c) 3
d) 4

21.4.6.0 (1108)
A public transport passengers aircraft, with a seating configuration of more than 61 seats, must have in its passenger compartment(s), at least 3 portable fire-extinguishers including:
a) 2 halon fire-extinguishers.
b) 1 halon fire-extinguisher.
c) 3 halon fire-extinguishers.
d) no halon fire-extinguisher.

21.4.6.0 (1109)
In a ditching situation, the passenger life jackets will be inflated :
a) when leaving the airplane.
b) immediately on the opening of the exits.
c) immediately on ditching.
d) once the passengers are in the water.

21.4.6.0 (1110)
An aircraft whose maximum approved configuration for passenger seats is 10 seats must be equipped with:
a) one fire-extinguisher in the cockpit and three fire-extinguishers in the passenger cabin.
b) one fire-extinguisher in the cockpit and two fire- extinguishers in the passenger cabin.
c) three fire-extinguishers in the passenger cabin only.
d) two fire-extinguishers in the cockpit and two fire-extinguishers in the passenger cabin.

21.4.6.0 (1111)
There are 60 passengers and crew members on board a turbo-prop aircraft. Its speed is 240 kt. At a point along the course steered, above the sea, the aircraft is at 1h45 min from an airdrome suitable for emergency landing. The minimum equipment complying with regulations is :
a) 60 life jackets and three 30-seat life boats
b) 60 life jackets
c) One 30-seat life boat and two 20-seat life boats
d) 60 life jackets, two 30-seat life boats

21.4.6.0 (1112)
The emergency lighting system must be able to function and supply a certain level of lighting after the main electric power system has been cut off for at least:
a) 10 minutes
b) 90 seconds
c) 5 minutes
d) 30 minutes

21.4.6.0 (1113)
An aircraft whose maximum approved configuration for passenger seats is 200 seats must be equipped with:
a) 3 manual fire-extinguishers in the passenger cabin.
b) 5 manual-fire extinguishers in the passenger cabin.
c) 7 manual-fire extinguishers in the passenger cabin.
d) 4 manual fire-extinguishers in the passenger cabin.

21.4.6.0 (1114)
The pyrotechnic means used in case of an emergency to indicate your position to the emergency teams are a flare:
a) which is used at night and a smoke device which is used in the daytime.
b) and a smoke device which are only used at night.
c) which is used at daytime and a smoke device which is used at night.
d) and a smoke device which are only used in the daytime.

21.4.6.0 (1115)
The portable emergency beacons which are used after an emergency landing or ditching have a duration of :
a) 48 h
b) 24 h
c) 12 h
d) 72 h

21.4.6.0 (1116)
In accordance with JAR-OPS 1 and if necessary, the number of liferafts to be found on board an aircraft must allow the transportation of the entire aircraft occupants:
a) in the case of a loss of one raft of the largest rated capacity.
b) plus 10 %.
c) plus 30 %.
d) in the case of a loss of two rafts.

22.1.1.0 (1117)
In a standard atmosphere and at the sea level, the calibrated airspeed (CAS) is :
a) equal to the true airspeed (TAS).
b) independent of the true airspeed (TAS).
c) higher than the true airspeed (TAS).
d) lower than the true airspeed (TAS).

22.1.1.1 (1118)
The pressure measured at the forward facing orifice of a pitot tube is the :
a) total pressure.
b) static pressure.
c) total pressure plus static pressure.
d) dynamic pressure.

22.1.1.1 (1119)
A pitot blockage of both the ram air input and the drain hole with the static port open causes the airspeed indicator to :
a) react like an altimeter.
b) read a little high.
c) read a little low.
d) freeze at zero.

22.1.1.1 (1120)
A pitot tube covered by ice which blocks the ram air inlet will affect the following instrument (s) :
a) airspeed indicator only.
b) altimeter only.
c) vertical speed indicator only.
d) airspeed indicator, altimeter and vertical speed indicator.

22.1.1.1 (1121)
(For this question use annex 022-9771A)The atmospheric pressure at FL 70 in a ""standard + 10"" atmosphere is:
a) 781.85 hPa.
b) 942.13 hPa.
c) 1 013.25 hPa.
d) 644.41 hPa.

22.1.1.1 (1122)
In a non-pressurized aircraft, if one or several static pressure ports are damaged, there is an ultimate emergency means for restoring a practically correct static pressure intake :
a) breaking the rate-of-climb indicator glass window
b) slightly opening a window to restore the ambient pressure in the cabin
c) descending as much as possible in order to fly at a pressure as close to 1013.25 hPa as possible
d) calculating the ambient static pressure, allowing for the altitude and QNH and adjusting the instruments

22.1.1.2 (1123)
The error in altimeter readings caused by the variation of the static pressure near the source is known as:
a) position pressure error.
b) barometric error.
c) instrument error.
d) hysteresis effect.

22.1.1.2 (1124)
If the static source of an altimeter becomes blocked during a descent the instrument will:
a) continue to display the reading at which the blockage occured
b) gradually indicate zero
c) under-read
d) indicate a height equivalent to the setting on the millibar subscale

22.1.1.2 (1125)
The primary factor which makes the servo-assisted altimeter more accurate than the simple pressure altimeter is the use of:
a) an induction pick-off device
b) more effective temperature compensating leaf springs
c) combination of counters/pointers
d) a sub-scale logarithmic function

22.1.1.2 (1126)
If the static source to an altimeter becomes blocked during a climb, the instrument will:
a) continue to indicate the reading at which the blockage occured
b) under-read by an amount equivalent to the reading at the time that the instrument became blocked
c) over-read
d) gradually return to zero

22.1.1.2 (1127)
The hysteresis error of an altimeter varies substantially with the:
a) time passed at a given altitude.
b) mach number of the aircraft.
c) aircraft altitude.
d) static temperature.

22.1.1.2 (1128)
The purpose of the vibrating device of an altimeter is to:
a) reduce the effect of friction in the linkages
b) inform the crew of a failure of the instrument
c) allow damping of the measurement in the unit
d) reduce the hysteresis effect

22.1.1.2 (1129)
The static pressure error of the static vent on which the altimeter is connected varies substantially with the:
a) Mach number of the aircraft
b) deformation of the aneroid capsule
c) aircraft altitude
d) static temperature

22.1.1.2 (1130)
The altitude indicated on board an aircraft flying in an atmosphere where all the atmosphere layers below the aircraft are cold is :
a) lower than the real altitude.
b) the same as the real altitude.
c) higher than the real altitude.
d) equal to the standard altitude.

22.1.1.2 (1131)
The altitude indicated on board an aircraft flying in an atmosphere where all atmosphere layers below the aircraft are warm is:
a) higher than the real altitude.
b) the same as the real altitude.
c) lower than the real altitude.
d) equal to the standard altitude.

22.1.1.2 (1132)
On board an aircraft the altitude is measured from the:
a) pressure altitude
b) density altitude

c) temperature altitude
d) standard altitude

22.1.1.2 (1133)
The density altitude is :
a) the altitude of the standard atmosphere on which the density is equal to the actual density of the atmosphere
b) the temperature altitude corrected for the difference between the real temperature and the standard temperature
c) the pressure altitude corrected for the relative density prevailing at this point
d) the pressure altitude corrected for the density of air at this point

22.1.1.2 (1134)
The pressure altitude is the altitude corresponding :
a) in standard atmosphere, to the pressure Ps prevailing at this point
b) in ambiant atmosphere, to the reference pressure Ps
c) in standard atmosphere, to the reference pressure Ps
d) in ambiant atmosphere, to the pressure Ps prevailing at this point

22.1.1.2 (1135)
When flying from a sector of warm air into one of colder air, the altimeter will :
a) overread.
b) underread.
c) be just as correct as before.
d) show the actual height above ground.

22.1.1.2 (1136)
At sea level, on a typical servo altimeter, the tolerance in feet from indicated must not exceed :
a) +/-60 feet
b) +/-75 feet
c) +/-30 feet
d) +/-70 feet

22.1.1.2 (1137)
The QNH is by definition the value of the:
a) altimeter setting so that the needles of the altimeter indicate the altitude of the location for which it is given.
b) atmospheric pressure at the sea level of the location for which it is given.
c) altimeter setting so that the needles indicate zero when the aircraft is on ground at the location for which it is provided.
d) atmospheric pressure at the level of the ground overflown by the aircraft.

22.1.1.2 (1138)
The use of the TCAS (Traffic Collision Avoidance System) for avoiding an aircraft in flight is now general. TCAS uses for its operation :
a) the replies from the transponders of other aircraft
b) the echos from the ground air traffic control radar system
c) the echos of collision avoidance radar system especially installed on board
d) both the replies from the transponders of other aircraft and the ground-based radar echoes

22.1.1.2 (1139)
If an aircraft is equipped with one altimeter which is compensated for position error and another altimeter which is not , and all other factors being equal...
a) At high speed, the non-compensated altimeter will indicate a higher altitude
b) At high speed the non-compensated altimeter will indicate a lower altitude
c) There will be no difference between them if the air data computer (ADC) is functioning normally
d) ATC will get an erroneous altitude report SSR

22.1.1.2 (1140)
The altimeter consists of one or several aneroid capsules located in a sealed casing.The pressures in the aneroid capsule (i) and casing (ii) are respectively :
a) (i) vacuum (or a very low pressure) (ii) static pressure
b) (i) static pressure at time t (ii) static pressure at time t - t
c) (i) total pressure (ii) static pressure
d) (i) static pressure (ii) total pressure

22.1.1.2 (1141)
The altimeter is fed by :
a) static pressure
b) dynamic pressure
c) total pressure
d) differential pressure

22.1.1.2 (1142)
In case of accidental closing of an aircraft's left static pressure port (rain, birds), the altimeter:
a) overreads the altitude in case of a sideslip to the left and displays the correct information during symmetric flight.
b) overreads the altitude in case of a side-slip to the right and displays the correct information during symmetric flight.
c) keeps on providing reliable reading in all situations
d) underreads the altitude.

22.1.1.3 (1143)
When climbing at a constant Mach number below the tropopause, in ISA conditions, the Calibrated Airspeed (CAS) will:
a) decrease
b) increase at a linear rate
c) remain constant
d) increase at an exponential rate

22.1.1.3 (1144)
For a constant Calibrated Airspeed (CAS) and a level flight, a fall in ambient temperature will result in a:
a) lower True Airspeed (TAS) due to an increase in air density
b) higher True Airspeed (TAS) due to a decrease in air density
c) higher True Airspeed (TAS) due to an increase in air density
d) lower True Airspeed (TAS) due to a decrease in air density

22.1.1.3 (1145)
When descending through an isothermal layer at a constant Calibrated Airspeed (CAS), the True Airspeed (TAS) will:
a) decrease
b) increase at a linear rate
c) remain constant
d) increase at an exponential rate

22.1.1.3 (1146)
A leak in the pitot total pressure line of a non-pressurized aircraft to an airspeed indicator would cause it to:
a) under-read.
b) over-read.
c) over-read in a climb and under-read in a descent.
d) under-read in a climb and over-read in a descent.

22.1.1.3 (1147)
The airspeed indicator circuit consists of pressure sensors. The pitot tube directly supplies:
a) the total pressure
b) the static pressure
c) the total pressure and the static pressure
d) the dynamic pressure

22.1.1.3 (1148)
If the static source to an airspeed indicator (ASI) becomes blocked during a descent the instrument will:
a) over-read
b) read zero
c) continue to indicate the speed applicable to that at the time of the blockage
d) under-read

22.1.1.3 (1149)
The calibrated airspeed (CAS) is obtained by applying to the indicated airspeed (IAS) :
a) an instrument and position/pressure error correction.
b) an antenna and compressibility correction.
c) and instrument and density correction.
d) a compressibility and density correction.

22.1.1.3 (1150)
VNO is the maximum speed :
a) not to be exceeded except in still air and with caution.
b) which must never be exceeded.
c) at which the flight controls can be fully deflected.
d) with flaps extended in landing position.

22.1.1.3 (1151)
VNE is the maximum speed :
a) which must never be exceeded
b) not to be exceeded except in still air and with caution
c) at which the flight controls can be fully deflected
d) with flaps extended in landing position

22.1.1.3 (1152)
VLO is the maximum :
a) speed at which the landing gear can be operated with full safety.
b) flight speed with landing gear down.
c) speed with flaps extended in a given position.
d) cruising speed not to be exceeded except in still air with caution.

22.1.1.3 (1153)
VLE is the maximum :
a) flight speed with landing gear down
b) speed at which the landing gear can be operated with full safety
c) speed with flaps extended in a given position
d) speed authorized in flight

22.1.1.3 (1154)
With a pitot probe blocked due to ice build up, the aircraft airspeed indicator will indicate in descent a :
a) decreasing speed.
b) constant speed.
c) increasing speed.
d) fluctuating speed.

22.1.1.3 (1155)
The limits of the yellow scale of an airspeed indicator are :
a) VNO for the lower limit and VNE for the upper limit
b) VLO for the lower limit and VNE for the upper limit
c) VLE for the lower limit and VNE for the upper limit
d) VFE for the lower limit and VNE for the upper limit

22.1.1.3 (1156)
The limits of the green scale of an airspeed indicator are :
a) VS1 for the lower limit and VNO for the upper limit
b) VS0 for the lower limit and VNO for the upper limit
c) VS1 for the lower limit and VNE for the upper limit
d) VS1 for the lower limit and VLO for the upper limit

22.1.1.3 (1157)
The limits of the white scale of an airspeed indicator are :
a) VSO for the lower limit and VFE for the upper limit
b) VSI for the lower limit and VFE for the upper limit
c) VSO for the lower limit and VLE for the upper limit
d) VSI for the lower limit and VLE for the upper limit

22.1.1.3 (1158)
The velocity maximum operating (V.M.O.) is a speed expressed in :
a) calibrated airspeed (CAS).
b) equivalent airspeed (EAS).

c) true airspeed (TAS).
d) computed airspeed (COAS).

22.1.1.3 (1159)
After an aircraft has passed through a volcanic cloud which has blocked the total pressure probe inlet of the airspeed indicator, the pilot begins a stabilized descent and finds that the indicated airspeed :
a) decreases steadily
b) increases abruptly towards VNE
c) increases steadily
d) decreases abruptly towards zero

22.1.1.3 (1160)
During a climb after take-off from a contaminated runway, if the total pressure probe of the airspeed indicator is blocked, the pilot finds that indicated airspeed :
a) increases steadily
b) increases abruptly towards VNE
c) decreases stadily
d) decreases abruptly towards zero

22.1.1.3 (1161)
With a constant weight, irrespective of the airfield altitude, an aircraft always takes off at the same :
a) calibrated airspeed.
b) ground speed.
c) true airspeed.
d) equivalent airspeed.

22.1.1.3 (1162)
All the anemometers are calibrated according to:
a) St-Venant' formula which takes into account the air compressibility.
b) Bernouilli's limited formula which takes into account the air compressibility.
c) St-Venant's formula which considers the air as an uncompressible fluid.
d) Bernouilli's limited formula which considers the air as an uncompressible fluid.

22.1.1.3 (1163)
VFE is the maximum speed :
a) with the flaps extended in a given position.
b) with the flaps extended in landing position.
c) at which the flaps can be operated.
d) with the flaps extended in take-off position.

22.1.1.3 (1164)
The airspeed indicator of an aircraft is provided with a moving red and white hatched pointer. This pointer indicates the:
a) maximum speed in VMO operation versus altitude
b) maximum speed in VMO operation, versus temperature
c) speed indicated on the autothrottle control box, versus temperature
d) speed indicated on the autothrottle control box versus altitude

22.1.1.3 (1165)
The airspeed indicator of a twin-engined aircraft comprises different sectors and color marks. The blue line corresponds to the :
a) optimum climbing speed with one engine inoperative, or Vy
b) speed not to be exceeded, or VNE
c) minimum control speed, or VMC
d) maximum speed in operations, or VMO

22.1.1.3 (1166)
Today's airspeed indicators (calibrated to the Saint-Venant formula), indicate, in the absence of static (and instrumental) error :
a) The conventional airspeed (CAS) in all cases
b) The true airspeed
c) The airspeed, whatever the altitude
d) The equivalent airspeed, in all cases

22.1.1.3 (1167)
Considering the maximum operational Mach number (MMO) and the maximum operational speed (VMO), the captain of a pressurized aircraft begins his descent from a high flight level. In order to meet his scheduled time of arrival, he decides to use the maximum ground speed at any time of the descent. He will be limited :
a) initially by the MMO, then by the VMO below a certain flight level
b) initially by theVMO, then by the MMO below a certain flight level
c) by the MMO
d) by the VMO in still air

22.1.1.4 (1168)
Machmeter readings are subject to:
a) position pressure error
b) density error.
c) temperature error.
d) setting error.

22.1.1.4 (1169)
If the outside temperature at 35 000 feet is -40°C, the local speed of sound is :
a) 596 kt.
b) 247 kt.
c) 307 kt.
d) 686 kt.

22.1.1.4 (1170)
During a straight and uniform climb, the pilot maintains a constant calibrated airspeed (CAS) :
a) The Mach number increases and the true airspeed (TAS) increases.
b) The Mach number increases and the true airspeed (TAS) is constant.
c) The Mach number is constant and the true airspeed (TAS) is constant.
d) The Mach number is constant and the true airspeed (TAS) decreases.

22.1.1.4 (1171)
A VMO-MMO warning device consists of an alarm connected to :
a) a barometric aneroid capsule subjected to a static pressure and an airspeed

sensor subjected to a dynamic pressure.
b) a barometic aneroid capsule subjected to a dynamic pressure and an airspeed sensor subjected to a static pressure.
c) a barometric aneroid capsule and an airspeed sensor subjected to dynamic pressure.
d) a barometric aneroid capsule and an airspeed sensor subjected to a static pressure.

22.1.1.4 (1172)
The reading of a Mach indicator is independent of :
a) the outside temperature
b) the static pressure
c) the total pressure
d) the differential pressure measurement

22.1.1.4 (1173)
The principle of the Mach indicator is based on the computation of the ratio :
a) (Pt - Ps) to Ps
b) Pt to Ps
c) (Pt - Ps) to Pt
d) (Pt + Ps) to Ps

22.1.1.4 (1174)
The mach number is the:
a) true airspeed (TAS) divided by the local speed of sound
b) corrected airspeed (CAS) divided by the local speed of sound
c) indicated airspeed (IAS) divided by the local speed of sound
d) equivalent airspeed (EAS) divided by the local speed of sound

22.1.1.4 (1175)
Sound propagates through the air at a speed which only depends on :
a) temperature.
b) temperature and the pressure.
c) pressure.
d) density.

22.1.1.4 (1176)
The velocity of sound at the sea level in a standard atmosphere is:
a) 661 kt.
b) 1059 kt.
c) 644 kt.
d) 332 kt.

22.1.1.4 (1177)
At a constant calibrated airspeed (CAS), the Mach number :
a) increases when the altitude increases
b) decreases when the altitude increases
c) remains unchanged when the outside temperature increases
d) remains unchanged when the outside temperature decreases

22.1.1.4 (1178)
At a constant Mach number, the calibrated air speed (CAS) :
a) decreases when the altitude increases
b) increases when the altitude increases
c) remains unchanged when the outside temperature increases
d) remains unchanged when the outside temperature decreases

22.1.1.4 (1179)
The Mach number is :
a) the ratio of the aircraft true airspeed to the sonic velocity at the altitude considered
b) a direct function of temperature , it varies in proportion to the square root of the absolute temperature
c) the ratio of the indicated airspeed to the sonic velocity at the altitude considered
d) the ratio of the aircraft conventionnal airspeed to the sonic velocity at the altitude considered

22.1.1.4 (1180)
Indication of Mach number is obtained from:
a) Indicated speed and altitude using a speed indicator equipped with an altimeter type aneroid
b) An ordinary airspeed indicator scaled for Mach numbers instead of knots
c) A kind of echo sound comparing velocity of sound with indicated speed
d) Indicated speed (IAS) compared with true air speed (TAS) from the air data computer

22.1.1.5 (1181)
The vertical speed indicator of an aircraft flying at a true airspeed of 100 kt, in a descent with a slope of 3 degrees, indicates :
a) - 500 ft/min.
b) - 300 ft/min
c) - 150 ft/min
d) - 250 ft/min

22.1.1.5 (1182)
The response time of a vertical speed detector may be increased by adding a:
a) correction based on an accelerometer sensor.
b) bimettalic strip
c) return spring
d) second calibrated port

22.1.1.5 (1183)
The vertical speed indicator (VSI) is fed by :
a) static pressure
b) dynamic pressure
c) total pressure
d) differential pressure

22.1.1.5 (1184)
The operating principle of the vertical speed indicator (VSI) is based on the measurement of the rate of change of:
a) Static pressure
b) Dynamic pressure

c) Total pressure
d) Kinetic pressure

22.1.1.6 (1185)
The advantages provided by an air data computer to indicate the altitude are :1. Position/pressure error correction2. Hysteresis error correction3. Remote data transmission capability4. Capability of operating as a conventional altimeter in the event of a failureThe combination of correct statements is :
a) 1,3,4
b) 1,2,3,4
c) 2,3,4
d) 1,2,3

22.1.1.6 (1186)
Given :- Ts the static temperature (SAT)- Tt the total temperature (TAT)- Kr the recovery coefficient- M the Mach numberThe total temperature can be expressed approximately by the formula :
a) Tt = Ts(1+0.2 M^2)
b) Tt = Ts(1-0.2 M^2)
c) Tt = Ts(1+0.2 Kr.M^2)
d) Tt = Ts/(1+0.2 Kr.M^2)

22.1.1.6 (1187)
In An Air Data Computer (ADC), aeroplane altitude is calculated from:
a) Measurement of absolute barometric pressure from a static source on the fuselage
b) The difference between absolute and dynamic pressure at the fuselage
c) Measurement of outside air temperature (OAT)
d) Measurement of elapsed time for a radio signal transmitted to the ground surface and back

22.1.1.6 (1188)
An Air Data Computer (ADC) :
a) Transforms air data measurements into electric impulses driving servo motors in instruments
b) Is an auxiliary system that provides altitude information in the event that the static source is blocked
c) Converts air data measurements given by ATC from the ground in order to provide correct altitude and speed information
d) Measures position error in the static system and transmits this information to ATC to provide correct altitude reporting

22.1.2.1 (1189)
The diagram on annex 022-648A shows three gyro assemblies: A, B and C. Among these gyros,-one is a roll gyro (noted 1)-one is a pitch gyro (noted 2)-one is a yaw gyro (noted 3)The correct matching of gyros and assemblies is:
a) 1B, 2C, 3A
b) 1C, 2B, 3A
c) 1B, 2A, 3C
d) 1A, 2B, 3C

22.1.2.1 (1190)
The basis properties of a gyroscope are :1. The gyro's weight.2. The rigidity in space.3. The inertia.4. The high RPM.5. The precessionThe combination of correct statements is :
a) 2,5
b) 2,3,5
c) 1,3,5
d) 3,4

22.1.2.1 (1191)
A rate integrating gyro is a detecting element used in1. An inertial attitude unit2. An automatic pilot3. A stabilizing servo system4. An inertial navigation system5. A rate-of-turn indicatorThe combination of correct statements is :
a) 1,4.
b) 1,2,3,4,5.
c) 2,3,5.
d) 2,3,4.

22.1.2.1 (1192)
Compared with a conventional gyro, a laser gyro :
a) has a longer life cycle
b) is influenced by temperature
c) has a fairly long starting cycle
d) consumes a lot of power

22.1.2.1 (1193)
A laser gyro consists of :
a) a laser generating two light waves
b) 2 electrodes (anodes+cathodes)
c) a gyro with 2 degrees of freedom
d) two moving cavities provided with mirrors

22.1.2.1 (1194)
Among the systematic errors of the ""directional gyro"", the error due to the earth rotation make the north reference turn in the horizontal plane. At a mean latitude of 45°N, this reference turns by...
a) 10.5°/hour to the right.
b) 15°/hour to the right.
c) 7.5°/hour to the right.
d) 7.5°/hour to the left.

22.1.2.1 (1195)
In the building principle of a gyroscope, the best efficiency is obtained through the concentration of the mass :
a) on the periphery and with a high rotation speed.
b) close to the axis and with a high rotation speed.
c) on the periphery and with a low rotation speed.
d) close to the axis and with a low rotation speed.

22.1.2.2 (1196)
The indications on a directional gyroscope or gyrocompass are subject to errors,

due to:1- rotation of Earth.2- aeroplane motion on Earth.3- lateral and transversal aeroplane bank angles.4- north change.5- mechanical defects.Chose the combination with true statements only:
a) 1,2,3,5.
b) 3,4,5.
c) 1,2,4,5.
d) 2,3,5.

22.1.2.2 (1197)
The characteristics of the directional gyro (DG) used in a gyro stabilised compass system are :
a) two degrees of freedom, whose horizontal axis corresponding to the reference direction is maintained in the horizontal plane by an automatic erecting system.
b) two degrees of freedom, whose axis aligned with the vertical to the location is maintained in this direction by an erecting system.
c) one degree of freedom, whose horizontal axis is maintained in the horizontal plane by an automatic erecting system.
d) one degree of freedom, whose vertical axis, aligned with the real vertical to the location is maintained in this direction by an automatic erecting system.

22.1.2.2 (1198)
The directional gyro axis no longer spins about the local vertical when it is located :
a) on the equator
b) in the latitude 30°
c) in the latitude 45°
d) on the North pole

22.1.2.2 (1199)
The directional gyro axis spins about the local vertical by 15°/hour :
a) on the North pole
b) in the latitude 30°
c) in the latitude 45°
d) on the equator

22.1.2.2 (1200)
The pendulum type detector system of the directional gyro feeds :
a) a levelling erection torque motor
b) a nozzle integral with the outer gimbal ring
c) a torque motor on the sensitive axis
d) 2 torque motors arranged horizontally

22.1.2.2 (1201)
The gimbal error of the directional gyro is due to the effect of :
a) a bank or pitch attitude of the aircraft
b) an apparent weight and an apparent vertical
c) too slow precession on the horizontal gimbal ring
d) the aircraft's track over the earth

22.1.2.2 (1202)
The indication of the directional gyro as an on-board instrument are valid only for a short period of time. The causes of this inaccuracy are :1. The earth's rotation2. The longitudinal acceleration3. The aircraft's motion over the surface of the earth.4. The mechanical defects of the gyro5. The gyro's weight6. The gimbal mount of the gyro ringsThe combination of correct statements is :
a) 1,3,4,6
b) 1,3,4
c) 1,2,3,4,5,6
d) 2,5,6

22.1.2.2 (1203)
An airborne instrument, equipped with a gyro with 2 degrees of freedom and a horizontal spin axis is:
a) a directional gyro
b) an artificial horizon
c) a turn indicator
d) a fluxgate compass

22.1.2.2 (1204)
An airborne instrument, equipped with a gyro with 2 degrees of freedom and a horizontal spin axis is :
a) a directional gyro
b) an artificial horizon
c) a turn indicator
d) a flux gate compass

22.1.2.2 (1205)
For an aircraft flying a true track of 360° between the 005°S and 005°N parallels, the precession error of the directional gyro due to apparent drift is equal to:
a) 0°/hour
b) +5°/hour
c) -5°/hour
d) depends only on the aircraft's ground speed

22.1.2.2 (1206)
A directional gyro is: 1- a gyroscope free around two axis 2- a gyroscope free around one axis 3- capable of self- orientation around an earth-tied direction 4- incapable of self-orientation around an earth-tied directionThe combination which regroups all of the correct statements is:
a) 04-Jan
b) 04-Fev
c) 03-Fev
d) 03-Jan

22.1.2.2 (1207)
The maximum directional gyro error due to the earth rotation is:
a) 15°/hour
b) 90°/hour
c) 180°/hour
d) 5°/hour

22.1.2.2 (1208)
The heading read on the dial of a directional gyro is subject to errors, one of which is due to the movement of the aircraft.This error...
a) is dependent on the ground speed of the aircraft, its true track and the average latitude of the flight
b) is, in spite of this, insignificant and may be neglected
c) is at its greatest value when the aircraft follows a meridional track
d) shows itself by an apparent rotation of the horizontal axis of the gyroscope which seems to turn at 15° per hour to the right in the northern hemisphere

22.1.2.3 (1209)
A failed RMI rose is locked on 090° and the ADF pointer indicates 225°. The relative bearing to the station is :
a) 135°.
b) Impossible to read, due to failure RMI.
c) 315°.
d) 225°.

22.1.2.3 (1210)
A slaved directional gyro derives it's directional signal from :
a) the flux valve.
b) the air-data-computer.
c) a direct reading magnetic compass.
d) the flight director.

22.1.2.3 (1211)
The input signal of the amplifier of the gyromagnetic compass resetting device originates from the:
a) error detector.
b) flux valve.
c) directional gyro unit.
d) directional gyro erection device.

22.1.2.3 (1212)
The heading information originating from the gyromagnetic compass flux valve is sent to the:
a) error detector.
b) erector system.
c) heading indicator.
d) amplifier.

22.1.2.3 (1213)
The gyromagnetic compass torque motor :
a) causes the directional gyro unit to precess
b) causes the heading indicator to precess
c) feeds the error detector system
d) is fed by the flux valve

22.1.2.3 (1214)
A gyromagnetic compass or heading reference unit is an assembly which always consists of :1- a directional gyro2- a vertical axis gyro3- an earth's magnetic field detector4- an azimuth control5- a synchronising controlThe combination of correct statements is :
a) 1,3,5
b) 2,3,5
c) 1,4
d) 2,5

22.1.2.3 (1215)
Heading information from the gyromagnetic compass flux gate is transmitted to the :
a) error detector.
b) erecting system.
c) heading indicator.
d) amplifier.

22.1.2.3 (1216)
Heading information given by a gyro platform, is given by a gyro at :
a) 2 degrees-of-freedom in the horizontal axis
b) 2 degrees-of-freedom in the vertical axis
c) 1 degree-of-freedom in the horizontal axis
d) l degree-of-freedom in the vertical axis

22.1.2.4 (1217)
Among the flight control instruments, the artificial horizon plays an essential part. It uses a gyroscope with :Note : in this question, the degrees of freedom of a gyro are determined by the number of gimbal rings it comprises.
a) two degrees of freedom, whose axis is oriented and continously maintained to local vertical by an automatic erecting system.
b) two degrees of freedom, whose horizontal axis corresponding to a reference direction is maintained in a horizontal plane by an automatic erecting system
c) one degree of freedom, whose horizontal axis is maintained in a horizontal plane by an automatic erecting system
d) one degree of freedom, whose vertical axis oriented in the direction of the real vertical to the location is maintained in this direction by an automatic erecting system

22.1.2.4 (1218)
When an aircraft has turned 270 degrees with a constant attitude and bank, the pilot observes the following on a classic artificial horizon :
a) too much nose-up and bank too high.
b) too much nose-up and bank too low.
c) attitude and bank correct.
d) too much nose-up and bank correct.

22.1.2.4 (1219)
When an aircraft has turned 360 degrees with a constant attitude and bank, the pilot observes the following on a classic artificial horizon :
a) attitude and bank correct
b) too much nose-up and bank too low
c) too much nose-up and bank correct
d) too much nose-up and bank too high

22.1.2.4 (1220)
When an aircraft has turned 90 degrees with a constant attitude and bank, the pilot observes the following on a classic artificial horizon :
a) too much nose-up and bank too low
b) attitude and bank correct
c) too much nose-up and bank correct
d) too much nose-up and bank too high

22.1.2.4 (1221)
A gravity type erector is used in a vertical gyro device to correct errors on :
a) an artificial horizon
b) a directional gyro unit
c) a turn indicator
d) a gyromagnetic indicator

22.1.2.4 (1222)
Following 180° stabilized turn with a constant attitude and bank, the artificial horizon indicates :
a) too high pitch-up and too low banking
b) too high pitch-up and correct banking
c) attitude and banking correct
d) too high pitch up and too high banking

22.1.2.4 (1223)
During an acceleration phase at constant attitude, the resetting principle of the artificial horizon results in the horizon bar indicating a :
a) nose-up attitude
b) nose-down attitude
c) constant attitude
d) nose-down followed by a nose-up attitude

22.1.2.4 (1224)
A Stand-by-horizon or emergency attitude indicator:
a) Contains its own separate gyro
b) Is automatically connected to the primary vertical gyro if the alternator fails
c) Is fully independent of external energy resources in an emergency situation
d) Only works of there is a complete electrical failure

22.1.2.4 (1225)
(Use the appendix to answer this question)The diagram which shows a 40° left bank and 15° nose down attitude is n°
a) 1
b) 2
c) 3
d) 4

22.1.2.4 (1226)
A gravity erector system is used to correct the errors on :
a) an artificial horizon.
b) a directional gyro.
c) a turn indicator.
d) a gyromagnetic compass.

22.1.2.5 (1227)
Under normal operating conditions, when an aircraft is in a banked turn, the rate-of-turn indicator is a valuable gyroscopic flight control instrument , when it is associated with an attitude indicator it indicates :1. the angular velocity of the aircraft about the yaw axis2. The bank of the aircraft3. The direction of the aircraft turn4. The angular velocity of the aircraft about the real verticalThe combination of correct statements is :
a) 1,3.
b) 1,2.
c) 3,4.
d) 2,4.

22.1.2.5 (1228)
A turn indicator is built around a gyroscope with:
a) 2 degrees of freedom.
b) 0 degree of freedom.
c) 1 degree of freedom.
d) 3 degrees of freedom.

22.1.2.5 (1229)
When, in flight, the needle and ball of a needle-and-ball indicator are on the right, the aircraft is :
a) turning right with too much bank
b) turning right with not enough bank
c) turning left with too much bank
d) turning left with not enough bank

22.1.2.5 (1230)
When, in flight, the needle of a needle-and-ball indicator is on the right and the ball on the left, the aircraft is :
a) turning right with not enough bank
b) turning right with too much bank
c) turning left with not enough bank
d) turning left with too much bank

22.1.2.5 (1231)
When, in flight, the needle of a needle-and-ball indicator is on the left and the ball on the right, the aircraft is:
a) turning left with not enough bank
b) turning left with too much bank
c) turning right with not enough bank
d) turning right with too much bank

22.1.2.5 (1232)
An airborne instrument, equipped with a gyro with 1 degree of freedom and a horizontal spin axis is a :
a) turn indicator
b) gyromagnetic compass

c) fluxgate compass
d) directional gyro

22.1.2.5 (1233)
In a turn at constant rate, the turn indicator reading is:
a) inversely proportional to the aircraft true airspeed
b) proportional to the aircraft true airspeed
c) independent to the aircraft true airspeed
d) proportional to the aircraft weight

22.1.2.5 (1234)
In a Turn-indicator, the measurement of rate-of-turn consists for :
a) low bank angles, in measuring the yaw rate
b) low bank angles , in measuring the roll rate
c) high bank angles,in measuring the yaw rate
d) high bank angles, in measuring the roll rate

22.1.2.5 (1235)
At a low bank angle, the measurement of rate-of-turn actually consists in measuring the :
a) yaw rate of the aircraft
b) pitch rate of the aircraft
c) roll rate of the aircraft
d) angular velocity of the aircraft

22.1.2.5 (1236)
The rate-of-turn is the:
a) change-of-heading rate of the aircraft
b) yaw rate in a turn
c) aircraft speed in a turn
d) pitch rate in a turn

22.1.2.5 (1237)
On the ground, during a right turn, the turn indicator indicates :
a) needle to the right, ball to left
b) needle to the right, ball to right
c) needle in the middle, ball to right
d) needle in the middle, ball to left

22.1.2.5 (1238)
On the ground, during a left turn, the turn indicator indicates :
a) needle to the left, ball to the right
b) needle to the left, ball to the left
c) needle in the middle, ball to the right
d) needle in the middle, ball to the left

22.1.2.5 (1239)
When, in flight, the needle and ball of a needle-and-ball indicator are on the left, the aircraft is:
a) turning left with too much bank
b) turning left with not enough bank
c) turning right with too much bank
d) turning right with not enough bank

22.1.2.5 (1240)
A turn indicator is an instrument which indicates rate of turn.Rate of turn depends upon :1 : bank angle2 : aeroplane speed3 : aeroplane weightThe combination regrouping the correct statements is :
a) 1 and 2.
b) 1 and 3.
c) 2 and 3.
d) 1, 2, and 3.

22.1.2.5 (1241)
(For this question use appendix)The diagram representing a left turn with insufficient rudder is:
a) 4
b) 1
c) 2
d) 3

22.1.2.5 (1242)
The turn rate indicator uses a gyroscope:1 - with one degree of freedom.2 - with two degrees of freedom3 - the frame of which is supported by two return springs.4 - the spinning wheel axis of which is parallel to the pitch axis.5 - the spinning wheel axis of which is parallel to the yawing axis.6 - the spinning wheel axis of which is horizontal.The combination regrouping all the correct statements is:
a) 03-Jan
b) 2001-03-04
c) 05-Fev
d) 06-Jan

22.1.2.5 (1243)
An aircraft is flying at a 120 kt true airspeed (VV), in order to achieve a rate 1 turn, the pilot will have to bank the aircraft at an angle of:
a) 18°.
b) 12°.
c) 36°.
d) 30°.

22.1.2.6 (1244)
While inertial platform system is operating on board an aircraft, it is necessary to use a device with the following characteristics, in order to keep the vertical line with a pendulous system:
a) with damping and a period of about 84 minutes.
b) without damping and a period of about 84 minutes
c) without damping and a period of about 84 seconds
d) with damping and a period of 84 seconds

22.1.2.6 (1245)
The heading reference unit of a three-axis data generator is equipped with a gyro

with:
a) 2 degrees of freedom and horizontal spin axis
b) 2 degrees of freedom and vertical spin axis
c) 1 degree of freedom and horizontal spin axis
d) 1 degree of freedom and vertical spin axis

22.1.2.6 (1246)
The vertical reference unit of a three-axis data generator is equipped with a gyro with :
a) 2 degrees of freedom and vertical spin axis
b) 2 degrees of freedom and horizontal spin axis
c) 1 degree of freedom and horizontal spin axis
d) 1 degree of freedom and vertical spin axis

22.1.2.7 (1247)
In order to align a strapdown inertial unit, it is required to insert the local geographical coordinates. This is necessary to:
a) Position the computing trihedron with reference to earth.
b) Check operation of laser gyros.
c) Determine magnetic or true heading.
d) Re-erect laser gyros.

22.1.3.0 (1248)
The quadrantal deviation of the magnetic compass is due to the action of :
a) the soft iron pieces influenced by the geomagnetic field
b) the hard iron ices and the soft iron pieces influenced by the hard iron pieces
c) the hard iron pieces influenced by the geomagnetic field
d) the hard iron pieces influenced by the mild iron pieces

22.1.3.0 (1249)
A pilot wishes to turn right on to a southerly heading with 20° bank at a latitude of 20° North. Using a direct reading compass, in order to achieve this he must stop the turn on an approximate heading of :
a) 210°
b) 150°
c) 170°
d) 190°

22.1.3.0 (1250)
A pilot wishes to turn left on to a southerly heading with 20° bank at a latitude of 20° North. Using a direct reading compass, in order to achieve this he must stop the turn on an approximate heading of :
a) 160°
b) 200°
c) 170°
d) 190°

22.1.3.0 (1251)
A pilot wishes to turn left on to a northerly heading with 10° bank at a latitude of 50° North. Using a direct reading compass, in order to achieve this he must stop the turn on an approximate heading of :
a) 030°
b) 355°
c) 330°
d) 015°

22.1.3.0 (1252)
A pilot wishes to turn right on to a northerly heading with 20° bank at a latitude of 40° North. Using a direct reading compass, in order to achieve this he must stop the turn on to an approximate heading of :
a) 330°
b) 350°
c) 030°
d) 010°

22.1.3.0 (1253)
The purpose of compass swinging is to determine the deviation of a magnetic compass :
a) on any heading
b) on a given heading
c) at any latitude
d) at a given latitude

22.1.3.0 (1254)
The compass heading can be derived from the magnetic heading by reference to a:
a) compass swinging curve
b) map showing the isoclinic lines
c) deviation correction curve
d) map showing the isogonic lines

22.1.3.0 (1255)
The magnetic heading can be derived from the true heading by means of a :
a) map showing the isogonal lines
b) map showing the isoclinic lines
c) deviation correction curve
d) compass swinging curve

22.1.3.0 (1256)
The fields affecting a magnetic compass originate from:1. magnetic masses2. ferrous metal masses3. non ferrous metal masses4. electrical currentsThe combination of correct statements is:
a) 1, 2, 4
b) 1, 2, 3
c) 1, 2, 3, 4
d) 1, 3, 4

22.1.3.0 (1257)
In the northern hemisphere, during deceleration following a landing in an Easterly direction, the magnetic compass will indicate :
a) an apparent turn to the South.
b) an apparent turn to the North.

c) a constant heading.
d) a heading fluctuating about 090°.

22.1.3.0 (1258)
During deceleration following a landing in Northerly direction, the magnetic compass will indicate :
a) no apparent turn.
b) an apparent turn to the East.
c) an apparent turn to the West.
d) a heading fluctuating about 360°.

22.1.3.0 (1259)
During deceleration following a landing in a Southerly direction, the magnetic compass will indicate :
a) no apparent turn.
b) an apparent turn to the East.
c) an apparent turn to the West.
d) a heading fluctuating about 180°.

22.1.3.0 (1260)
In the Southern hemisphere, during deceleration following a landing in a Westerly direction, the magnetic compass will indicate :
a) an apparent turn to the North.
b) an apparent turn to the South.
c) no apparent turn.
d) a heading fluctuating about 270°.

22.1.3.0 (1261)
In the Northern hemisphere, during deceleration following a landing in a Westerly direction, the magnetic compass will indicate :
a) an apparent turn to the South.
b) an apparent turn to the North.
c) no apparent turn.
d) a heading fluctuating about 270°.

22.1.3.0 (1262)
In the Southern hemisphere, during deceleration following a landing in an Easterly direction, the magnetic compass will indicate :
a) an apparent turn to the North.
b) an apparent turn to the South.
c) no apparent turn.
d) a heading fluctuating about 090°.

22.1.3.0 (1263)
The quadrantal deviation of a magnetic compass is corrected by using :
a) soft iron pieces
b) hard iron pieces
c) pairs of permanent magnets
d) magnetized needles

22.1.3.0 (1264)
An aircraft takes-off on a runway with an alignment of 045°. The isogonic line on the area chart indicates 0°. The compass deviation is O°.On a take-off with zero wind, the northerly turning error:
a) is such that the compass will indicate a value noticeably below 045°.
b) is such that the compass will indicate a value noticeably above 045°.
c) will be nul if the wings are kept level.
d) will be nul

22.1.3.0 (1265)
When turning onto a northerly heading the rose of a magnetic compass tends to ""undershoot,"" when turning onto a southerly heading it tends to ""overshoot"":1)these compass indications are less reliable in the northern hemisphere than in the southern hemisphere.2)these compass oscillations following a lateral gust are not identical if the aircraft is heading north or south.3) this behaviour is due to the mechanical construction of the compass. 4) this behaviour is a symptom of a badly swung compass.The correct statements are :
a) 2 and 3.
b) 1, 2, and 4.
c) 2, 3, and 4.
d) 1 and 3.

22.1.3.0 (1266)
Among the errors of a magnetic compass, are errors:
a) in North seeking, due to bank angle and magnetic heading
b) due to cross-wind gusts particularly on westerly or easterly headings
c) due to Schüler type oscillations
d) of parallax, due to oscillations of the compass rose

22.1.3.0 (1267)
The purpose of a compass swing is to attempt to coincide the indications of:
a) compass north and magnetic north.
b) compass north and true north.
c) true north and magnetic north.
d) compass north and the lubber line.

22.1.3.0 (1268)
In a steep turn, the northerly turning error on a magnetic compass on the northern hemisphere is:
a) equal to 180° on a 090° heading in a right turn.
b) none on a 270° heading in a left turn.
c) none on a 090° heading in a right turn.
d) equal to 180° on a 270° heading in a right turn.

22.1.3.0 (1269)
Magnetic compass swinging is carried out to reduce as much as possible :
a) deviation.
b) variation.
c) regulation.
d) acceleration.

22.1.3.0 (1270)
A flux valve senses the changes in orientation of the horizontal component of the earth's magnetic field.1- the flux valve is made of a pair of soft iron bars2- the primary coils are fed A.C. voltage (usually 487.5 Hz)3- the information can be used by a ""flux gate"" compass or a directional gyro4- the flux gate valve casing is dependent on the aircraft three inertial axis5- the accuracy on the value of the magnetic field indication is less than 0,5%Which of the following combinations contains all of the correct statements?
a) 2002-03-05
b) 1 - 3 - 4 - 5
c) 05-Mar
d) 2001-04-05

22.1.4.0 (1271)
In low altitude radio altimeters, the reading is zero when main landing gear wheels are on the ground. For this, it is necessary to:
a) account for signal processing time in the unit and apply a correction factor to the reading.
b) place the antennas on the bottom of the aeroplane.
c) change the display scale in short final, in order to have a precise readout.
d) compensate residual altitude due to antennas height above the ground and coaxial cables length.

22.1.4.0 (1272)
The aircraft radio equipment which emits on a frequency of 4400 MHz is the :
a) radio altimeter.
b) high altitude radio altimeter.
c) weather radar.
d) primary radar.

22.1.4.0 (1273)
The low-altitude radio altimeters used in precision approaches:1 operate in the 1540-1660 MHz range.2 are of the pulsed type.3 are of the frequency modulation type.4 have an operating range of 0 to 5000 ft.5 have a precision of +/- 2 feet between 0 and 500 ft.The combination of the correct statements is :
a) 3, 5
b) 3, 4
c) 2, 3, 4
d) 1, 2, 5

22.1.4.0 (1274)
The data supplied by a radio altimeter:
a) indicates the distance between the ground and the aircraft.
b) concerns only the decision height.
c) is used only by the radio altimeter indicator.
d) is used by the automatic pilot in the altitude hold mode.

22.1.4.0 (1275)
In low altitude radio altimeters, the height measurement (above the ground) is based upon:
a) a frequency modulation wave, for which the frequency variation between the transmitted wave and the received wave after ground reflection is measured.
b) a pulse transmission, for which time between transmission and reception is measured on a circular scanning screen.
c) a wave transmission, for which the frequency shift by DOPPLER effect after ground reflection is measured.
d) a triangular amplitude modulation wave, for which modulation phase shift between transmitted and received waves after ground reflection is measured.

22.1.4.0 (1276)
Modern low altitude radioaltimeters emit waves in the following frequency band:
a) SHF (Super High Frequency).
b) VLF (Very Low Frequency).
c) HF (High Frequency).
d) UHF (Ultra High Frequency).

22.1.4.0 (1277)
The operating frequency range of a low altitude radio altimeter is:
a) 4200 MHz to 4400 MHz.
b) 5400 MHz or 9400 MHz.
c) 2700 MHz to 2900 MHz.
d) 5 GHz.

22.1.4.0 (1278)
The Decision Height (DH) warning light comes on when an aircraft:
a) descends below a pre-set radio altitude.
b) passes over the outer marker.
c) descends below a pre-set barometric altitude.
d) passes over the ILS inner marker.

22.1.4.0 (1279)
The operation of the radio altimeter of a modern aircraft is based on:
a) frequency modulation of the carrier wave.
b) amplitude modulation of the carrier wave.
c) pulse modulation of the carrier wave.
d) a combination of frequency modulation and pulse modulation.

22.1.4.0 (1280)
A radio altimeter can be defined as a :
a) self-contained on-board aid used to measure the true height of the aircraft
b) self-contained on-board aid used to measure the true altitude of the aircraft
c) ground radio aid used to measure the true height of the aircraft
d) ground radio aid used to measure the true altitude of the aircraft

22.1.4.0 (1281)
For most radio altimeters, when a system error occurs during approach the ..
a) Height indication is removed
b) DH lamp flashes red and the audio signal sounds
c) DH lamp flashes red
d) Audio warning signal sounds

22.1.4.0 (1282)
During the approach, a crew reads on the radio altimeter the value of 650 ft. This is an indication of the true:
a) height of the lowest wheels with regard to the ground at any time.
b) height of the aircraft with regard to the ground at any time.
c) height of the aircraft with regard to the runway.
d) altitude of the aircraft.

22.1.5.0 (1283)
Regarding Electronic Instrument System (EFIS) :1- the Navigation Display (ND) displays Flight Director Bars.2- the altimeter setting is displayed on the PFD (Primary Flight Display).3- the PFD is the main flying instrument.4- the FMA (Flight Mode Annunciator) is part of the ND.The combination regrouping all the correct statements is :
a) 2, 3.
b) 3, 4.
c) 1, 4.
d) 1, 2.

22.1.5.0 (1284)
The Primary Flight Display (PFD) displays information dedicated to:
a) piloting.
b) weather situation.
c) engines and alarms.
d) systems.

22.1.6.0 (1285)
All the last generation aircraft use flight control systems. The Flight Management System (FMS) is the most advanced system , it can be defined as a:
a) global 3-D Flight Management System
b) management system optimized in the vertical plane
c) management system optimized in the horizontal plane
d) global 2-D Flight Management System

22.2.0.0 (1286)
When the altitude acquisition mode is engaged on a jet transport airplane equipped with autopilot (AP) and auto-throttle (ATS) systems the:
a) indicated airspeed (IAS) is maintained constant by the autopilot by means of elevator.
b) true airspeed (TAS) is maintained constant by the autopilot by means of elevator.
c) true airspeed (TAS) is maintained constant by the auto-throttle system.
d) indicated airspeed (IAS) is maintained constant by the auto-throttle system.

22.2.1.0 (1287)
Flight Director Information supplied by an FD computer is presented in the form of command bars on the following instrument:
a) ADI Attitude Display Indicator.
b) BDHI Bearing Distance Heading Indicator.
c) RMI Radio Magnetic Indicator.
d) HSI Horizontal Situation Indicator.

22.2.1.0 (1288)
The Head Up Display (HUD) is a device allowing the pilot, while still looking outside, to have:
a) a synthetic view of the instrument procedure.
b) a flying and flight path control aid.
c) a monitoring of engine data.
d) a monitoring only during Cat III precision approaches.

22.2.1.0 (1289)
For capturing and keeping a preselected magnetic heading, the flight director computer takes into account:1- track deviation2- rate of track closure3- rate of change of track closure4- wind velocity given by the inertial reference unitThe combination regrouping all the correct statements is :
a) 1,2,3
b) 1,2,4
c) 2,3,4
d) 1,3,4

22.2.1.0 (1290)
The essential components of a flight director are :1- a computer2- an automatic pilot3- an autothrottle4- command barsThe combination of correct statements is :
a) 1,4
b) 1,2
c) 2,4
d) 2,3

22.2.1.0 (1291)
The ""heading hold"" mode is selected on the flight director (FD) with a course to steer of 180°. Your aircraft holds a heading of 160°. The vertical bar of the FD:
a) is centered if the aircraft is on optimum path to join heading 180°
b) is centered if the aircraft has a starboard drift of 20°
c) is centered if the aircraft has a port drift of 20°
d) cannot be centered

22.2.1.0 (1292)
Mode ""Localizer ARM"" active on Flight Director means:
a) System is armed for localizer approach and coupling will occur upon capturing center line
b) Localizer ALARM, making localizer approach not authorized
c) Coupling has occurred and system provides control data to capture the centerline
d) Localizer is armed and coupling will occur when flag warning disappears

22.2.1.0 (1293)
An aeroplane is equipped with a Flight Director (with crosshair trend bars), heading 270°, in HDG mode (heading hold). A new heading, of 360°, is selected the vertical trend bar :
a) deviates to the right and will be centred as soon as you roll the aircraft to the bank angle calculated by the flight director.
b) deviates to the right and remains in that position until the aircraft has reached heading 360°.
c) disappears, the new heading selection has deactivated the HDG mode.

b) 28400 kg
c) 31960 kg
d) 32505 kg

31.2.1.1 (1545)
The empty mass of an aeroplane is recorded in
a) the weighing schedule and is amended to take account of changes due to modifications of the aeroplane.
b) the weighing schedule. If changes occur, due to modifications, the aeroplane must be re-weighed always.
c) the loading manifest. It differs from Dry Operating Mass by the value of the 'useful load'.
d) the loading manifest. It differs from the zero fuel mass by the value of the 'traffic load'.

31.2.1.1 (1546)
When establishing the mass breakdown of an aeroplane, the empty mass is defined as the sum of the:
a) standard empty mass plus specific equipment mass plus trapped fluids plus unusable fuel mass
b) empty mass dry plus variable equipment mass
c) basic mass plus variable equipment mass
d) basic mass plus special equipment mass

31.2.1.1 (1547)
The Basic Mass of a helicopter is the mass of the helicopter without crew, :
a) without specific equipment for the mission, without payload, with the unusable fuel and standard equipment.
b) without payload, with specific equipment for the mission, without the unusable fuel.
c) without specific equipment for the mission, without payload, wthout unusable fuel.
d) without specific equipments for the mission, without payload, with fuel on board.

31.2.1.2 (1548)
In relation to an aeroplane the Dry Operating Mass is the total mass of the aeroplane ready for a specific type of operation but excluding
a) usable fuel and traffic load.
b) usable fuel and crew.
c) potable water and lavatory chemicals.
d) usable fuel, potable water and lavatory chemicals.

31.2.1.2 (1549)
The Take-off Mass of an aeroplane is 66700 kg which includes a traffic load of 14200 kg and a usable fuel load of 10500 kg. If the standard mass for the crew is 545 kg the Dry Operating Mass is
a) 42000 kg
b) 56200 kg
c) 41455 kg
d) 42545 kg

31.2.1.2 (1550)
For the purpose of completing the Mass and Balance documentation, the Dry Operating Mass is defined as:
a) The total mass of the aeroplane ready for a specific type of operation excluding all usable fuel and traffic load.
b) The total mass of the aeroplane ready for a specific type of operation excluding all usable fuel.
c) The total mass of the aeroplane ready for a specific type of operation excluding all traffic load.
d) The total mass of the aeroplane ready for a specific type of operation excluding crew and crew baggage.

31.2.1.2 (1551)
Dry Operating Mass is the mass of the aeroplane less
a) usable fuel and traffic load.
b) usable fuel.
c) traffic load, potable water and lavatory chemicals.
d) usable fuel, potable water and lavatory chemicals.

31.2.1.2 (1552)
The total mass of the aeroplane including crew, crew baggage, plus catering and removable passenger equipment, plus potable water and lavatory chemicals but excluding usable fuel and traffic load, is referred to as:
a) Dry Operating Mass.
b) Zero Fuel Mass.
c) Aeroplane Prepared for Service (APS) Mass.
d) Maximum Zero Fuel Mass

31.2.1.2 (1553)
The basic empty mass of an aircraft is 30 000 kg. The masses of the following items are :- catering: 300 kg- safety and rescue material: nil- fly away kit: nil- crew (inclusive crew baggage): 365kg- fuel at take-off: 3 000 kg- unusable fuel: 120 kg- passengers, baggage, cargo: 8 000 kgThe Dry Operating Mass is :
a) 30 785 kg
b) 30 300 kg
c) 38 300 kg
d) 30 665 kg

31.2.1.2 (1554)
The Dry Operating Mass of a helicopter is the total mass of a helicopter :
a) ready for a specific operation including the crew and traffic load, not including the usable fuel
b) excluding the crew but including specific equipments for the mission and not including the usable fuel
c) including the crew,the fuel and the specific equipments for the mission but excluding payload
d) including the crew, the usable fuel and the specific equipments for the mission and payload

31.2.1.2 (1555)
By adding to the basic empty mass the following fixed necessary equipment for a specific flight (catering, safety and rescue equipment, fly away kit, crew), we get:
a) Dry operating mass
b) take-off mass
c) zero fuel mass
d) landing mass

31.2.1.3 (1556)
The zero fuel mass of an aeroplane is always:
a) The take-off mass minus the take-off fuel mass.
b) The take-off mass minus the wing fuel mass.
c) The take-off mass minus the fuselage fuel mass.
d) The maximum take-off mass minus the take-off fuel mass.

31.2.1.3 (1557)
The term 'Maximum Zero Fuel Mass' consist of :
a) The maximum permissible mass of an aeroplane with no usable fuel.
b) The maximum mass authorized for a certain aeroplane not including traffic load and fuel load.
c) The maximum mass authorized for a certain aeroplane not including the fuel load and operational items
d) The maximum mass for some aeroplanes including the fuel load and the traffic load

31.2.1.3 (1558)
The actual 'Zero Fuel Mass' is equal to the:
a) Dry Operating Mass plus the traffic load.
b) Operating Mass plus all the traffic load.
c) Basic Empty Mass plus the fuel loaded.
d) Actual Landing Mass plus trip fuel.

31.2.1.3 (1559)
The maximum zero-fuel mass:1- is a regulatory limitation2- is calculated for a maximum load factor of +3.5 g3- is due to the maximum permissible bending moment at the wing root4- imposes fuel dumping from the outer wings tank first5- imposes fuel dumping from the inner wings tank first6- can be increased by stiffening the wingThe combination of correct statements is:
a) 1, 3, 5
b) 2, 5, 6
c) 4, 2, 6
d) 1, 2, 3

31.2.1.3 (1560)
Which of the following alternatives corresponds to zero fuel mass?
a) The mass of an aeroplane with no usable fuel.
b) Operating mass plus load of passengers and cargo.
c) Operating mass plus passengers and cargo.
d) Take-off mass minus fuel to destination and alternate.

31.2.1.3 (1561)
On an aeroplane without central fuel tank, the maximum Zero Fuel Mass is related to:
a) The bending moment at the wing root.
b) Maximum Structural Take-Off Mass.
c) Wing loaded trip fuel.
d) Variable equipment for the flight.

31.2.1.3 (1562)
The Maximum Zero Fuel Mass is the mass of the aeroplane with no usable fuel on board. It is a limitation which is:
a) listed in the Flight Manual as a fixed value. It is a structural limit.
b) governed by the requirements of the centre of gravity limits and the structural limits of the aeroplane.
c) tabulated in the Flight Manual against arguments of airfield elevation and temperature.
d) governed by the traffic load to be carried. It also provides protection from excessive 'wing bending'.

31.2.1.3 (1563)
The Zero Fuel Mass and the Dry Operating Mass
a) differ by the value of the traffic load mass.
b) are the same value.
c) differ by the sum of the mass of usable fuel plus traffic load mass.
d) differ by the mass of usable fuel.

31.2.1.3 (1564)
The Maximum Zero Fuel Mass is a structural limiting mass. It is made up of the aeroplane Dry Operational mass plus
a) traffic load and unuseable fuel.
b) traffic load, unuseable fuel and crew standard mass.
c) unuseable and crew standard mass.
d) traffic load and crew standard mass.

31.2.1.3 (1565)
The take-off mass of an aeroplane is 141000 kg. Total fuel on board is 63000 kg including 14000 kg reserve fuel and 1000 kg of unusable fuel. The traffic load is 12800 kg. The zero fuel mass is:
a) 79000 kg
b) 78000 kg
c) 93000 kg
d) 65200 kg.

31.2.1.4 (1566)
Mass for individual passengers (to be carried on an aeroplane) may be determined from a verbal statement by or on behalf of the passengers if the number of
a) passenger seats available is less than 6.
b) passengers carried is less than 6.
c) passenger seats available is less than 20.
d) passengers carried is less than 20.

31.2.1.4 (1567)
'Standard Mass' as used in the computation of passenger load establish the mass of a child as
a) 35 kg irrespective of age provided they occupy a seat.
b) 35 kg only if they are over 2 years old and occupy a seat.
c) 35 kg for children over 2 years occupying a seat and 10 kg for infants (less than 2 years) not occupying a seat.
d) 35 kg for children over 2 years occupying a seat and 10 kg for infants (less than 2 years) occupying a seat.

31.2.1.4 (1568)
On an aeroplane with a seating capacity of more than 30, it is decided to use standard mass values for computing the total mass of passengers. If the flight is not a holiday charter, the mass value which may be used for an adult is
a) 84 kg
b) 76 kg
c) 84 kg (male) 76 kg (female).
d) 88 kg (male) 74 kg (female).

31.2.1.4 (1569)
The standard mass for a child is
a) 35 kg for all flights.
b) 35 kg for holiday charters and 38 kg for all other flights.
c) 38 kg for all flights.
d) 30 kg for holiday charters and 35 kg for all other flights.

31.2.1.4 (1570)
On an aeroplane with 20 or more seats engaged on an inter-continental flight, the 'standard mass' which may be used for passenger baggage is
a) 15 kg per passenger.
b) 13 kg per passenger.
c) 14 kg per passenger.
d) 11 kg per passenger.

31.2.1.4 (1571)
In determining the Dry Operating Mass of an aeroplane it is common practice to use 'standard mass' values for crew. These values are
a) flight crew 85 kg., cabin crew 75 kg. each. These are inclusive of a hand baggage allowance.
b) flight crew 85 kg., cabin crew 75 kg. each. These do not include a hand baggage allowance.
c) flight crew (male) 88 kg. (female) 75 kg., cabin crew 75 kg. each. These include an allowance for hand baggage.
d) flight crew (male) 88 kg. (female) 75 kg., cabin crew 75 kg. each. These do not include an allowance for hand baggage.

31.2.1.4 (1572)
The maximum quantity of fuel that can be loaded into an aeroplane's tanks is given as 3800 US Gallons. If the fuel density (specific gravity) is given as 0.79 the mass of fuel which may be loaded is
a) 11364 kg.
b) 14383 kg.
c) 18206 kg.
d) 13647 kg.

31.2.1.4 (1573)
Conversion of fuel volume to mass
a) may be done by using standard fuel density values as specified in the Operations Manual, if the actual fuel density is not known.
b) may be done by using standard fuel density values as specified in JAR - OPS 1.
c) must be done by using actual measured fuel density values.
d) must be done using fuel density values of 0.79 for JP 1 and 0.76 for JP 4 as specified in JAR - OPS, IEM - OPS 1.605E.

31.2.1.4 (1574)
Standard masses may be used for the computation of mass values for baggage if the aeroplane
a) has 20 or more seats.
b) has 6 or more seats.
c) has 30 or more seats.
d) is carrying 30 or more passengers.

31.2.1.4 (1575)
The operator of an aircraft equipped with 50 seats uses standard masses for passengers and baggage. During the preparation of a scheduled flight a group of passengers present themselves at the check-in desk, it is apparent that even the lightest of these exceeds the value of the declared standard mass.
a) the operator should use the individual masses of the passengers or alter the standard masss
b) the operator may use the standard masses for the load and balance calculation without correction
c) the operator may use the standard masses for the balance but must correct these for the load calculation
d) the operator is obliged to use the actual masses of each passenger

31.2.1.4 (1576)
(For this question use annex 031-12272A)For the purpose of calculating traffic loads, an operator's loading manual gives the following standard mass values for passengers. (These values include an allowance for hand baggage)Male 88 kgFemale 70 kgChild 35 kgInfant 6 kgThe standard mass value to be used for hold baggage is 14 kg per pieceThe loading manifest shows the following details :Passengers loaded Males 40Females 65Children 8 Infants 5Baggage in hold number 4: 120 piecesUsing the standard mass values given and the data in the appendix, select from the following the correct value for the mass of freight (all loaded in hold No1) which constitutes the remainder of the traffic load
a) 260 kg
b) 210 kg
c) 280 kg
d) no cargo can be loaded in hold number 1

31.2.1.5 (1577)
The actual 'Take-off Mass' is equivalent to:
a) Dry Operating Mass plus take-off fuel and the traffic load
b) Actual Zero Fuel Mass plus the traffic load
c) Dry Operating Mass plus the take-off fuel
d) Actual Landing Mass plus the take-off fuel

31.2.1.5 (1578)
Traffic load is the:
a) Zero Fuel Mass minus Dry Operating Mass.
b) Dry Operating Mass minus the disposable load.

c) Dry Operating Mass minus the variable load.
d) Take-off Mass minus Zero Fuel Mass.

31.2.1.5 (1579)
The term 'useful load' as applied to an aeroplane includes
a) traffic load plus useable fuel.
b) traffic load only.
c) the revenue-earning portion of traffic load only.
d) the revenue-earning portion of traffic load plus useable fuel.

31.2.1.5 (1580)
An aeroplane is performance limited to a landing mass of 54230 kg. The Dry Operating Mass is 35000 kg and the zero fuel mass is 52080 kg. If the take-off mass is 64280 kg the useful load is
a) 29280 kg.
b) 17080 kg
c) 12200 kg.
d) 10080 kg.

31.2.1.5 (1581)
(For this question use annex 031-9676 A or Loading Manual MRJT 1 Paragraph 4)For the medium range transport aeroplane, from the loading manual, determine the maximum total volume of fuel which can be loaded into the main wing tanks. (Fuel density value 0.78)
a) 11349 litres
b) 8850 litres
c) 11646 litres
d) 5674 litres

31.2.1.5 (1582)
An aeroplane's weighing schedule indicates that the empty mass is 57320 kg. The nominal Dry Operating Mass is 60120 kg and the Maximum Zero Fuel Mass is given as 72100 kg. Which of the following is a correct statement in relation to this aeroplane?
a) operational items have a mass of 2800 kg and the maximum traffic load for this aeroplane is 11980 kg.
b) operational items have a mass of 2800 kg and the maximum traffic load for this aeroplane is 14780 kg.
c) operational items have a mass of 2800 kg and the maximum useful load is 11980 kg.
d) operational items have a mass of 2800 kg and the maximum useful load is 14780 kg.

31.2.1.5 (1583)
The empty mass of an aeroplane, as given in the weighing schedule, is 61300 kg. The operational items (including crew) is given as a mass of 2300 kg. If the take-off mass is 132000 kg (including a useable fuel quantity of 43800 kg) the useful load is
a) 68400 kg
b) 70700 kg
c) 29600 kg
d) 26900 kg.

31.2.1.5 (1584)
The following data applies to an aeroplane which is about to take off: Certified maximum take-off mass 141500 kg Performance limited take-off mass 137300 kg Dry Operating Mass 58400 kg Crew and crew hand baggage mass 640 kg Crew baggage in hold 110 kgFuel on board 60700 kgFrom this data calculate the mass of the useful load.
a) 78900 kg
b) 78150 kg
c) 18200 kg
d) 17450 kg

31.2.1.5 (1585)
The Dry Operating Mass of an aircraft is 2 000 kg.The maximum take-off mass, landing and zero fuel mass are identical at 3500 kg. The block fuel mass is 550kg, and the taxi fuel mass is 50 kg. The available mass of payload is:
a) 1 000 kg
b) 950 kg
c) 1 500 kg
d) 1 450 kg

31.2.1.5 (1586)
Allowed traffic load is the difference between :
a) allowed take off mass and operating mass
b) allowed take off mass and basic mass plus trip fuel
c) allowed take off mass and basic mass
d) operating mass and basic mass

31.2.1.5 (1587)
(For this question use annex 031 11634A)Maximum allowed take-off mass limit: 37 200kgDry operating mass: 21 600 kgTake-off fuel: 8 500 kgPassengers on board: male 33, female 32, children 5Baggages: 880 kgThe company uses the standard passenger mass systems (see annex) allowed by regulations. The flight is not a holiday charter.In these conditions, the maximum cargo that may be loaded is
a) 585 kg
b) 901 kg
c) 1 098 kg
d) 1 105 kg

31.2.1.5 (1588)
The crew of a transport aeroplane prepares a flight using the following data:- Block fuel: 40 000 kg- Trip fuel: 29 000 kg- Taxi fuel: 800 kg- Maximum take-off mass: 170 000 kg- Maximum landing mass: 148 500 kg- Maximum zero fuel mass: 112 500 kg- Dry operating mass: 80 400 kgThe maximum traffic load for this flight is:
a) 32 100 kg
b) 32 900 kg
c) 18 900 kg
d) 40 400 kg

31.2.1.5 (1589)
The crew of a transport aeroplane prepares a flight using the following data:- Dry operating mass: 90 000 kg- Block fuel: 30 000 kg- Taxi fuel: 800 kg- Maximum take-off mass: 145 000 kgThe traffic load available for this flight is:
a) 25 800 kg
b) 25 000 kg
c) 55 000 kg
d) 55 800 kg

31.2.1.5 (1590)
An aircraft basic empty mass is 3000 kg.The maximum take-off, landing, and zero-fuel mass are identical, at 5200 kg. Ramp fuel is 650 kg, the taxi fuel is 50 kg.The payload available is :
a) 1 600 kg
b) 1 550 kg
c) 2 200 kg
d) 2 150 kg

31.2.2.0 (1591)
The take-off mass of an aeroplane is 117 000 kg, comprising a traffic load of 18 000 kg and fuel of 46 000 kg. What is the dry operating mass?
a) 53 000 kg
b) 64 000 kg
c) 71 000 kg
d) 99 000 kg

31.2.2.1 (1592)
When preparing to carry out the weighing procedure on an aeroplane, which of the following is not required?
a) drain all engine tank oil.
b) drain all useable fuel.
c) drain all chemical toilet fluid tanks.
d) removable passenger services equipment to be off-loaded.

31.2.2.1 (1593)
An aeroplane may be weighed
a) in an enclosed, non-air conditioned, hangar.
b) in a quiet parking area clear of the normal manoeuvring area.
c) in an area of the airfield set aside for maintenance.
d) at a specified 'weighing location' on the airfield.

31.2.2.2 (1594)
An aeroplane must be re-weighed at certain intervals. Where an operator uses 'fleet masses' and provided that changes have been correctly documented, this interval is
a) 9 years for each aeroplane.
b) 4 years for each aeroplane.
c) whenever the Certificate of Airworthiness is renewed.
d) whenever a major modification is carried out.

31.2.2.2 (1595)
If individual masses are used, the mass of an aeroplane must be determined prior to initial entry into service and thereafter
a) at intervals of 4 years if no modifications have taken place.
b) at regular annual intervals.
c) only if major modifications have taken place.
d) at intervals of 9 years.

31.2.3.1 (1596)
An aeroplane is weighed prior to entry into service. Who is responsible for deriving the Dry Operational Mass from the weighed mass by the addition of the 'operational items' ?
a) The Operator.
b) The appropriate Aviation Authority.
c) The aeroplane manufacturer or supplier.
d) The commander of the aeroplane.

31.2.3.1 (1597)
The responsibility for determination of the mass of 'operating items' and 'crew members' included within the Dry Operating Mass lies with
a) the operator.
b) the commander.
c) the authority of the state of registration.
d) the person compiling the weighing schedule.

31.2.3.3 (1598)
(For this question use annex 031-9640 A or Loading Manual MRJT 1 Figure 4.14)A revenue flight is planned for the transport aeroplane. Take-off mass is not airfield limited. The following data applies:Dry Operating Mass 34930 kgPerformance limited landing mass 55000 kgFuel on board at ramp-Taxi fuel 350 kgTrip fuel 9730 kgContingency and final reserve fuel 1200 kgAlternate fuel 1600 kgPassengers on board 130Standard mass for each passenger 84 kgBaggage per passenger 14 kgTraffic load Maximum possibleUse the loading manual provided and the above data. Determine the maximum cargo load that may be carried without exceeding the limiting aeroplane landing mass.
a) 4530 kg.
b) 5400 kg
c) 6350 kg.
d) 3185 kg.

31.2.3.3 (1599)
The empty mass of an aeroplane is given as 44800 kg. Operational items (including crew standard mass of 1060 kg) are 2300 kg. If the maximum zero fuel mass is given as 65500 kg, the maximum traffic load which could be carried is:
a) 18400 kg
b) 20700 kg
c) 23000 kg
d) 19460 kg.

31.2.3.3 (1600)
(For this question use annex 031-9643 A or Loading Manual MRJT 1 Figure

4.14)The following data relates to a planned flight of an aeroplane -Dry Operational mass 60520 kgPerformance limited take-off mass 92750 kgPerformance limited landing mass 72250 kgMaximum Zero Fuel mass 67530 kgFuel on board at take-off -Trip fuel 12500 kgContingency and final reserve fuel 2300 kgAlternate fuel 1700 kgUsing this data, as appropriate, calculate the maximum traffic load that can be carried.
a) 7010 kg
b) 7730 kg
c) 11730 kg
d) 15730 kg

31.2.3.3 (1601)
(For this question use annex 031-9644 A or Loading Manual MRJT 1 Figure 4.14)Aeroplane Dry Operating mass 85000 kgPerformance limited take-off mass 127000 kgPerformance limited landing mass 98500 kgMaximum zero fuel mass 89800 kgFuel requirements for flight -Trip fuel 29300 kgContingency and final reserve fuel 3600 kgAlternate fuel 2800 kg.The maximum traffic load that can be carried on this flight is:
a) 4800 kg
b) 7100 kg
c) 6300 kg
d) 12700 kg

31.2.3.4 (1602)
For the purpose of completing the Mass and Balance documentation, the Operating Mass is considered to be Dry Operating Mass plus
a) Take-off Fuel Mass.
b) Ramp Fuel Mass.
c) Trip Fuel Mass.
d) Ramp Fuel Mass less the fuel for APU and run-up.

31.2.3.4 (1603)
The following data applies to a planned flight.Dry Operating Mass 34900 kgPerformance limited Take-Off Mass 66300 kgPerformance limited Landing Mass 55200 kgMaximum Zero Fuel Mass 53070 kgFuel required at ramp:-Taxy fuel 400 kgtrip fuel 8600 kgcontingency fuel 430 kgalternate fuel 970 kgholding fuel 900 kgTraffic load 16600 kgFuel costs at the departure airfield are such that it is decided to load the maximum fuel quantity possible. The total fuel which may be safely loaded prior to departure is :
a) 12700 kg
b) 13230 kg
c) 15200 kg
d) 10730 kg

31.2.3.4 (1604)
Prior to departure the medium range twin jet aeroplane is loaded with maximum fuel of 20100 litres at a fuel density (specific gravity) of 0.78. Using the following data - Performance limited take-off mass 67200 kgPerformance limited landing mass 54200 kgDry Operating Mass 34930 kgTaxi fuel 250 kgTrip fuel 9250 kgContingency and holding fuel 850 kgAlternate fuel 700 kgThe maximum permissible traffic load is
a) 13090 kg.
b) 16470 kg
c) 18040 kg
d) 12840 kg

31.2.3.4 (1605)
(For this question use annex 031-9660 A or Loading Manual MRJT 1 Paragraph 3.1)The medium range jet transport aeroplane is to operate a flight carrying the maximum possible fuel load. Using the following data as appropriate, determine the mass of fuel on board at start of take off.Departure airfield performance limited take-off mass: 60 400 kgLanding airfield -not performance limited.Dry Operating Mass: 34930 kgFuel required for flight - Taxi fuel: 715 kg Trip fuel: 8600 kg Contingency and final reserve fuel: 1700 kg Alternate fuel 1500 kg Additional reserve 400 kgTraffic load for flight 11000 kg
a) 14 470 kg
b) 15 815 kg
c) 13 655 kg
d) 16 080 kg

31.2.3.4 (1606)
An aeroplane is to depart from an airfield at a take-off mass of 302550 kg. Fuel on board at take-off (including contingency and alternate of 19450 kg) is 121450 kg. The Dry Operating Mass is 161450 kg. The useful load will be
a) 141100 kg
b) 19650 kg
c) 121450 kg
d) 39105 kg

31.2.3.5 (1607)
Given:Maximum structural take-off mass= 146 900 kgMaximum structural landing mass= 93 800 kgMaximum zero fuel mass= 86 400 kgTrip fuel= 27 500 kgBlock fuel= 35 500 kgEngine starting and taxi fuel = 1 000 kgThe maximum take-off mass is equal to:
a) 120 900 kg
b) 121 300 kg
c) 113 900 kg
d) 120 300 kg

31.2.3.5 (1608)
Given:Dry Operating Mass= 29 800 kgMaximum Take-Off Mass= 52 400 kgMaximum Zero-Fuel Mass= 43 100 kgMaximum Landing Mass= 46 700 kgTrip fuel= 4 000 kgFuel quantity at brakes release= 8 000 kgThe maximum traffic load is:
a) 12 900 kg
b) 13 300 kg
c) 9 300 kg
d) 14 600 kg

31.2.3.5 (1609)
Given the following :- Maximum structural take-off mass 48 000 kg- Maximum structural landing mass: 44 000 kg- Maximum zero fuel mass: 36 000 kg-Taxi fuel: 600 kg-Contingency fuel: 900 kg-Alternate fuel: 800 kg-Final reserve fuel: 1 100

kg-Trip fuel: 9 000 kgDetermine the actual take-off mass:
a) 47 800 kg
b) 48 000 kg
c) 48 400 kg
d) 53 000 kg

31.2.3.5 (1610)
Given that:- Maximum structural take-off mass: 146 000 kg- Maximum structural landing mass: 93 900 kg- Maximum zero fuel mass: 86 300 kg- Trip fuel: 27 000 kg- Taxi fuel: 1 000 kg- Contingency fuel: 1350 kg- Alternate fuel: 2650 kg- Final reserve fuel: 3000 kgDetermine the actual take-off mass:
a) 120 300 kg.
b) 146 000 kg.
c) 120 900 kg.
d) 121 300 kg.

31.2.3.5 (1611)
Given are:- Maximum structural take-off mass: 72 000 kg- Maximum structural landing mass: 56 000 kg- Maximum zero fuel mass: 48 000 kg- Taxi fuel: 800 kg- Trip fuel: 18 000 kg- Contingency fuel: 900 kg- Alternate fuel: 700 kg- Final reserve fuel: 2 000 kgDetermine the actual take-off mass:
a) 69 600 kg
b) 74 000 kg
c) 72 000 kg
d) 70 400 kg

31.2.3.5 (1612)
(For this question use annex 031-4741A or Loading Manual MEP1 Figure 3.4)With respect to a multi-engine piston powered aeroplane, determine the total moment (lbs.In) at landing in the following conditions:Basic empty mass: 3 210 lbs.One pilot: 160 lbs.Front seat passenger : 200 lbs.Centre seat passengers: 290 lbs. (total)One passenger rear seat: 110 lbs.Baggage in zone 1: 100 lbs.Baggage in zone 4: 50 lbs.Block fuel: 100 US Gal.Trip fuel: 55 US Gal.Fuel for start up and taxi (included in block fuel): 3 US Gal.Fuel density: 6 lbs./US Gal.Total moment at take-off: 432226 lbs.In
a) 401 338
b) 432 221
c) 433 906
d) 377 746

31.2.3.5 (1613)
With respect to aeroplane loading in the planning phase, which of the following statements is always correct ?LM = Landing MassTOM = Take-off MassMTOM = Maximum Take-off MassZFM = Zero Fuel MassMZFM = Maximum Zero Fuel MassDOM = Dry Operating Mass
a) LM = TOM - Trip Fuel
b) MTOM = ZFM + maximum possible fuel mass
c) MZFM = Traffic load + DOM
d) Reserve Fuel = TOM - Trip Fuel

31.2.3.5 (1614)
Given an aeroplane with:Maximum Structural Landing Mass: 68000 kgMaximum Zero Fuel Mass: 70200 kgMaximum Structural Take-off Mass: 78200 kgDry Operating Mass : 48000 kgScheduled trip fuel is 7000 kg and the reserve fuel is 2800 kg,Assuming performance limitations are not restricting, the maximum permitted take-off mass and maximum traffic load are respectively:
a) 75000 kg and 17200 kg
b) 75000 kg and 20000 kg
c) 77200 kg and 19400 kg
d) 77200 kg and 22200 kg

31.2.3.5 (1615)
Given an aeroplane with: Maximum Structural Landing Mass: 125000 kgMaximum Zero Fuel Mass: 108500 kg Maximum Structural Take-off Mass: 155000 kgDry Operating Mass: 82000 kgScheduled trip fuel is 17000 kg and the reserve fuel is 5000 kg.Assuming performance limitations are not restricting, the maximum permitted take-off mass and maximum traffic load are respectively:
a) 130500 kg and 26500 kg
b) 130500 kg and 31500 kg
c) 125500 kg and 21500 kg
d) 125500 kg and 26500 kg

31.2.3.5 (1616)
For the purpose of completing the Mass and Balance documentation, the Traffic Load is considered to be equal to the Take-off Mass
a) less the Operating Mass.
b) plus the Operating Mass.
c) plus the Trip Fuel Mass.
d) less the Trip Fuel Mass.

31.2.3.5 (1617)
A jet transport has the following structural limits:-Maximum Ramp Mass: 63 060 kg-Maximum Take Off Mass: 62 800 kg-Maximum Landing Mass: 54 900 kg-Maximum Zero Fuel Mass: 51 300 kgThe aeroplane's fuel is loaded accordance with the following requirements:-Taxi fuel: 400 kg-Trip fuel: 8400 kg-Contingency & final reserve fuel: 1800 kg-Alternate fuel: 1100 kgIf the Dry Operating Mass is 34930 kg, determine the maximum traffic load that can be carried on the flight if departure and landing airfields are not performance limited.
a) 16 370 kg
b) 16 430 kg
c) 17 070 kg
d) 16 570 kg

31.2.3.5 (1618)
A flight has been made from London to Valencia carrying minimum fuel and maximum traffic load. On the return flight the fuel tanks in the aeroplane are to be filled to capacity with a total fuel load of 20100 litres at a fuel density of 0.79 kg/l.The following are the aeroplane's structural limits:-Maximum Ramp Mass: 69 900 kg-Maximum Take Off Mass: 69 300 kg-Maximum Landing Mass: 58 900 kg-Maximum Zero Fuel Mass: 52 740 kgThe performance limited take off mass at Valencia is 67 330 kg.The landing mass at London is not performance limited.Dry Operating Mass: 34 930 kgTrip Fuel (Valencia to London): 5 990 kgTaxi fuel: 250

kgThe maximum traffic load that can be carried from Valencia will be:
a) 14 331 kg
b) 13 240 kg
c) 16 770 kg
d) 9 830 kg

31.2.3.5 (1619)
An aeroplane is to depart from an airfield where the performance limited take-off mass is 89200 kg. Certificated maximum masses are as follows:Ramp (taxi) mass 89930 kgMaximum Take-off mass 89430 kgMaximumLanding mass 71520 kgActual Zero fuel mass 62050 kgFuel on board at ramp:Taxi fuel 600 kgTrip fuel 17830 kgContingency, final reserve and alternate 9030 kgIf the Dry Operating Mass is 40970 kg the traffic load that can be carried on this flight is
a) 21080 kg
b) 21500 kg
c) 21220 kg
d) 20870 kg

31.2.3.5 (1620)
A revenue flight is to be made by a jet transport. The following are the aeroplane's structural limits:-Maximum Ramp Mass: 69 900 kg-Maximum Take Off Mass: 69 300 kg-Maximum Landing Mass: 58 900 kg-Maximum Zero Fuel Mass: 52 740 kgThe performance limited take off mass is 67 450kg and the performance limited landing mass is 55 470 kg.Dry Operating Mass: 34 900 kgTrip Fuel: 6 200 kgTaxi Fuel: 250 kgContingency & final reserve fuel: 1 300 kgAlternate Fuel: 1 100 kg The maximum traffic load that can be carried is:
a) 17 840 kg
b) 18 170 kg
c) 13 950 kg
d) 25 800 kg

31.2.3.5 (1621)
A revenue flight is to be made by a jet transport. The following are the aeroplane's structural limits:-Maximum Ramp Mass: 69 900 kg-Maximum Take Off Mass: 69 300 kg-Maximum Landing Mass: 58 900 kg-Maximum Zero Fuel Mass: 52 740 kgTake Off and Landing mass are not performance limited.Dry Operating Mass: 34 930 kgTrip Fuel: 11 500 kgTaxi Fuel: 250 kgContingency & final reserve fuel: 1 450 kgAlternate Fuel: 1 350 kg The maximum traffic load that can be carried is:
a) 17 810 kg
b) 21 170 kg
c) 21 070 kg
d) 20 420 kg

31.2.3.5 (1622)
A revenue flight is to be made by a jet transport. The following are the aeroplane's structural limits:-Maximum Ramp Mass: 69 900 kg-Maximum Take Off Mass: 69 300 kg-Maximum Landing Mass: 58 900 kg-Maximum Zero Fuel Mass: 52 740 kgTake Off and Landing mass are not performance limited.Dry Operating Mass: 34 900 kgTrip Fuel: 11 800 kgTaxi Fuel: 500 kgContingency & final reserve fuel: 1 600 kgAlternate Fuel: 1 900 kg The maximum traffic load that can be carried is:
a) 17 840 kg
b) 19 100 kg
c) 19 200 kg
d) 19 500 kg

31.2.3.5 (1623)
(For this question use annex 031-9685 A or Loading Manual MRJT 1 Figure 4.14)The medium range twin jet transport is scheduled to operate from a departure airfield where conditions limit the take-off mass to 65050 kg. The destination airfield has a performance limited landing mass of 54500 kg. The Dry Operating Mass is 34900 kg. Loading data is as follows - Taxi fuel 350 kgTrip fuel 9250 kgContingency and final reserve fuel 1100 kgAlternate fuel 1000 kgTraffic load 18600 kgCheck the load and ensure that the flight may be operated without exceeding any of the aeroplane limits. Choose, from those given below, the most appropriate answer.
a) The flight is 'landing mass' limited and the traffic load must be reduced to 17500 kg.
b) The flight is 'zero fuel mass' limited and the traffic load must be reduced to 14170 kg.
c) The flight may be safely operated with the stated traffic and fuel load.
d) The flight may be safely operated with an additional 200 kg of traffic load.

31.2.3.5 (1624)
The flight preparation of a turbojet aeroplane provides the following data: Take-off runway limitation: 185 000 kg Landing runway limitation: 180 000 kg Planned fuel consumption: 11 500 kg Fuel already loaded on board the aircraft: 20 000 kgKnowing that: Maximum take-off mass (MTOM): 212 000 kg Maximum landing mass (MLM): 174 000 kg Maximum zero fuel mass (MZFM): 164 000 kg Dry operating mass (DOM): 110 000 kgThe maximum cargo load that the captain may decide to load on board is:
a) 54 000 kg
b) 55 000 kg
c) 55 500 kg
d) 61 500 kg

31.2.3.5 (1625)
To calculate a usable take-off mass, the factors to be taken into account include:
a) Maximum landing mass augmented by the fuel burn.
b) Maximum landing mass augmented by fuel on board at take-off.
c) Maximum zero fuel mass augmented by the fuel burn.
d) Maximum take-off mass decreased by the fuel burn.

31.2.3.5 (1626)
Given:Dry operating mass = 38 000 kgmaximum structural take-off mass = 72 000 kgmaximum landing mass = 65 000 kgmaximum zero fuel mass = 61 000 kgFuel burn = 8 000 kgTake-off Fuel = 10 300 kgThe maximum allowed take-off mass and payload are respectively :
a) 71 300 kg and 23 000 kg
b) 71 300 kg and 25 300 kg
c) 73 000 kg and 24 700 kg
d) 73 000 kg and 27 000 kg

31.2.3.5 (1627)
(For this question use annex 031-12273A)From the data contained in the attached

appendix, the maximum allowable take - off mass and traffic load is respectively :
a) 61600 kg and 12150 kg
b) 68038 kg and 18588 kg
c) 66770 kg and 17320 kg
d) 60425 kg and 10975 kg

31.2.3.5 (1628)
(For this question use annex 031-12274A)An aeroplane is carrying a traffic load of 10320 kgComplete the necessary sections of the attached appendix and determine which of the answers given below represents the maximum increase in the traffic load
a) 1830 kg
b) 7000 kg
c) 8268 kg
d) 655 kg

31.2.4.1 (1629)
Prior to departure an aeroplane is loaded with 16500 litres of fuel at a fuel density of 780 kg/m³. This is entered into the load sheet as 16500 kg and calculations are carried out accordingly. As a result of this error, the aeroplane is
a) lighter than anticipated and the calculated safety speeds will be too high
b) lighter than anticipated and the calculated safety speeds will be too low
c) heavier than anticipated and the calculated safety speeds will be too high
d) heavier than anticipated and the calculated safety speeds will be too low.

31.2.4.1 (1630)
An additional baggage container is loaded into the aft cargo compartment but is not entered into the load and trim sheet. The aeroplane will be heavier than expected and calculated take-off safety speeds
a) will give reduced safety margins.
b) will not be achieved.
c) will be greater than required.
d) are unaffected but V1 will be increased.

31.2.4.1 (1631)
Fuel loaded onto an aeroplane is 15400 kg but is erroneously entered into the load and trim sheet as 14500 kg. This error is not detected by the flight crew but they will notice that
a) speed at un-stick will be higher than expected
b) V1 will be reached sooner than expected
c) V1 will be increased.
d) the aeroplane will rotate much earlier than expected.

31.2.4.1 (1632)
When considering the effects of increased mass on an aeroplane, which of the following is true?
a) Stalling speeds will be higher.
b) Stalling speeds will be lower.
c) Gradient of climb for a given power setting will be higher.
d) Flight endurance will be increased.

31.2.4.2 (1633)
A flight benefits from a strong tail wind which was not forecast. On arrival at destination a straight in approach and immediate landing clearance is given. The landing mass will be higher than planned and
a) the landing distance required will be longer.
b) the landing distance will be unaffected.
c) the approach path will be steeper.
d) the approach path will be steeper and threshold speed higher.

31.2.4.4 (1634)
If an aeroplane is at a higher mass than anticipated, for a given airspeed the angle of attack will
a) be greater, drag will increase and endurance will decrease.
b) be decreased, drag will decrease and endurance will increase.
c) remain constant, drag will decrease and endurance will decrease.
d) remain constant, drag will increase and endurance will increase.

31.2.4.4 (1635)
In order to provide an adequate ""buffet boundary"" at the commencement of the cruise a speed of 1.3Vs is used. At a mass of 120000 kg this is a CAS of 180 knots. If the mass of the aeroplane is increased to 135000 kg the value of 1.3Vs will be
a) increased to 191 knots, drag will increase and air distance per kg of fuel will decrease.
b) unaffected as Vs always occurs at the same angle of attack.
c) increased to 191 knots, drag will decrease and air distance per kg of fuel will increase.
d) increased to 202 knots but, since the same angle of attack is used, drag and range will remain the same.

31.2.4.6 (1636)
The following data is extracted from an aeroplane's loading manifest:Performance limited take-off mass 93500 kgExpected landing mass at destination 81700 kgMaximum certificated landing mass 86300 kgFuel on board 16500 kgDuring the flight a diversion is made to an en-route alternate which is not 'performance limited' for landing. Fuel remaining at landing is 10300 kg. The landing mass
a) is 87300 kg and excess structural stress could result
b) is 83200 kg which is in excess of the regulated landing mass and could result in overrunning the runway
c) must be reduced to 81700 kg in order to avoid a high speed approach.
d) is 87300 kg which is acceptable in this case because this is a diversion and not a normal scheduled landing.

31.2.4.6 (1637)
At maximum certificated take-off mass an aeroplane departs from an airfield which is not limiting for either take-off or landing masses. During initial climb the number one engine suffers a contained disintegration. An emergency is declared and the aeroplane returns to departure airfield for an immediate landing. The most likely result of this action will be
a) a high threshold speed and possible undercarriage or other structural failure.
b) a high threshold speed and a shorter stop distance.
c) a landing further along the runway than normal.
d) a landing short resultant from the increased angle of approach due to the very high aeroplane mass.