c) 300 - 3000 kHz
d) 200 - 2000 kHz

62.1.2.0 (4622)
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'

62.1.2.0 (4623)
Factors liable to affect most NDB/ADF system performance and reliability include:
a) static interference - night effect - absence of failure warning system
b) static interference - station interference - latitude error
c) height error - station interference - mountain effect
d) coastal refraction - lane slip - mountain effect

62.1.2.0 (4624)
Which one of the following disturbances is most likely to cause the greatest inaccuracy in ADF bearings?
a) Local thunderstorm activity
b) Coastal effect
c) Quadrantal error
d) Precipitation interference

62.1.2.0 (4625)
The BFO selector on an ADF receiver is used to:
a) hear the IDENT of some NDB stations radiating a continuous wave signal
b) stop loop rotation
c) hear the IDENT and must always be switched ON
d) find the loop 'null' position

62.1.2.0 (4626)
An NDB transmits a signal pattern in the horizontal plane which is :
a) omnidirectional
b) bi-lobal circular
c) a cardioid balanced at 30 Hz
d) a beam rotating at 30 Hz

62.1.3.0 (4627)
Transmissions from VOR facilities may be adversely affected by:
a) uneven propagation over irregular ground surfaces
b) static interference
c) night effect
d) quadrantal error

62.1.3.0 (4628)
If VOR bearing information is used beyond the published protection range, errors could be caused by:
a) interference from other transmitters
b) noise from precipitation static exceeding the signal strength of the transmitter
c) sky wave interference from the same transmitter
d) sky wave interference from distant transmitters on the same frequency

62.1.3.0 (4629)
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) 1.5
b) 3.0
c) 4.5
d) 6.0

62.1.3.0 (4630)
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) 105 NM
b) 50 NM
c) 165 NM
d) 210 NM

62.1.3.0 (4631)
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 TO flag showing
b) 284° with the FROM flag showing
c) 104° with the TO flag showing
d) 104° with the FROM flag showing

62.1.3.0 (4632)
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) 270°
b) 090°
c) 100°
d) 280°

62.1.3.0 (4633)
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°

62.1.3.0 (4634)
The VOR system is limited to about 1° of accuracy. One degree at 200 NM represents a width of:
a) 3.5 NM
b) 2.0 NM
c) 2.5 NM
d) 3.0 NM

62.1.3.0 (4635)
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°

62.1.3.0 (4636)
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) 270°
b) 280°
c) 100°
d) 090°

62.1.3.0 (4637)
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) 212
b) 208
c) 360
d) 180

62.1.3.0 (4638)
The principle used in VOR bearing measurement is:
a) phase comparison
b) envelope matching
c) beat frequency discrimination
d) difference in depth of modulation

62.1.3.0 (4639)
Which frequency band is used by VOR transmissions?
a) VHF
b) UHF
c) SHF
d) HF

62.1.3.0 (4640)
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

62.1.3.0 (4641)
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 TO flag showing
b) 064° with the FROM flag showing
c) 244° with the FROM flag showing
d) 244° with the TO flag showing

62.1.3.0 (4642)
What is the maximum theoretical range that an aircraft at FL150 can receive signals from a VOR situated 609 feet above MSL?
a) 184 NM
b) 220 NM
c) 147 NM
d) 156 NM

62.1.3.0 (4643)
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 135°, relative bearing unknown
b) Radial unknown, relative bearing 225°
c) Radial unknown, relative bearing 045°
d) Radial 315°, relative bearing unknown

62.1.3.0 (4644)
Which of the following statements concerning the variable, or directional, signal of a conventional VOR is correct?
a) The rotation of the variable signal at a rate of 30 times per second gives it the characteristics of a 30 Hz amplitude modulation
b) The transmitter varies the amplitude of the variable signal by 30 Hz each time it rotates
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

62.1.3.0 (4645)
The maximum theoretical range at which an aircraft at FL230 may receive signals from a VOR facility sited at mean sea level is:
a) 190 NM
b) 230 NM
c) 170 NM
d) 151 NM

62.1.3.0 (4646)
If an aircraft flies along a VOR radial it will follow a:

a) great circle track
b) rhumbline track
c) line of constant bearing
d) constant magnetic track

62.1.3.0 (4647)
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) 110 NM
b) 90 NM
c) 100 NM
d) 120 NM

62.1.3.0 (4648)
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

62.1.3.0 (4649)
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) 204 NM
b) 245 NM
c) 163 NM
d) 183 NM

62.1.3.0 (4650)
In which frequency band do VOR transmitters operate?
a) VHF
b) UHF
c) SHF
d) EHF

62.1.3.0 (4651)
The two signals transmitted by a conventional VOR ground station are 90° out of phase on magnetic:
a) east
b) south
c) west
d) north

62.1.3.0 (4652)
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) NW
b) SW
c) SE
d) NE

62.1.3.0 (4653)
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) 10° or more
b) less than 10°
c) 1.5° or more
d) 2.5 or more

62.1.3.0 (4654)
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 'TO' showing
b) right with 'TO' showing
c) right with 'FROM' showing
d) left with 'FROM' showing

62.1.3.0 (4655)
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) 275
b) 85
c) 265
d) 95

62.1.3.0 (4656)
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

62.1.3.0 (4657)
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°

62.1.3.0 (4658)
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°

62.1.3.0 (4659)
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) 123 NM
b) 123 km
c) 12.3 NM
d) 1230 km

62.1.3.0 (4660)
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) behind the aeroplane symbol with the FROM flag showing
b) behind the aeroplane symbol with the TO flag showing
c) ahead of the aeroplane symbol with the FROM flag showing
d) ahead of the aeroplane symbol with the TO flag showing

62.1.4.0 (4661)
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) 16 NM
b) 14 NM
c) 15 NM
d) 17 NM

62.1.4.0 (4662)
Which of the following will give the most accurate calculation of aircraft ground speed?
a) A DME station sited on the flight route
b) An ADF sited on the flight route
c) A VOR station sited on the flight route
d) A DME station sited across the flight route

62.1.4.0 (4663)
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 tracking directly towards the station at a range of 100 NM or more
b) When passing abeam the station and within 5 NM of it
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

62.1.4.0 (4664)
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

62.1.4.0 (4665)
An aircraft DME receiver does not lock on to its own transmissions reflected from the ground because:
a) they are not on the receiver frequency
b) DME transmits twin pulses
c) the pulse recurrence rates are varied
d) DME uses the UHF band

62.1.4.0 (4666)
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.

62.1.4.0 (4667)
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) 6 NM
b) 7 NM
c) 11 NM
d) 8 NM

62.1.4.0 (4668)
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

62.1.4.0 (4669)
A typical frequency employed in Distance Measuring Equipment (DME) is:
a) 1000 MHz
b) 10 MHz
c) 100 MHz
d) 100 GHz

62.1.4.0 (4670)
Distance Measuring Equipment (DME) operates in the:
a) UHF band and is a secondary radar system
b) VHF band and uses the principle of phase comparison
c) UHF band and is a primary radar system
d) SHF band and uses frequency modulation techniques

62.1.4.0 (4671)
For a conventional DME facility 'Beacon Saturation' will occur whenever the number of simultaneous interrogations exceeds:
a) 100
b) 200

c) 60
d) 80

62.1.4.0 (4672)
On a DME, display counters rotating throughout their range indicates:
a) the airborne receiver is conducting a range search
b) airborne equipment failure
c) ground equipment failure
d) the airborne equipment is conducting a frequency search

62.1.4.0 (4673)
The aircraft DME receiver is able to accept replies to its own transmissions and reject replies to other aircraft interrogations because:
a) pulse pairs are discreet to a particular 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) transmission frequencies are 63 MHz different for each aircraft

62.1.4.0 (4674)
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

62.1.4.0 (4675)
The design requirements for DME stipulate that, at a range of 100 NM, the maximum systematic error should not exceed:
a) + or - 1.5 NM
b) + or - 3 NM
c) + or - 0.25 NM
d) + or - 1.25 NM

62.1.4.0 (4676)
ICAO specifications are that range errors indicated by Distance Measuring Equipment (DME) should not exceed:
a) + or - 0.25 NM plus 1.25% of the distance measured
b) + or - 0.5 NM or 3% of the distance measured whichever is the greater
c) + or - 1.25 NM plus 0.25% of the distance measured
d) + or - 0.25 NM plus 3% of the distance measured up to a maximum of 5 NM

62.1.4.0 (4677)
What is the maximum distance between VOR and DME/TACAN ground installations if they are to have the same morse code identifier?
a) 600 m
b) 2000 m
c) 60 m
d) 300 m

62.1.4.0 (4678)
A DME in tracking mode subsequently experiences a reduction in signal strength will switch the equipment in the first instance to:
a) memory mode
b) search mode
c) standby mode
d) signal controlled search

62.1.4.0 (4679)
Of what use, if any, is a military TACAN station to civil aviation ?
a) It can provide DME distance
b) It is of no use to civil aviation
c) It can provide a DME distance and magnetic bearing
d) It can provide a magnetic bearing

62.1.4.0 (4680)
A DME that has difficulty obtaining a ""lock-on"":(NOTE: PRF = pulse recurrence frequency, PPS = pulses per second)
a) stays in search mode but reduces PRF to max. 60 PPS after 15000 pulse pairs have been transmitted
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) alternates search mode with periods of memory mode lasting 10 seconds

62.1.4.0 (4681)
DME channels utilise frequencies of approximately:
a) 1000 MHz
b) 300 MHz
c) 110 MHz
d) 600 MHz

62.1.4.0 (4682)
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) DME callsign is the one with the higher pitch that was broadcast only once
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) VOR and DME callsigns were the same and broadcast with the same pitch

62.1.5.0 (4683)
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

62.1.5.0 (4684)
A Category 1 Instrument Landing System (ILS) ground installation provides accurate guidance from coverage limit down to:
a) 200 feet above the runway threshold

b) 50 feet above ILS reference point
c) runway surface
d) 200 feet above the inner marker

62.1.5.0 (4685)
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) aircraft manoeuvring near the runway may disturb guidance signals
b) heavy precipitation 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

62.1.5.0 (4686)
An aircraft tracking to intercept the Instrument Landing System (ILS) localiser inbound on the approach side, outside the published ILS coverage angle:
a) may receive false course indications
b) will not normally receive signals
c) will receive signals without identification coding
d) can expect signals to give correct indications

62.1.5.0 (4687)
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

62.1.5.0 (4688)
The OUTER MARKER of an Instrument Landing System (ILS) facility transmits on a frequency of:
a) 75 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) 300 MHz and is modulated by morse at two dashes per second

62.1.5.0 (4689)
What approximate rate of descent is required in order to maintain a 3° glide path at a groundspeed of 120 kt?
a) 600 FT/MIN
b) 550 FT/MIN
c) 800 FT/MIN
d) 950 FT/MIN

62.1.5.0 (4690)
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) 1450 FT
b) 1400 FT
c) 1350 FT
d) 1300 FT

62.1.5.0 (4691)
What is the approximate angular coverage of reliable navigation information for a 3° ILS glide path out to a distance of 10 NM?
a) 1.35° above the horizontal to 5.25° above the horizontal and 8° each side of the localiser centreline
b) 0.45° above the horizontal to 1.75° above the glide path 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

62.1.5.0 (4692)
ILS is subject to false glide paths resulting from:
a) multiple lobes of radiation patterns in the vertical plane
b) spurious signals reflected by nearby obstacles
c) back-scattering of antennas
d) ground returns ahead of the antennas

62.1.5.0 (4693)
What is the colour sequence when passing over an Outer, Middle and Inner Marker beacon?
a) blue - amber - white
b) amber - white - green
c) white - amber - blue
d) blue - green - white

62.1.5.0 (4694)
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

62.1.5.0 (4695)
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

62.1.5.0 (4696)
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) modulation frequencies
b) (i) the same (ii) phases
c) (i) different (ii) modulation frequencies
d) (i) different (ii) phases

62.1.5.0 (4697)
In which frequency band does an ILS glide slope transmit?
a) UHF
b) VHF
c) SHF
d) EHF

62.1.5.0 (4698)
Assuming a five dot display, what does each of the dots on either side of the ILS localizer cockpit display represent :
a) 0.5 degrees
b) 1.5 degrees
c) 2.5 degrees
d) 2.0 degrees

62.1.5.0 (4699)
Outer marker transmits on 75 MHz and has an aural frequency of:
a) 400 Hz
b) 1300 Hz
c) 2000 Hz
d) 3000 Hz

62.1.5.0 (4700)
Every 10 kt decrease in groundspeed, on a 3° ILS glidepath, will require an approximate:
a) decrease in the aircraft's rate of descent of 50 FT/MIN
b) increase 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

62.1.5.0 (4701)
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

62.1.5.0 (4702)
The rate of descent required to maintain a 3.25° glide slope at a groundspeed of 140 kt is approximately:
a) 800 FT/MIN
b) 850 FT/MIN
c) 670 FT/MIN
d) 700 FT/MIN

62.1.5.0 (4703)
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

62.1.5.0 (4704)
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

62.1.5.0 (4705)
Which of the following is an ILS localiser frequency?
a) 109.15 MHz
b) 108.25 MHz
c) 110.20 MHz
d) 112.10 MHz

62.1.5.0 (4706)
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

62.1.5.0 (4707)
The heading rose of an HSI is frozen on 200°.Lined up on the ILS of runway 25, the localizer needle will be:
a) centred
b) left of centre
c) right of centre
d) centred with the 'fail' flag showing

62.1.6.0 (4708)
The azimuth transmitter of a Microwave Landing System (MLS) provides a fan-shaped horizontal approach zone which is usually:
a) + or - 40° of the runway centre-line
b) + or - 50° of the runway centre-line
c) + or - 60° of the runway centre-line
d) + or - 30° of the runway centre-line

62.1.6.0 (4709)
Which one of the following is an advantage of a Microwave Landing System (MLS) compared with an Instrument Landing System (ILS)?

a) It is insensitive to geographical site and can be installed at sites where it is not possible to use an ILS
b) It does not require a separate azimuth (localiser) and elevation (azimuth) transmitter
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

62.1.6.0 (4710)
MLS installations notified for operation, unless otherwise stated, provide azimuth coverage of:
a) + or - 40° about the nominal courseline out to a range of 20 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 - 20° about the nominal courseline out to a range of 10 NM

62.1.6.0 (4711)
In which frequency band does the Microwave Landing System (MLS) operate?
a) SHF
b) EHF
c) VHF
d) UHF

62.1.6.0 (4712)
Which one of the following methods is used by a Microwave Landing System (MLS) to indicate distance from the runway threshold?
a) A DME co-located with the MLS transmitters
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) Timing the interval between the reception of sequential secondary radar pulses from the MLS station to the aircraft

62.1.6.0 (4713)
Which one of the following correctly lists the major ground based components of a Microwave Landing System (MLS)?
a) Separate azimuth and elevation transmitters, DME facility
b) Separate azimuth and elevation transmitters, outer and middle marker beacons
c) Combined azimuth and elevation transmitter, DME facility
d) Combined azimuth and elevation transmitter, outer and inner marker beacons

62.2.1.0 (4714)
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) pulse length (ii) pulse recurrence frequency
b) (i) transmission frequency (ii) transmitter power output
c) (i) pulse length (ii) length of the timebase
d) (i) transmission frequency (ii) pulse recurrence frequency

62.2.1.0 (4715)
Which one of the following statements is correct concerning the use in primary radar of continuous wave transmissions as compared with pulse transmissions?
a) It eliminates the minimum target reception range
b) A smaller common transmitter and receiver aerial can be used
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

62.2.1.0 (4716)
A Primary radar operates on the principle of:
a) pulse technique
b) transponder interrogation
c) phase comparison
d) continuous wave transmission

62.2.1.0 (4717)
The main factor which determines the minimum range that can be measured by a pulsed radar is pulse:
a) length
b) amplitude
c) repetition rate
d) frequency

62.2.1.0 (4718)
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) 405 pps
b) 782 pps
c) 308 pps
d) 375 pps

62.2.1.0 (4719)
The maximum range of primary radar depends on :
a) pulse recurrence frequency
b) wave length
c) frequency
d) pulse length

62.2.1.0 (4720)
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) 16
b) 2
c) 4
d) 8

62.2.1.0 (4721)
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

62.2.1.0 (4722)
Which of the following types of radar systems are most suited for short range operation?
a) primary continuous wave
b) centimetric pulse
c) millimetric pulse
d) secondary continuous wave

62.2.1.0 (4723)
In which frequency band do most airborne weather, and ground based ATC, radar systems operate?
a) SHF
b) UHF
c) EHF
d) VHF

62.2.1.0 (4724)
In relation to radar systems that use pulse technology, the term 'Pulse Recurrence Rate (PRR)' signifies the:
a) number of pulses per second
b) delay after which the process re-starts
c) the number of cycles per second
d) ratio of pulse period to pulse width

62.2.1.0 (4725)
The theoretical maximum range for an Airborne Weather Radar is determined by the:
a) pulse recurrence frequency
b) transmission power
c) size of the aerial
d) transmission frequency

62.2.1.0 (4726)
In a primary radar using pulse technique, pulse length determines:
a) minimum measurable range
b) target discrimination
c) maximum measurable range
d) beam width

62.2.1.0 (4727)
In a primary radar using pulse technique, pulse recurrence frequency (PRF)/pulse recurrence rate (PRR) determines:
a) maximum theoretical range
b) target discrimination
c) minimum range
d) beam width

62.2.1.0 (4728)
In a primary radar using pulse technique, the ability to discriminate between targets in azimuth is a factor of:
a) beam width
b) aerial rotation rate
c) Pulse Recurrence Rate (PRR)
d) pulse length

62.2.1.0 (4729)
Which of the following radar equipments operate by means of the pulse technique?
1. Aerodrome Surface Movement Radar2. Airborne Weather Radar3. Secondary Surveillance Radar (SSR)4. Aerodrome Surveillance (approach) Radar
a) 1, 2, 3 and 4
b) 1, 2 and 4 only
c) 2, 3 and 4 only
d) 2 and 4 only

62.2.2.0 (4730)
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) 333 km
b) 666 km
c) 1333 km
d) 150 km

62.2.2.0 (4731)
A radar facility transmitting at a Pulse Recurrence Frequency (PRF) of 1200 pulses/second will have a maximum unambiguous range of approximately:
a) 69 NM
b) 135 NM
c) 270 NM
d) 27 NM

62.2.2.0 (4732)
A ground radar transmitting at a PRF of 1200 pulses/second will have a maximum unambiguous range of approximately:
a) 67 NM
b) 135 NM
c) 270 NM
d) 27 NM

62.2.2.0 (4733)
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) 60 (iii) sometimes
b) (i) EHF (ii) 30 (iii) never
c) (i) SHF (ii) 10 (iii) always
d) (i) EHF (ii) 100 (iii) never

62.2.2.0 (4734)
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) 1620 pps
b) 3240 pps
c) 610 pps
d) 713 pps

62.2.2.0 (4735)
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) 3000
b) 6000
c) 167
d) 330

62.2.2.0 (4736)
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

62.2.2.0 (4737)
The maximum range obtainable from an ATC Long Range Surveillance Radar is approximately:
a) 300 NM
b) 200 NM
c) 100 NM
d) 400 NM

62.2.2.0 (4738)
On which of the following radar displays is it possible to get an indication of the shape, and to some extent the type, of the aircraft generating the return?
a) Aerodrome Surface Movement Radar (ASMR)
b) Secondary Surveillance Radar (SSR)
c) Aerodrome Surveillance (approach) Radar
d) Airborne Weather Radar (AWR)

62.2.3.0 (4739)
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

62.2.3.0 (4740)
The ISO-ECHO facility of an airborne weather radar is provided in order to:
a) detect areas of possible severe turbulence in cloud
b) give an indication of cloud tops
c) inhibit unwanted ground returns
d) extend the mapping range

62.2.3.0 (4741)
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

62.2.3.0 (4742)
Which of the following cloud types is most readily detected by airborne weather radar when using the 'weather beam'?
a) cumulus
b) cirrocumulus
c) stratus
d) altostratus

62.2.3.0 (4743)
In which mode of operation does the aircraft weather radar use a cosecant radiation pattern.
a) MAPPING
b) CONTOUR
c) WEATHER
d) MANUAL

62.2.3.0 (4744)
In an Airborne Weather Radar that has a colour cathode ray tube (CRT) the areas of greatest turbulence are indicated on the screen by:
a) colour zones being closest together
b) blank iso-echo areas where there is no colour
c) large areas of flashing red colour
d) iso-echo areas which are coloured black

62.2.3.0 (4745)
Which of the following is a complete list of airborne weather radar antenna stabilisation axes?
a) roll and pitch
b) roll, pitch and yaw
c) pitch and yaw
d) roll and yaw

62.2.3.0 (4746)
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

62.2.3.0 (4747)
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

62.2.3.0 (4748)
In general the operation of airborne weather radar equipment on the ground is:
a) only permitted with certain precautions, to safeguard health of personnel and to protect equipment
b) permitted anywhere
c) totally prohibited
d) unrestrictedly permitted in aerodrome maintenance areas

62.2.3.0 (4749)
The pencil shaped beam of an airborne weather radar is used in preference to the mapping mode for the determination of ground features:
a) beyond 50 to 60 NM because more power can be concentrated in the narrower beam
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) when approaching coast-lines in polar regions

62.2.3.0 (4750)
A frequency of airborne weather radar is :
a) 9375 MHz
b) 9375 GHz
c) 9375 kHz
d) 93.75 MHz

62.2.3.0 (4751)
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) increase 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) decrease in area and move to the top of the screen

62.2.3.0 (4752)
In weather radar the use of a cosecant beam in 'Mapping' mode enables:
a) scanning of a large ground zone producing echos whose signals are practically independent of distance
b) better reception of echos on contrasting terrain such as ground to sea
c) a greater radar range to be achieved
d) higher definition echoes to be produced giving a clearer picture

62.2.3.0 (4753)
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

62.2.3.0 (4754)
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) 2.5° up
b) 0°
c) 2.5° down
d) 5° up

62.2.3.0 (4755)
When switching on the weather radar, after start-up, a single very bright line appears on the screen.This means that the:
a) scanning of the cathode ray tube is faulty
b) transmitter is faulty
c) scanner is not rotating
d) receiver is faulty

62.2.3.0 (4756)
The advantage of the use of slotted antennas in modern radar technology is to:
a) virtually eliminate lateral lobes and as a consequence concentrate more energy in the main beam
b) simultaneously transmit weather and mapping beams
c) have a wide beam and as a consequence better target detection
d) eliminate the need for azimuth slaving

62.2.3.0 (4757)
Which of the following lists phenomena that CANNOT be detected by weather radar?
a) snow, clear air turbulence
b) dry hail, clear air turbulence
c) clear air turbulence, turbulence in cloud with precipitation
d) snow, turbulence in clouds with precipitation

62.2.3.0 (4758)
Which of the following equipments uses primary radar principles?
a) Airborne weather radar (AWR)
b) Secondary Surveillance Radar (SSR)
c) Distance Measuring Equipment (DME)
d) Global Positioning System (GPS)

62.2.4.0 (4759)
When Mode C is selected on the aircraft SSR transponder the additional information transmitted is:
a) flight level based on 1013.25 hPa
b) altitude based on regional QNH

c) aircraft height based on sub-scale setting
d) height based on QFE

62.2.4.0 (4760)
The ground Secondary Surveillance Radar (SSR) equipment incorporates a transmitter and receiver respectively operating in the following frequencies:
Transmitter Receiver
a) 1030 MHz 1090 MHz
b) 1090 MHz 1030 MHz
c) 1090 MHz 1090 MHz
d) 1030 MHz 1030 MHz

62.2.4.0 (4761)
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

62.2.4.0 (4762)
In order to indicate radio failure the aircraft SSR transponder should be selected to code:
a) 7600
b) 7700
c) 7000
d) 7500

62.2.4.0 (4763)
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) 7500
b) 7600
c) 7700
d) 7000

62.2.4.0 (4764)
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

62.2.4.0 (4765)
The frequency of an SSR ground transmission is:
a) 1030 +/- 0.2 Mhz
b) 1050 +/- 0.5 Mhz
c) 1090 +/- 0.3 Mhz
d) 1120 +/- 0.6 Mhz

62.2.4.0 (4766)
The two main design functions of Secondary Surveillance Radar (SSR) Mode S are:
a) air to ground and ground to air data link communications and improved ATC aircraft surveillance capability
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) the elimination of ground to air communications and the introduction of automatic separation between aircraft using TCAS II

62.2.4.0 (4767)
The ATC transponder system,excluding Mode S, contains :
a) two modes, each of 4096 codes
b) four modes, each 1024 codes
c) four modes, each 4096 codes
d) two modes, each 1024 codes

62.2.4.0 (4768)
A secondary radar can provide up to 4096 different codes.These 4096 codes can be used in:
a) all modes
b) mode A only
c) mode C only
d) mode S

62.2.4.0 (4769)
The code transmitted by a SSR transponder consists of:
a) pulses
b) phase differences
c) frequency differences
d) amplitude differences

62.2.4.0 (4770)
Which of the following Secondary Surveillance Radar (SSR) codes is used to indicate transponder malfunction?
a) 0
b) 7600
c) 4096
d) 9999

62.2.4.0 (4771)
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) 2000
b) 5000
c) 7000
d) 0

62.2.4.0 (4772)
What is the maximum number of usable Secondary Surveillance Radar (SSR)

transponder codes?
a) 4096
b) 3600
c) 1000
d) 760

62.2.4.0 (4773)
Which of the following equipments works on the interrogator/transponder principle?
a) Secondary Surveillance Radar (SSR)
b) Global Positioning System (GPS)
c) Airborne Weather Radar (AWR)
d) Aerodrome Surface Movement Radar

62.2.4.0 (4774)
In order to indicate an emergency situation, the aircraft Secondary Surveillance Radar (SSR) transponder should be set to:
a) 7700
b) 7600
c) 7500
d) 7000

62.2.4.0 (4775)
Which one of the following switch positions should be used when selecting a code on the Transponder?
a) STBY (Standby)
b) IDENT (Identification)
c) NORMAL
d) OFF

62.2.4.0 (4776)
The selection of code 2000 on an aircraft SSR transponder indicates:
a) entry into airspace from an area where SSR operation has not been required
b) unlawful interference with the planned operation of the flight
c) an emergency
d) transponder malfunction

62.2.4.0 (4777)
The selection of code 7500 on an aircraft SSR transponder indicates:
a) unlawful interference with the planned operation of the flight
b) an emergency
c) transponder malfunction
d) radio communication failure

62.2.4.0 (4778)
The selection of code 7600 on an aircraft SSR transponder indicates:
a) radio communication failure
b) an emergency
c) unlawful interference with the planned operation of the flight
d) transponder malfunction

62.2.4.0 (4779)
The selection of code 7700 on an aircraft SSR transponder indicates:
a) an emergency
b) radio communication failure
c) transponder malfunction
d) unlawful interference with the planned operation of the flight

62.5.1.0 (4780)
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

62.5.1.0 (4781)
Precision RNAV (P-RNAV) requires a track-keeping accuracy of:
a) 0.5 NM standard deviation or better
b) 0.25 NM standard deviation or better
c) 1.0 NM standard deviation or better
d) 1.5 NM standard deviation or better

62.5.1.0 (4782)
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

62.5.1.0 (4783)
Under JAR-25 colour code rules, features displayed in red on an Electronic Flight Instrument System (EFIS), indicate:
a) warnings, flight envelope and system limits
b) flight envelope and system limits, engaged modes
c) warnings, cautions and abnormal sources
d) cautions and abnormal sources, engaged modes

62.5.1.0 (4784)
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

62.5.1.0 (4785)
Under JAR-25 colour code rules, features displayed in green on an Electronic Flight

c) Flight Control Computer
d) Navigation database

62.6.1.0 (4835)
An apparent increase in the transmitted frequency which is proportional to the transmitter velocity will occur when:
a) the transmitter moves towards the receiver
b) the transmitter moves away from the receiver
c) the receiver moves towards the transmitter
d) both transmitter and receiver move towards each other

62.6.1.0 (4836)
The Doppler Navigation System is based on:
a) radar principles using frequency shift
b) radio waves refraction in the ionosphere
c) doppler VOR (DVOR) Navigation System
d) phase comparison from ground station transmissions

62.6.1.0 (4837)
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 moves away from the reciever
b) the transmitter and receiver move towards each other
c) the transmitter moves toward the reciever
d) both transmitter and receiver move away from each other

62.6.3.0 (4838)
Which of the following statements concerning LORAN-C is correct?
a) It is a hyperbolic navigation system that works on the principle of differential range by pulse technique
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 range measurement by phase comparison
d) It is a navigation system based on simultaneous ranges being received from a minimum of four ground stations

62.6.3.0 (4839)
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

62.6.3.0 (4840)
Which of the following correctly gives the principle of operation of the Loran C navigation system?
a) Differential range by pulse technique
b) Frequency shift between synchronised transmissions
c) Differential range by phase comparison
d) Phase comparison between synchronised transmissions

62.6.3.0 (4841)
Which of the following frequency-bands is used by the Loran C navigation system?
a) 90 - 110 kHz
b) 1750 - 1950 kHz
c) 10.2 - 13.6 kHz
d) 978 - 1213 MHz

62.6.3.0 (4842)
Loran C coverage is:
a) confined to certain limited areas of the world
b) global
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

62.6.5.0 (4843)
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

62.6.5.0 (4844)
In which frequency band do Satellite-Assisted Navigation systems (GNSS/GPS) provide position information that is available to civil aircraft?
a) UHF
b) SHF
c) EHF
d) VHF

62.6.5.0 (4845)
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

62.6.5.0 (4846)
What is the minimum number of satellites required for a Satellite-Assisted Navigation System (GNSS/GPS) to carry out two dimensional operation?
a) 3
b) 4

c) 5
d) 2

62.6.5.0 (4847)
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 satellites is:
a) 6
b) 7
c) 4
d) 5

62.6.5.0 (4848)
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) 4
b) 5
c) 6
d) 3

62.6.5.0 (4849)
Which of the following lists are all errors that affect the accuracy and reliability of the Satellite-Assisted Navigation system (GNSS/GPS)?
a) Satellite clock, satellite ephemeris, atmospheric propagation
b) Satellite mutual interference, satellite ephemeris, atmospheric propagation
c) Satellite to ground time lag, atmospheric propagation, satellite clock
d) Satellite mutual interference, frequency drift, satellite to ground time lag

62.6.5.0 (4850)
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

62.6.5.0 (4851)
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-for communications purpose

62.6.5.0 (4852)
Which of the following coordinate systems is used by the GPS receiver to determine position (Latitude, longitude and altitude)?
a) WGS 84
b) ED 87
c) ED 50
d) EUREF 92

62.6.5.0 (4853)
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, altitude and time
b) Latitude and longitude
c) Latitude, longitude and time
d) Latitude, longitude and altitude

62.6.5.0 (4854)
Which of the following combinations of satellite navigation systems provide the most accurate position fixes in air navigation?
a) NAVSTAR/GPS and GLONASS
b) NAVSTAR/GPS and NNSS-Transit
c) NNSS-Transit and GLONASS
d) GLONASS and COSPAS-SARSAT

62.6.5.0 (4855)
The required 24 NAVSTAR/GPS operational satellites are located on:
a) 6 orbital planes with 4 satellites in each 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 3 satellites in each plane plus 6 reserve satellites positioned in a geostationary orbital plane

62.6.5.0 (4856)
Which of the following statements about the 'visibility' of NAVSTAR/GPS satellites is correct?
a) It varies, depending on the time and observer's location
b) It is the same throughout the globe
c) It is greatest at the equator
d) It is greatest at the poles

62.6.5.0 (4857)
How many operational satellites are required for Full Operational Capability (FOC) of the satellite navigation system NAVSTAR/GPS?
a) 24
b) 18
c) 12
d) 30

62.6.5.0 (4858)
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 one code
b) only the 1 575 MHz carrier wave and two codes
c) only the 1 227 MHz carrier wave and one code
d) the two carrier waves and one public code

62.6.5.0 (4859)
Which of the following satellite navigation systems has Full Operational Capability (FOC) and is approved for specified flights under IFR conditions in Europe?
a) NAVSTAR/GPS
b) NNSS-Transit
c) COSPAS-SARSAT
d) GLONASS

62.6.5.0 (4860)
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

62.6.5.0 (4861)
One of the tasks of the control segment of the satellite navigation system NAVSTAR/GPS is to:
a) monitor the status of the satellites
b) manufacture and launch the satellites
c) manipulate the signals of selected satellites to reduce the precision of the position fix
d) grant and monitor user authorisations

62.6.5.0 (4862)
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

62.6.5.0 (4863)
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

62.6.5.0 (4864)
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

62.6.5.0 (4865)
In civil aviation, the height value computed by the receiver of the satellite navigation system NAVSTAR/GPS is the:
a) height above the WGS-84 ellipsoid
b) geometric height above ground
c) height above Mean Sea Level (MSL)
d) flight level

62.6.5.0 (4866)
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

62.6.5.0 (4867)
How long does it take a NAVSTAR/GPS satellite to orbit the earth?
a) Approximately 12 hours (1/2 of a sidereal day)
b) Approximately 24 hours (one sidereal day)
c) 12 days
d) 365 days because the satellites are located in a geostationary orbit

62.6.5.0 (4868)
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

62.6.5.0 (4869)
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

62.6.5.0 (4870)
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) UHF
b) VHF

c) EHF
d) SHF

62.6.5.0 (4871)
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 is a code used for the identification of the satellites and the measurement of the time taken by the signal to reach the receiver
b) PRN is the atmospheric jamming that affects the signals transmitted by the satellites
c) PRN describes the continuous electro-magnetical background noise that exists in space
d) PRN occurs in the receiver. It is caused by the signal from one satellite being received from different directions (multipath effect)

62.6.5.0 (4872)
Which of the following NAVSTAR/GPS satellite navigation system codes can be processed by 'unauthorised' civil aviation receivers?
a) C/A
b) P
c) C/A- and P
d) P and Y

62.6.5.0 (4873)
Almanac data stored in the receiver of the satellite navigation system NAVSTAR/GPS is used for the:
a) fast identification of received signals coming from visible satellites
b) recognition wether Selective Availability (SA) is operative
c) assignment of received PRN-codes (Pseudo Random Noise) to the appropriate satellite
d) correction of receiver clock error

62.6.5.0 (4874)
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 common frequencies, with an individual Pseudo Random Noise code
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 a separate frequency

62.6.5.0 (4875)
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) almanac data, satellite status information
b) time, data to impair the accuracy of the position fix
c) data to correct receiver clock error, almanac data
d) time, positions of the satellites

62.6.5.0 (4876)
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) 12.5 minutes (= 30 seconds per data frame)
b) 12 hours (= period of the satellites orbit)
c) 25 seconds (= 1 second per data frame)
d) 24 seconds (= 1 second per data frame)

62.6.5.0 (4877)
Which of the following statements concerning the L1 and L2 NAVSTAR/GPS transmission frequencies and codes is correct?
a) The higher frequency is used to transmit both the C/A and P codes
b) C/A and P codes are transmitted at different times on both frequencies
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

62.6.5.0 (4878)
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

62.6.5.0 (4879)
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 path delay of the signals in the earth atmosphere is proportional to the inverse of the carrier frequency squared
b) The effect of receiver noise can be reduced due to the interference of both frequencies
c) The effect of signal reflections (multipath effect) can be reduced due to the interference of both frequencies
d) The influence of shadowing on the GPS signals is proportional to the inverse of the carrier frequency squared

62.6.5.0 (4880)
Concerning the NAVSTAR/GPS satellite navigation system, what is the meaning of the term 'Receiver Autonomous Integrity Monitoring' (RAIM)?
a) It is a technique by which a receiver ensures the integrity of the navigation information
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 method whereby a receiver ensures the integrity of the Pseudo Random Noise (PRN) code transmitted by the satellites
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

62.6.5.0 (4881)
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

62.6.5.0 (4882)
In relation to the satellite navigation system NAVSTAR/GPS, 'All in View' is a term used when a receiver:
a) is tracking more than the required 4 satellites and can instantly replace any lost signal with another already being monitored
b) is receiving the signals of all visible satellites but tracking only those of the 4 with the best geometric coverage
c) is receiving and tracking the signals of all 24 operational satellites simultaneously
d) requires the signals of all visible satellites for navigation purposes

62.6.5.0 (4883)
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) calculated range includes receiver clock error
b) measured distance is based on the Pseudo Random Noise code
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

62.6.5.0 (4884)
What type of satellite navigation system NAVSTAR/GPS receiver is most suitable for use on board an aircraft?
a) Multichannel
b) Sequential
c) Multiplex
d) Any hand held type

62.6.5.0 (4885)
What is the minimum number of NAVSTAR/GPS satellites required to produce an accurate independent 3-D position fix?
a) 4
b) 5
c) 24
d) 3

62.6.5.0 (4886)
The receiver aerial for a NAVSTAR/GPS system should be mounted:
a) on the upper side of the fuselage in the vicinity of the centre of gravity
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) under the fuselage in order to receive correction data transmitted by D-GPS stations

62.6.5.0 (4887)
In the NAVSTAR/GPS satellite navigation system, 'Selective Availability' (SA) gives the option to artificially degrade the accuracy by :
a) dithering the satellite clock
b) shutting off selected satellites
c) using a less accurate atomic clock in a satellite for signal processing
d) offsetting satellite atomic clocks by a predetermined constant amount

62.6.5.0 (4888)
In the event of the use of Selective Availability, how does this affect, if at all, the navigation accuracy of the NAVSTAR/GPS satellite navigation system ?
a) It degrades position accuracy by manipulating satellite signals
b) It increases because only signals from satellites in the most suitable geometric constellation are selected by the receiver
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

62.6.5.0 (4889)
In the NAVSTAR/GPS satellite navigation system, receiver clock error:
a) is corrected by using signals from four satellites
b) is the biggest part of the total error, it cannot be corrected
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

62.6.5.0 (4890)
The influence of the ionosphere on the accuracy of the satellite navigation system NAVSTAR/GPS is:
a) minimised by the receiver using a model of the atmosphere and comparing signals transmitted by the satellites
b) minimised by computing the average of all signals
c) only significant if the satellites are located at a small elevation angle above the horizon
d) negligible

62.6.5.0 (4891)
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 GNSS can be used to update a drifting INS
b) The activation of 'Selective Availability' can be recognised by the INS
c) The average position calculated from data provided by both systems increases overall accuracy
d) The only advantage of coupling both systems is double redundancy

62.6.5.0 (4892)
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

62.6.5.0 (4893)
Which of the following geometric satellite constellations provides the most accurate NAVSTAR/GPS position fix?

a) 3 satellites with a low elevation above the horizon and an azimuth of 120° from each other together with a fourth directly overhead
b) 3 satellites with an azimuth of 120° from each other and an elevation of 45° above the horizon
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

62.6.5.0 (4894)
In relation to the NAVSTAR/GPS satellite navigation system, what is involved in the differential technique (D-GPS)?
a) Fixed ground stations compute position errors and transmit correction data to a suitable receiver on the aircraft
b) The difference between signals transmitted on the L1 and L2 frequencies are processed by the receiver to determine an error correction
c) Receivers from various manufacturers are operated in parallel to reduce the characteristical receiver noise error
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

62.6.5.0 (4895)
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 nearer a receiver is situated to a D-GPS ground station, the more accurate the position fix
b) The increase in accuracy of position fixes is independent of the receiver position in relation to a D-GPS ground station
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'

62.6.5.0 (4896)
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

62.6.5.0 (4897)
In relation to the NAVSTAR/GPS satellite navigation system, 'Search the Sky' is a:
a) procedure that starts after switching on a receiver if there is no stored satellite data available
b) continuous process by the ground segment to monitor the GPS satellites
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

62.6.5.0 (4898)
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

62.6.5.0 (4899)
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) The prescribed IFR-equipment must be installed and operational
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) Multi-sensor systems are not certificated for flights under IFR conditions

62.6.5.0 (4900)
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 may be continued using conventional navigation systems
b) It may be continued using NAVSTAR/GPS, prior to the next flight all systems must be checked
c) It must be continued under VFR conditions
d) The pilot must determine the reason for the deviation and correct the error or switch off the faulty system

62.6.5.0 (4901)
What datum is used for the Minimum Descent Altitude (MDA) on a non-precision approach when using the NAVSTAR/GPS satellite navigation system?
a) Barometric altitude
b) If using Differential-GPS (D-GPS) the altitude obtained from the D-GPS, otherwise barometric altitude
c) Radar altitude
d) GPS altitude

62.6.5.0 (4902)
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) Barometric altitude
b) The average of GPS altitude and barometric altitude
c) GPS altitude
d) GPS altitude if 4 or more satellites are received otherwise barometric altitude