grant and monitor user authorisations

368 id 5463 The main task of the user segment (receiver) of the satellite navigation system NAVSTAR/GPS is to:

a **select appropriate satellites automatically, to track the signals and to measure the time taken by signals from the satellites to reach the receiver**

b transmit signals which, from the time taken, are used to determine the distance to the satellite

c to monitor the status of the satellites, determine their positions and to measure the time

d monitor the orbital planes of the satellites

369 id 5464 One of the tasks of the space segment of the satellite navigation system NAVSTAR/GPS is to:

a **transmit signals which can be used, by suitable receivers, to determine time, position and velocity**

b transmit signals to suitable receivers and to monitor the orbital planes autonomously

c compute the user position from the received user messages and to transmit the computed position back to the user segment

d monitor the satellites' orbits and status

370 id 5465 The geometric shape of the reference system for the satellite navigation system NAVSTAR/GPS, defined as WGS 84, is:

a **an ellipsoid**

b a mathematical model that describes the exact shape of the earth

c a sphere

d a geoid

371 id 5466 In civil aviation, the height value computed by the receiver of the satellite navigation system NAVSTAR/GPS is the:

a height above Mean Sea Level (MSL)

b geometric height above ground

c **height above the WGS-84 ellipsoid**

d flight level

372 id 5467 In relation to the satellite navigation system NAVSTAR/GPS, the term 'inclination' denotes the angle between the:

a **orbital plane and the equatorial plane**

b horizontal plane at the location of the receiver and the direct line to a satellite

c orbital plane and the earth's axis

d horizontal plane at the location of the receiver and the orbital plane of a satellite

373 id 5468 How long does it take a NAVSTAR/GPS satellite to orbit the earth?

a 12 days

b Approximately 24 hours (one sidereal day)

c **Approximately 12 hours (1/2 of a sidereal day)**

d 365 days because the satellites are located in a geostationary orbit

374 id 5469 At what approximate height above the WGS-84 ellipsoid are NAVSTAR/GPS satellites circling the earth?

a **20200 km**

b 10900 km

c 36000 km

d 19500 km

375 id 5470 The orbital planes of the satellite navigation system NAVSTAR/GPS are:

a **inclined 55° to the equatorial plane**

b inclined 55° to the earth axis

c inclined 90° to the equatorial plane

d parallel to the equatorial plane

376 id 5471 In which frequency bands are the L1 and L2 frequencies used by the satellite navigation system NAVSTAR/GPS for transmission of the navigation message?

a EHF

b VHF

c **UHF**

d SHF

377 id 5472 In relation to the satellite navigation system NAVSTAR/GPS, which of the following statements correctly describes the term 'Pseudo Random Noise (PRN)' signal?

a PRN describes the continuous electro-magnetical background noise that exists in space

b PRN is the atmospheric jamming that affects the signals transmitted by the satellites

c **PRN is a code used for the identification of the satellites and the measurement of the time taken by the signal to reach the receiver**

d PRN occurs in the receiver. It is caused by the signal from one satellite being received from different directions (multipath effect)

378 id 5473 Which of the following NAVSTAR/GPS satellite navigation system codes can be processed by 'unauthorised' civil aviation receivers?

a P and Y

b P

c C/A- and P

d **C/A**

379 id 5474 Almanac data stored in the receiver of the satellite navigation system NAVSTAR/GPS is used for the:

a recognition of Selective Availability (SA)

b **fast identification of received signals coming from visible satellites**

c assignment of received PRN-codes (Pseudo Random Noise) to the appropriate satellite

d correction of receiver clock error

380 id 5475 How does a NAVSTAR/GPS satellite navigation system receiver recognise which of the received signals belongs to which satellite?

a Each satellite transmits its signal on a separate frequency

b The Doppler shift is unique to each satellite

c The receiver detects the direction from which the signals are received and compares this information with the calculated positions of the satellites

d **Each satellite transmits its signal, on common frequencies, with an individual Pseudo Random Noise code**

381 id 5476 Which of the following data, in addition to the Pseudo Random Noise (PRN) code, forms part of the so called 'Navigation Message' transmitted by NAVSTAR/GPS satellites?

a time; data to impair the accuracy of the position fix (Selective Availability SA)

b **almanac data; satellite status information**

c data to correct receiver clock error; almanac data

d time; positions of the satellites

382 id 5477 In the NAVSTAR/GPS satellite navigation system, what is the maximum time taken to receive the complete set of almanac data from all satellites?

a 25 seconds (= 1 second per data frame)

b 12 hours (= period of the satellites orbit)

c **12.5 minutes (= 30 seconds per data frame)**

d 24 seconds (= 1 second per data frame)

383 id 5478 Which of the following statements concerning the L1 and L2 NAVSTAR/GPS transmission frequencies and codes is correct?

a C/A and P codes are transmitted at different times on both frequencies

b **The higher frequency is used to transmit both the C/A and P codes**

c The higher frequency is only used to transmit the P code

d The lower frequency is used to transmit both the C/A and P codes

384 id 5479 Which one of the following errors can be compensated for by a NAVSTAR/GPS receiver comparing L1 and L2 frequencies?

a **Ionospheric**

b Multipath

c Tropospheric

d Receiver noise

385 id 5480 Which of the following statements is correct concerning the principle behind the correction of one of the NAVSTAR/GPS satellite navigation system errors by the transmission of the signals on two frequencies (L1 and L2)?

a The effect of signal reflections (multipath effect) can be reduced due to the interference of both frequencies

b The effect of receiver noise can be reduced due to the interference of both frequencies

c **The path delay of the signals in the earth atmosphere is proportional to the inverse of the carrier frequency squared**

d The influence of shadowing on the GPS signals is proportional to the inverse of the carrier frequency squared

386 id 5481 Concerning the NAVSTAR/GPS satellite navigation system, what is the meaning of the term 'Receiver Autonomous Integrity Monitoring' (RAIM)?

a It is a method whereby a receiver ensures the integrity of the Pseudo Random Noise (PRN) code transmitted by the satellites

b It is the ability of the GPS satellites to check the integrity of the data transmitted by the monitoring stations of the ground segment

c **It is a technique by which a receiver ensures the integrity of the navigation information**

d It is a technique whereby the receivers of the world-wide distributed monitor stations (ground segment) automatically determines the integrity of the navigation message

387 id 5590 GPS system satellites transmit their signals on two carrier waves 1575 MHz and 1227 MHz and supply two possible codes accessible acording to user (civil or military). Commercial aviation uses:

a only the 1 575 MHz carrier wave and two codes

b **only the 1 575 MHz carrier wave and one code**

c only the 1 227 MHz carrier wave and one code

d the two carrier waves and one public code

388 id 5773 What are the effects, if any, of shadowing by parts of the aircraft (e.g. wing) on the reception of signals from NAVSTAR/GPS satellites?

a **It may prevent the reception of signals**

b It causes multipath propagation

c The signals will be distorted, however the error can be corrected for using an algorithm and information from unaffected signals

d It has no influence because high frequency signals are unaffected

389 id 5774 Which of the following geometric satellite constellations provides the most accurate NAVSTAR/GPS position fix?

a 3 satellites with an azimuth of 120° from each other and an elevation of 45° above the horizon

b **3 satellites with a low elevation above the horizon and an azimuth of 120° from each other together with a fourth directly overhead**

c 4 satellites with an azimuth of 90° from each other and a low elevation above the horizon

d 4 satellites with an azimuth of 90° from each other and an elevation of 45° above the horizon

390 id 5775 In relation to the NAVSTAR/GPS satellite navigation system, what is involved in the differential technique (D-GPS)?

a Receivers from various manufacturers are operated in parallel to reduce the characteristical receiver noise error

b The difference between signals transmitted on the L1 and L2 frequencies are processed by the receiver to determine an error correction

c **Fixed ground stations compute position errors and transmit correction data to a suitable receiver on the aircraft**

d Signals from satellites are received by 2 different antennas which are located a fixed distance apart. This enables a suitable receiver on the aircraft to recognise and correct for multipath errors

391 id 5776 Which of the following statements about the accuracy that can be obtained with the differential technique (D-GPS) of the satellite navigation system NAVSTAR/GPS is correct?

a The increase in accuracy of position fixes is independent of the receiver position in relation to a D-GPS ground station

b **The nearer a receiver is situated to a D-GPS ground station, the more accurate the position fix**

c A D-GPS receiver can detect and correct for SA providing a more accurate position fix

d Only D-GPS allows position fixes accurate enough for 'Non Precision Approaches'

392 id 5777 How does a receiver of the NAVSTAR/GPS satellite navigation system determine the elevation and azimuth data of a satellite relative to the location of the antenna?

a **It calculates it by using Almanac data transmitted by the satellites**

b The data is stored in the receiver together with the Pseudo Random Noise (PRN) code

c The data is based on the direction to the satellite determined at the location of the antenna

d The data is determined by the satellite and transmitted together with the navigation message

393 id 5778 In relation to the NAVSTAR/GPS satellite navigation system, 'Search the Sky' is a:

a continuous process by the ground segment to monitor the GPS satellites

b **procedure that starts after switching on a receiver if there is no stored satellite data available**

c procedure performed by the receiver to recognise new satellites becoming operational

d continuous procedure performed by the receiver that searches the sky for satellites rising above the horizon

394 id 5779 What is the procedure to be followed if, on a flight under IFR conditions using the NAVSTAR/GPS satellite navigation system, the number of satellites required to maintain the RAIM (Receiver Autonomous Integrity Monitoring) function are not available?

a **The flight may be continued using other certificated navigation systems**

b The flight has to be continued under VFR conditions

c A constant heading and speed must be flown until the required number of satellites are again available

d The flight may be continued as planned if at least 4 satellites are available and the pilot monitors the GPS-System manually

395 id 5780 Which of the following, if any, is a prerequisite if a receiver of a NAVSTAR/GPS satellite navigation system is to be used in combination with a multi sensor system?

a Multi-sensor systems are not certificated for flights under IFR conditions

b The prescribed IFR-equipment must be in working correctly and the navigation information continuously displayed

c The RAIM-function of the GPS receiver must be able to monitor all prescribed navigation systems

d **The prescribed IFR-equipment must be installed and operational**

396 id 5781 Which of the following procedures must be adopted if, on a flight under IFR conditions using a NAVSTAR/GPS satellite navigation system receiver, the position fix obtained from the GPS receiver differs from the position of conventional navigation systems by an unacceptable amount?

a It must be continued under VFR conditions

b It may be continued using NAVSTAR/GPS; prior to the next flight all systems must be checked

c **It may be continued using conventional navigation systems**

d The pilot must determine the reason for the deviation and correct the error or switch off the faulty system

397 id 5782 What datum is used for the Minimum Descent Altitude (MDA) on a non-precision approach when using the NAVSTAR/GPS satellite navigation system?

a If using Differential-GPS (D-GPS) the altitude obtained from the D-GPS, otherwise barometric altitude

b **Barometric altitude**

c Radar altitude

d GPS altitude

398 id 5783 Which of the following is the datum for altitude information when conducting flights under IFR conditions on airways using the NAVSTAR/GPS satellite navigation system?

a GPS altitude if 4 or more satellites are received otherwise barometric altitude

b The average of GPS altitude and barometric altitude

c GPS altitude

d **Barometric altitude**

399 id 7230 The satellites used in the GPS

a Are geostationary

b Do not cross the plane of the Equator

c All have different planes of orbit

d **Orbit the Earth at an altitude of about 20 200 km**

400 id 7231 Using GPS, the primary position information is in the form of

a **Spheres, with the satellites in the centre of the spheres**

b Spheres, with the airplane in the centre of the spheres

c Bearing and distance from the satellite

d 3-dimensional position, with the Earth's centre as reference

401 id 7232 The GPS satellites will pass positions on the Earth having latitude as high as

a 45°

b **55°**

c 60°

d 65°

402 id 7233 Of the types of GPS receivers available for civil aviation, which is the most advanced type?

a The multiplex receiver

b The multiple satellite receiver

c The single channel receiver

d **The continuous tracking receiver**

403 id 7234 Current minimum operational standards for the GPS system calls for

a 3 satellites "visible" at least 7,5° above the horizon

b 4 satellites "visible" above the horizon

c 4 satellites "visible" at least 10° above the horizon

d **5 satellites "visible" at least 7,5° above the horizon**

404 id 7235 In the GPS system Receiver Autonomous Integrity Monitoring (RAIM)

a **Means that the receiver evaluates the signals from 5 satellites and discards the signals from a satellite exhibiting anomalous pseudo range errors**

b Means that the positions from 3 independent receivers are matched and blended to one accurate position

c Means that the receiver itself selects 3 satellites from the 21 in orbit at any time

d Includes the operators final selection of the satellites that the receiver presents as suitable

405 id 7236 Differential GPS (DGPS)

a Is used to differentiate between the signals from different satellites

b Means to find the difference between a DR position produced by the navigation (between the GPS position and the real position) computer and the GPS position

c **Is used to improve the accuracy of GPS signals within an area, by using data from a receiver placed in a known position as a correction to the data received in the aircraft from the satellites**

d Means to use the GPS receiver while in a known position, and register the difference