Module 08.Basic Aerodynamics

08.1. Physics of the Atmosphere.

Question Number. 1. The ISA.
Option A. assumes a standard day.
Option B. is taken from the equator.
Option C. is taken from 45 degrees latitude.
Correct Answer is. is taken from 45 degrees latitude.
Explanation. The properties of a standard day are related to sea level at latitude 45 degrees latitude. See the Forum for more details.

Question Number. 2. At higher altitudes as altitude increases, pressure.
Option A. decreases at constant rate.
Option B. decreases exponentially.
Option C. increases exponentially.
Correct Answer is. decreases exponentially.
Explanation. Pressure decreases - sure! But the rate of decrease reduces with altitude. At 18000 ft, half the pressure is lost already, and there is still another 40,000ft or so to go.

Question Number. 3. When the pressure is half of that at sea level, what is the altitude?.
Option A. 12,000 ft.
Option B. 18,000 ft.
Option C. 8,000 ft.
Correct Answer is. 18,000 ft.
Explanation. Just one of those facts you have to learn - but it is quoted in just about every text book on CAA reading list.

Question Number. 4. If gauge pressure on a standard day at sea level is 25 PSI, the absolute pressure is.
Option A. 39.7 PSI.
Option B. 10.3 PSI.
Option C. 43.8 PSI.
Correct Answer is. 39.7 PSI.
Explanation. Absolute pressure = gauge pressure plus atmospheric pressure. Atmospheric pressure at seallevel = 14.7 PSI.

Question Number. 5. Pressure decreases.
Option A. inversely proportional to temperature.
Option B. proportionally with a decreases in temperature.
Option C. Pressure and temperature are not related.
Correct Answer is. proportionally with a decreases in temperature.
Explanation. Temperature and volume are directly proportional - Charles' Law.

Question Number. 6. As air gets colder, the service ceiling of an aircraft.
Option A. reduces.
Option B. increases.
Option C. remains the same.
Correct Answer is. increases.

Explanation. As air gets colder it gets denser. Lift increases (remember the lift equation has density) and the engines produce more thrust - so it can climb higher.

Question Number. 7. What is sea level pressure?.

Option A. 1012.3 mb.

Option B. 1013.2 mb.

Option C. 1032.2 mb.

Correct Answer is. 1013.2 mb.

Explanation. Learn the ISA sea level quantities, in all units.

Question Number. 8. How does IAS at the point of stall vary with height?.

Option A. It decreases.

Option B. It is practically constant.

Option C. It increases.

Correct Answer is. It is practically constant.

Explanation. The stalling IAS at altitude is practically the same as it is at sea level. That's because IAS is not corrected for density.

Question Number. 9. What is the lapse rate with regard to temperature?.

Option A. 4°C per 1000 ft.

Option B. 1.98°C per 1000 ft.

Option C. 1.98°F per 1000 ft.

Correct Answer is. 1.98°C per 1000 ft.

Explanation. The lapse rate is approximately 2°C per 1000 feet (in the troposphere).

Question Number. 10. Standard sea level temperature is.

Option A. 20 degrees Celsius.

Option B. 0 degrees Celsius.

Option C. 15 degrees Celsius.

Correct Answer is. 15 degrees Celsius.

Explanation. 15 degrees C is standard sea level temperature!.

Question Number. 11. As altitude increases, pressure.

Option A. decreases exponentially.

Option B. decreases at constant rate.

Option C. increases exponentially.

Correct Answer is. decreases exponentially.

Explanation. As altitude increases, pressure decreases exponentially. Since pressure is given by density * gravity * height, both density and height decreases (that is, height above the point you measuring) so the decrease in pressure is exponential.

Question Number. 12. Lapse rate usually refers to.

Option A. Density.

Option B. Pressure.

Option C. Temperature.

Correct Answer is. Temperature.

Explanation. Temperature lapse rate is constant up to 36000ft -2degrees per 1000ft.

Question Number. 13. Temperature above 36,000 feet will.

Option A. increase exponentially.

Option B. decrease exponentially.

Option C. remain constant.

Correct Answer is. remain constant.

Explanation. Temperature lapse rate up to 36,000 feet (the tropopause) is approximately 2 degrees centigrade per 1000 feet. Above the tropopause it is constant.

Question Number. 14. With increasing altitude pressure decreases and.

Option A. temperature decreases at the same rate as pressure reduces.

Option B. temperature decreases but at a lower rate than pressure reduces.

Option C. temperature remains constant to 8000 ft.

Correct Answer is. temperature decreases but at a lower rate than pressure reduces.

Explanation. See a graph of pressure against altitude and temperature against altitude. Pressure decreases faster than temperature therefore pressure has a greater effect upon the performance of the aircraft.

Question Number. 15. What is the temperature in comparison to ISA conditions at 30,000ft?.

Option A. -60°C.

Option B. 0°C.

Option C. -45°C.

Correct Answer is. -45°C.

Explanation. ISA = 15°C temperature lapse rate is 2°C per 1000ft. Therefore 30000 = - 60 + 15 = 45.

Question Number. 16. At what altitude is the tropopause?.

Option A. 36,000 ft.

Option B. 57,000 ft.

Option C. 63,000 ft.

Correct Answer is. 36,000 ft.

Explanation. The tropopause is 36,000 ft. Above the tropopause is the stratosphere.

Question Number. 17. What approximate percentage of oxygen is in the atmosphere?.

Option A. 12%.

Option B. 21%.

Option C. 78%.

Correct Answer is. 21%.

Explanation. 21% oxygen, 78% nitrogen, 1% other gases.

Question Number. 18. Which has the greater density?.

Option A. Air at low altitude.

Option B. Air at high altitude.

Option C. It remains constant.

Correct Answer is. Air at low altitude.

Explanation. Air density reduces with altitude.

Question Number. 19. At what altitude does stratosphere commence approximately?.

Option A. Sea level.

Option B. 36,000 ft.

Option C. 63,000 ft.

Correct Answer is. 36,000 ft.

Explanation. The stratosphere is above 36,000 ft.

Question Number. 20. A pressure of one atmosphere is equal to.
Option A. 14.7 psi.
Option B. 1 inch Hg.
Option C. 100 millibar.
Correct Answer is. 14.7 psi.
Explanation. One atmosphere is 14.7 psi.
Question Number. 21. The millibar is a unit of.
Option A. atmospheric temperature.
Option B. pressure altitude.
Option C. barometric pressure.
Correct Answer is. barometric pressure.
Explanation. Barometric pressure is measured in millibar.
Question Number. 22. With an increase in altitude under I.S.A. conditions the temperature in the troposphere.
Option A. remains constant.
Option B. decreases.
Option C. increases.
Correct Answer is. decreases.
Explanation. Temperature reduces at a lapse rate of 1.98 degrees celsius per thousand feet from sea level to about 36000ft (the tropopause).
Question Number. 23. A barometer indicates.
Option A. pressure.
Option B. density.
Option C. temperature.
Correct Answer is. pressure.
Explanation. A barometer indicates pressure.
Question Number. 24. The amount of water vapour capacity in the air (humidity holding capacity of the air) is.
Option A. greater on a colder day, and lower on a hotter day.
Option B. doesn't have a significant difference.
Option C. greater on a hotter day and lower on a colder day.
Correct Answer is. greater on a hotter day and lower on a colder day.
Explanation. The amount of water vapour capacity in the air is greater on a hotter day.
Question Number. 25. Which condition is the actual amount of water vapour in a mixture of air and water?.
Option A. Relative humidity.
Option B. Absolute humidity.
Option C. Dew point.
Correct Answer is. Absolute humidity.
Explanation. Absolute humidity is the 'actual' amount of water in a mixture of air and water.
Question Number. 26. Which will weigh the least?.
Option A. 98 parts of dry air and 2 parts of water vapour.
Option B. 50 parts of dry air and 50 parts of water vapour.

Option C. 35 parts of dry air and 65 parts of water vapour.
Correct Answer is. 35 parts of dry air and 65 parts of water vapour.
Explanation. Water vapour is 62% the weight of dry air.
Question Number. 27. Which is the ratio of the water vapour actually present in the atmosphere to the amount that would be present if the air were saturated at the prevailing temperature and pressure?.
Option A. Absolute humidity.
Option B. Dew point.
Option C. Relative humidity.
Correct Answer is. Relative humidity.
Explanation. Relative humidity is the ratio of the water vapour actually present to the water vapour that the air would hold if it were saturated.
Question Number. 28. The speed of sound in the atmosphere.
Option A. changes with a change in pressure.
Option B. varies according to the frequency of the sound.
Option C. changes with a change in temperature.
Correct Answer is. changes with a change in temperature.
Explanation. Speed of sound is affected by air temperature only.
Question Number. 29. What is sea level pressure?.
Option A. 1032.2 mb.
Option B. 1012.3 mb.
Option C. 1013.2 mb.
Correct Answer is. 1013.2 mb.
Explanation. Sea level pressure is 1013.2 mb.
Question Number. 30. Which statement concerning heat and/or temperature is true?.
Option A. Temperature is a measure of the kinetic energy of the molecules of any substance.
Option B. Temperature is a measure of the potential energy of the molecules of any substance.
Option C. There is an inverse relationship between temperature and heat.
Correct Answer is. Temperature is a measure of the kinetic energy of the molecules of any substance.
Explanation. Temperature is a measure of the kinetic energy of the molecules of a substance. Heat is a form of energy exchange.
Question Number. 31. What is absolute humidity?.
Option A. The temperature to which humid air must be cooled at constant pressure to become saturated.
Option B. The actual amount of the water vapour in a mixture of air and water.
Option C. The ratio of the water vapour actually present in the atmosphere to the amount that would be present if the air were saturated at the prevailing temperature and pressure.
Correct Answer is. The ratio of the water vapour actually present in the atmosphere to the amount that would be present if the air were saturated at the prevailing temperature and pressure.

Explanation. Absolute Humidity is the actual amount of water vapor in a liter of gas.

Question Number. 32. The temperature to which humid air must be cooled at constantpressuretobecome saturated is called.

Option A. relative humidity.

Option B. dew point.

Option C. absolute humidity.

Correct Answer is. dew point.

Explanation. The temperature to which humid air must be cooled to become saturated is called the 'due point'.

Question Number. 33. Density changes with altitude at a rate.

Option A. of 2kg/m3 per 1000 ft.

Option B. which changes with altitude.

Option C. which is constant until 11 km.

Correct Answer is. which changes with altitude.

Explanation. The rate of change of density is not constant - it diminishes with altitude. So no single figure for lapse rate can be quoted.

Question Number. 34. Above 65,800 ft temperature.

Option A. decreases by 1.98°C up to 115,000 ft.

Option B. remains constant up to 115,000 ft.

Option C. increases by 0.303°C up to 115,000 ft.

Correct Answer is. increases by 0.303°C up to 115,000 ft.

Explanation. 65,800ft is the upper stratosphere boundary. Temperature increases with altitude in the stratosphere.

Question Number. 35. At sea level, ISA atmospheric pressure is.

Option A. 14.7 kPa.

Option B. 10 Bar.

Option C. 14.7 PSI.

Correct Answer is. 14.7 PSI.

Explanation. An alternative to 1013.2mb.

Question Number. 36. On a very hot day with ambient temperature higher than ISA, the pressure altitude is 20,000 ft. How much will the density altitude be?.

Option A. the same.

Option B. greater than 20,000ft.

Option C. less than 20,000ft.

Correct Answer is. greater than 20,000ft.

Explanation. "Density Altitude is pressure altitude corrected for temperature and humidity. Assuming constant humidity (we are told no different) ISA or above temperature will further thin the air for a given pressure altitude thus making the density altitude higher. Note : At ISA Temp density and pressure altitude will be the same and for less than ISA density altitude will be less- Got all that!!.

"

Question Number. 37. The atmospheric zone where the temperature remains fairly constant is called the.

Option A. Stratosphere.

Option B. Ionosphere.

Option C. Troposphere.
Correct Answer is. Stratosphere.
Explanation. The stratosphere starts at 36,000ft and rises to about 66,000ft.
Question Number. 38. In the ISA the height of the tropopause is.
Option A. 11,000 feet.
Option B. 11,000 metres.
Option C. 36,000 metres.
Correct Answer is. 11,000 metres.
Explanation. 11,000 metres or 36,000 feet approximately.
Question Number. 39. In the ISA the sea level pressure is taken to be.
Option A. 14 PSI.
Option B. 1013.2 mb.
Option C. 1.013 mb.
Correct Answer is. 1013.2 mb.
Explanation. 1013.2 millibars.
Question Number. 40. In the ISA the temperature lapse rate with altitude is taken to be : .
Option A. dependent on pressure and density changes.
Option B. linear.
Option C. non linear.
Correct Answer is. linear.
Explanation. NIL..
Question Number. 41. Put in sequence from the ground up.
Option A. tropopause, stratosphere, troposphere.
Option B. tropopause, troposphere, stratosphere.
Option C. troposphere, tropopause, stratosphere.
Correct Answer is. troposphere, tropopause, stratosphere.
Explanation. NIL.
Question Number. 42. The International Standard Atmosphere can be described as.
Option A. the atmosphere at 45 degrees north latitude.
Option B. the atmosphere at the equator with certain conditions.
Option C. the atmosphere which can be used Worldwide to provide comparable performance results.
Correct Answer is. the atmosphere which can be used Worldwide to provide comparable performance results.
Explanation. NIL.
Question Number. 43. The temperature lapse rate below the tropopause is.
Option A. 1°C per 1000 ft.
Option B. 2°C per 1000 ft.
Option C. 3°C per 1000 ft.
Correct Answer is. 2°C per 1000 ft.
Explanation. 1.98°C per 1000 ft to be exact.
Question Number. 44. Above the tropopause air pressure.
Option A. decreases at a constant rate.
Option B. decreases exponentially.

Option C. increases exponentially.
Correct Answer is. decreases exponentially.
Explanation. Air pressure continues to decrease exponentially in the stratosphere.
Question Number. 45. Which of the following is correct?.
Option A. Absolute pressure + Atmospheric pressure = Gauge pressure.
Option B. Absolute pressure = Gauge pressure + Atmospheric pressure.
Option C. Atmospheric pressure = Absolute pressure + Gauge pressure.
Correct Answer is. Absolute pressure = Gauge pressure + Atmospheric pressure.
Explanation. Absolute pressure = Gauge pressure + Atmospheric pressure.
Question Number. 46. As the altitude increases what happens of the ratio of Nitrogen to Oxygen?.
Option A. Increases.
Option B. Decreases.
Option C. Stays the same.
Correct Answer is. Stays the same.
Explanation. NIL.
Question Number. 47. What happens to the density of air as altitude is increased?.
Option A. Decreases.
Option B. Stays the same.
Option C. Increases.
Correct Answer is. Decreases.
Explanation. NIL.

08.2. Aerodynamics .

Question Number. 1. An aircraft is travelling at a speed of 720 nautical miles per hour. To calculate speed in MPH you.
Option A. divide by 0.83.
Option B. multipy by 0.83.
Option C. multiply by 1.15.
Correct Answer is. multiply by 1.15.
Explanation. 1nmph = 1.15mph 1mph = 0.83nmph.
Question Number. 2. Lift on a delta wing aircraft.
Option A. increases with an increased angle of incidence (angle of attack).
Option B. does not change with a change in angle of incidence (angle of attack).
Option C. decreases with an increase in angle of incidence (angle of attack).
Correct Answer is. increases with an increased angle of incidence (angle of attack). OR does not change with a change in angle of incidence (angle of.
Explanation. This question is much easier than it looks at first read. All wing types (straight, swept, delta etc.) increase lift with an increase in angle of attack (up to the stall angle).
Question Number. 3. The CofP is the point where.
Option A. the lift can be said to act.
Option B. the three axis of rotation meet.
Option C. all the forces on an aircraft act.
Correct Answer is. the lift can be said to act.
Explanation. NIL.

Question Number. 4. When an aircraft experiences induced drag.
Option A. air flows under the wing span wise towards the root and on top of the wing span wise towards the tip.
Option B. Neither a) or b) since induced drag does not caused by span wise flow.
Option C. air flows under the wing span wise towards the tip and on top of the wing span wise towards the root.
Correct Answer is. air flows under the wing span wise towards the tip and on top of the wing span wise towards the root. OR Neither a) or b) since induced drag does not caused by.
Explanation. The high pressure under the wing flows around the tip to the low pressure on top of the wing. The resulting vortex is what causes induced drag. Since air is viscous it drags the air underneath the wing towards the tip, and pushes the air on top of the wing towards the root.

Question Number. 5. At stall, the wingtip stagnation point.
Option A. doesn't move.
Option B. moves toward the lower surface of the wing.
Option C. moves toward the upper surface of the wing.
Correct Answer is. moves toward the lower surface of the wing.
Explanation. At stall the angle of attack is high (all along the wing) and the stagnation point moves towards the lower surface of the wing.
Question Number. 6. The rigging angle of incidence of an elevator is.
Option A. the angle between the bottom surface of the elevator and the longitudinal datum.
Option B. the angle between the bottom surface of the elevator and the horizontal in the rigging position.
Option C. the angle between the mean chord line and the horizontal in the rigging position.
Correct Answer is. the angle between the mean chord line and the horizontal in the rigging position.
Explanation. The angle of incidence of any surface is measured from the mean chord line.
Question Number. 7. Which of the following is true?.
Option A. Lift acts at right angles to the relative airflow and weight acts vertically down.
Option B. Lift acts at right angles to the wing chord line and weight acts vertically down.
Option C. Lift acts at right angles to the relative air flow and weight acts at right angles to the aircraft centre line.
Correct Answer is. Lift acts at right angles to the relative airflow and weight acts vertically down.
Explanation. Lift acts at right angles to the relative airflow and weight acts vertically down.
Question Number. 8. The vertical fin of a single engined aircraft is.
Option A. parallel with the longitudinal axis but not the vertical axis.
Option B. parallel with both the longitudinal axis and vertical axis.
Option C. parallel with the vertical axis but not the longitudinal axis.

Correct Answer is. parallel with both the longitudinal axis and vertical axis. OR parallel with the vertical axis but not the longitudinal axis.
Explanation. Single engined aircraft fin is offset to left to counter torque...i.e. chord of fin is at an angle to.longitudinal axis.
Question Number. 9. "What happens to air flowing at the speed of sound when it enters a converging duct?."
Option A. Velocity increases, pressure and density decreases.
Option B. Velocity, pressure and density increase.
Option C. Velocity decreases, pressure and density increase.
Correct Answer is. Velocity decreases, pressure and density increase.
Explanation. Subsonic air in incompressible, so density does not change. But this is sonic speed, and everything (P and V) change opposite to what they would if it were subsonic air. Density increases, as does pressure, and velocity decreases. See Mechanics of Flight by AC Kermode.
Question Number. 10. As the angle of attack of an airfoil increases the centre of pressure.
Option A. remains stationary.
Option B. moves aft.
Option C. moves forward.
Correct Answer is. moves forward.
Explanation. As the angle of attack of the aerofoil increases, the centre of pressure moves forward.
Question Number. 11. Vapour trails from the wingtips of an aircraft in flight are caused by.
Option A. low pressure above the wing and high pressure below the wing causing vortices.
Option B. low pressure above the wing and high pressure below the wing causing a temperature rise.
Option C. high pressure above the wing and low pressure below the wing causing vortices.
Correct Answer is. low pressure above the wing and high pressure below the wing causing vortices.
Explanation. Vapour trails are caused by wing tip vortices which are caused by low pressure above the wing and high pressure below the wing.
Question Number. 12. The chord line of a wing is a line that runs from.
Option A. the centre of the leading edge of the wing to the trailing edge.
Option B. half way between the upper and lower surface of the wing.
Option C. one wing tip to the other wing tip.
Correct Answer is. the centre of the leading edge of the wing to the trailing edge.
Explanation. The chord line is a STRAIGHT line which goes from the leading edge of the wing to the trailing.
Question Number. 13. The angle of incidence of a wing is an angle formed by lines.
Option A. parallel to the chord line and longitudinal axis.
Option B. parallel to the chord line and the vertical axis.
Option C. parallel to the chord line and the lateral axis.

Correct Answer is. parallel to the chord line and longitudinal axis.
Explanation. The angle of incidence is the angle between the chord line and the longitudinal axis.
Question Number. 14. The centre of pressure of an aerofoil is located.
Option A. 30 - 40% of the chord line forward of the leading edge.
Option B. 50% of the chord line back from the leading edge.
Option C. 30 - 40% of the chord line back from the leading edge.
Correct Answer is. 30 - 40% of the chord line back from the leading edge.
Explanation. The centre of pressure is positioned roughly 30 - 40 % of the chord line BACK from the leading edge.
Question Number. 15. Compressibility effect is.
Option A. drag associated with the form of an aircraft.
Option B. the increase in total drag of an aerofoil in transonic flight due to the formation of shock waves.
Option C. drag associated with the friction of the air over the surface of the aircraft.
Correct Answer is. the increase in total drag of an aerofoil in transonic flight due to the formation of shock waves.
Explanation. Compressibility effect is associated with an increase in drag during the transonic flight stage.
Question Number. 16. A high aspect ratio wing will give.
Option A. high profile and low induced drag.
Option B. low profile and high induced drag.
Option C. low profile and low induced drag.
Correct Answer is. high profile and low induced drag.
Explanation. A high aspect ratio has a lower induced drag (due to less wing tip effect) and a higher frontal area therefore greater profile drag.
Question Number. 17. Aerofoil efficiency is defined by.
Option A. lift over drag.
Option B. lift over weight.
Option C. drag over lift.
Correct Answer is. lift over drag.
Explanation. At plus 4degrees AOA the lift weight ratio is greatest. This is the optimum AOA therefore the wing is at its most efficient when lift is greatest and drag is at a minimum.

Question Number. 18. The relationship between induced drag and airspeed is, induced drag is.
Option A. directly proportional to the square of the speed.
Option B. directly proportional to speed.
Option C. inversely proportional to the square of the speed.
Correct Answer is. inversely proportional to the square of the speed.
Explanation. Induced drag decreases proportionally with the square of the speed.

Question Number. 19. What is the definition of Angle of Incidence?.
Option A. The angle the underside of the mainplane or tailplane makes with the horizontal.

Option B. The angle the underside of the mainplane or tailplane makes with the longitudinal datum line.
Option C. The angle the chord of the mainplane or tailplane makes with the horizontal.
Correct Answer is. The angle the chord of the mainplane or tailplane makes with the horizontal.
Explanation. Angle of incidence is the 'wing setting angle'. That is the angle of the chord of the mainplane or tailplane with the horizontal - or aircraft centre line when in the rigging position.
Question Number. 20. What is Boundary Layer?.
Option A. Separated layer of air forming a boundary at the leading edge.
Option B. Sluggish low energy air that sticks to the wing surface and gradually gets faster until it joins the free stream flow of air.
Option C. Turbulent air moving from the leading edge to trailing edge.
Correct Answer is. Sluggish low energy air that sticks to the wing surface and gradually gets faster until it joins the free stream flow of air.
Explanation. The boundary layer is the layer of air immediately in contact with the aircraft skin which is slowed down by the skin friction.
Question Number. 21. "What is the collective term for the fin and rudder and other surfaces aft of the centre of gravity that helps directional stability?."
Option A. Empennage.
Option B. Fuselage surfaces.
Option C. Effective keel surface.
Correct Answer is. Effective keel surface.
Explanation. All the side surfaces aft of the centre of gravity which aid the directional stability are collectively called the EFFECTIVE KEEL SURFACE.
Question Number. 22. "A decrease in incidence toward the wing tip may be provided to."
Option A. prevent adverse yaw in a turn.
Option B. retain lateral control effectiveness at high angles of attack.
Option C. prevent span wise flow in maneuvers.
Correct Answer is. retain lateral control effectiveness at high angles of attack.
Explanation. A decrease in incidence towards the wingtip (known as washout) causes the wing root to stall before the wing tip. So, even after the wing roots have stalled, the wing tips are still flying and full aileron control is provided.
Question Number. 23. For a given aerofoil production lift, whereP = pressure and V = velocity.
Option A. P1 is greater than P2, and V1 is less than V2.
Option B. P1 is greater than P2, and V1 is greater than V2.
Option C. P1 is less than P2 and V1 is greater than V2.
Correct Answer is. P1 is greater than P2, and V1 is less than V2.
Explanation. Bernoulli's principle applies.
Question Number. 24. Low wing loading.
Option A. increases stalling speed, landing speed and landing run.
Option B. increases lift, stalling speed and maneuverability.
Option C. decreases stalling speed, landing speed and landing run.

Correct Answer is. decreases stalling speed, landing speed and landing run.
Explanation. Wing loading is aircraft weight divided by wing area, therefore an aircraft with a low wing loading will require less landing speed, less landing run and have a decreased stalling speed.
Question Number. 25. As a general rule, if the aerodynamic angle of incidence (angle of attack) of an aerofoil is slightly increased, the centre of pressure will.
Option A. move towards the tip.
Option B. move forward towards the leading edge.
Option C. never move.
Correct Answer is. move forward towards the leading edge.
Explanation. As the angle of attack increases the centre of pressure moves towards the leading edge.
Question Number. 26. The 'wing setting angle' is commonly known as.
Option A. angle of dihedral.
Option B. angle of incidence.
Option C. angle of attack.
Correct Answer is. angle of incidence.
Explanation. The wing setting angle is commonly known as the 'angle of incidence'.
Question Number. 27. When does the angle of incidence change?.
Option A. It never changes.
Option B. When the aircraft attitude changes.
Option C. When the aircraft is ascending or descending.
Correct Answer is. It never changes.
Explanation. The angle of incidence is the angle at which the wing is 'set' into the fuselage. It never changes.
Question Number. 28. As the angle of attack decreases, what happens to the centre of pressure?.
Option A. It moves rearwards.
Option B. Centre of pressure is not affected by angle of attack decrease.
Option C. It moves forward.
Correct Answer is. It moves rearwards.
Explanation. The centre of pressure moves FORWARDS with an INCREASE in angle of attack. Therefore it moves REARWARDS with a DECREASE in angle of attack.
Question Number. 29. A decrease in pressure over the upper surface of a wing or aerofoil is responsible for.
Option A. approximately 2/3 (two thirds) of the lift obtained.
Option B. approximately 1/2 (one half) of the lift obtained.
Option C. approximately 1/3 (one third) of the lift obtained.
Correct Answer is. approximately 2/3 (two thirds) of the lift obtained.
Explanation. Look at a diagram of the lift distributions on the top and bottom surfaces of a wing. 2/3rds of the lift is provided by the top surface.
Question Number. 30. Which of the following types of drag increases as the aircraft gains altitude?.
Option A. Interference drag.
Option B. Parasite drag.

Option C. Induced drag.
Correct Answer is. Induced drag.
Explanation. As density decreases with altitude, the lift must be compensated by increasing angle of attack. Induced drag increases with angle of attack, therefore induced drag increases with altitude.
Question Number. 31. The layer of air over the surface of an aerofoil which is slower moving, in relation to the rest of the airflow, is known as.
Option A. none of the above.
Option B. camber layer.
Option C. boundary layer.
Correct Answer is. boundary layer.
Explanation. The boundary layer is the layer of air in immediate contact with the skin of the aircraft which is slowed down by skin friction.
Question Number. 32. What is a controlling factor of turbulence and skin friction?.
Option A. Countersunk rivets used on skin exterior.
Option B. Aspect ratio.
Option C. Fineness ratio.
Correct Answer is. Countersunk rivets used on skin exterior.
Explanation. Countersunk rivets increase skin friction and turbulence.
Question Number. 33. If the C of G is aft of the Centre of Pressure.
Option A. when the aircraft yaws the aerodynamic forces acting forward of the Centre of Pressure.
Option B. changes in lift produce a pitching moment which acts to increase the change in lift.
Option C. when the aircraft sideslips, the C of G causes the nose to turn into the sideslip thus applying a restoring moment.
Correct Answer is. changes in lift produce a pitching moment which acts to increase the change in lift.
Explanation. If the C of G is aft of the centre of pressure (not normal, but possible), an increase in lift will pitch the aircraft nose-up, which will increase the lift even further etc. etc.

Question Number. 34. The upper part of the wing in comparison to the lower.
Option A. develops less lift.
Option B. develops the same lift.
Option C. develops more lift.
Correct Answer is. develops more lift.
Explanation. Look at the lift distribution diagram of an aerofoil and see how approximately 2/3rds of the lift is derived from the top surface.
Question Number. 35. What effect would a forward CG have on an aircraft on landing?.
Option A. Increase stalling speed.
Option B. Reduce stalling speed.
Option C. No effect on landing.
Correct Answer is. Increase stalling speed.

Explanation. A forward CG would require the tail of the aircraft to exert more download to keep the nose level. This will increase the wing loading and thus the aircraft would stall at a higher speed.

Question Number. 36. QNH refers to.

Option A. quite near horizon.

Option B. setting the altimeter to zero.

Option C. setting the mean sea level atmospheric pressure so an altimeter reads the aerodrome altitude above mean sea level.

Correct Answer is. altimeter reads the aerodrome altitude above mean sea level.

Explanation. Q' is the mathematical symbol for pressure. 'NH' stands for Nautical Height. QNH refers to the setting of actual sea level atmospheric pressure so the altimeter indicates the actual altitude above sea level of the non-standard day.

Question Number. 37. QNE refers to.

Option A. setting the mean sea level atmospheric pressure in accordance with ICAO standard atmosphere i.e. 1013 millibars.

Option B. Setting an altimeter to read aerodrome altitude above sea level.

Option C. quite new equipment.

Correct Answer is. setting the mean sea level atmospheric pressure in accordance with ICAO standard atmosphere i.e. 1013 millibars.

Explanation. Q' is the mathematical symbol for pressure. 'NE' stands for Nautical Elevation. QNE refers to the setting of the standard sea level atmospheric pressure (i.e. 1013mb) so the altimeter indicates the elevation above mean sea level. (Although it is not the 'true' elevation, if it is not a standard day).

Question Number. 38. An aspect ratio of 8 : 1 would mean.

Option A. span 64, mean chord 8.

Option B. mean chord 64, span 8.

Option C. span squared 64, chord 8.

Correct Answer is. span 64, mean chord 8.

Explanation. Aspect Ratio is the ratio of the span to the chord.

Question Number. 39. QFE is.

Option A. airfield pressure.

Option B. difference between sea level and airfield pressure.

Option C. sea level pressure.

Correct Answer is. airfield pressure.

Explanation. Q' is the mathematical symbol for pressure. 'FE' stands for Field Elevation. QFE refers to setting airfield pressure so the altimeter indicates zero on the runway.

Question Number. 40. For any given speed, a decrease in aircraft weight, the induced drag will.

Option A. decrease.

Option B. remain the same.

Option C. increase.

Correct Answer is. decrease.

Explanation. Induced drag is 'lift dependant drag'. Less lift and there will be less induced drag.

Question Number. 41. The amount of lift generated by a wing is.

Option A. greatest at the tip.
Option B. constant along the span.
Option C. greatest at the root.
Correct Answer is. greatest at the root.
Explanation. See a diagram of the lift distribution of the wing (viewed from the front) and you will see it is parabolic. The wing tip vortices decrease the lift at the tips.
Question Number. 42. Induced Drag is.
Option A. greatest towards the tip and downwash decreases from tip to root.
Option B. greatest towards the wing tip and downwash is greatest towards the root.
Option C. greatest towards the wing root and downwash is greatest at the tip.
Correct Answer is. greatest towards the tip and downwash decreases from tip to root.
Explanation. Induced drag is associated with wingtip vortices. The greater the vortices at the tip, the greater is the induced drag.
Question Number. 43. Induced Drag is.
Option A. never equal to profile drag.
Option B. equal to profile drag at Vmd.
Option C. equal to profile drag at stalling angle.
Correct Answer is. equal to profile drag at Vmd.
Explanation. Sketch the drag curves (drag against speed). Induced drag decreases exponentially with speed. Profile drag increases exponentially with speed. Vmd (minimum drag speed) is where they meet.
Question Number. 44. With an increase in aircraft weight.
Option A. Vmd will be at a higher speed.
Option B. Vmd will be at the same speed.
Option C. Vmd will be at a lower speed.
Correct Answer is. Vmd will be at a higher speed.
Explanation. Sketch the drag curves (drag against speed). Induced drag decreases exponentially with speed. Profile drag increases exponentially with speed. The induced drag is elevated with weight (since it is lift dependant) and so cuts the profile drag further to the right (higher Vmd).
Question Number. 45. For a given IAS an increase in altitude will result in.
Option A. an increase in induced drag.
Option B. no change in the value of induced drag.
Option C. an increase in profile drag.
Correct Answer is. an increase in induced drag.
Explanation. With a decrease in density the aircraft must fly with a greater angle of attack (CL) to compensate for the loss of lift. Induced drag is dependant upon AOA, therefore induced drag increases with altitude.
Question Number. 46. As the angle of attack of a wing is increased in level flight.
Option A. the C of G moves aft and the CofP forward.
Option B. the CofP and transition point move forward.
Option C. the CofP moves forward and the stagnation point aft over the upper surface.
Correct Answer is. the CofP and transition point move forward. OR the CofP moves forward and the stagnation point aft over the.

Explanation. As AOA increases in level flight, CofP moves forward and the Transition Point (the point at which the laminar flow breaks away and forms into turbulent flow) also moves forward.

Question Number. 47. Stall inducers may be fitted to a wing.

Option A. at the root to cause the root to stall first.

Option B. at the tip to cause the root to stall first.

Option C. at the root to cause the tip to stall first.

Correct Answer is. at the root to cause the root to stall first.

Explanation. Stall inducers (or stall strips) are placed at the root of the wing to trip up the airflow just before full stall to ensure the wing stalls first at the root (and maintains the aileron authority even with a partially stalled wing).

Question Number. 48. The optimum angle of attack of an aerofoil is the angle at which.

Option A. the aerofoil produces maximum lift.

Option B. the aerofoil produces zero lift.

Option C. the highest lift/drag ratio is produced.

Correct Answer is. the highest lift/drag ratio is produced.

Explanation. The optimum angle of attack is the angle at which the highest lift/drag ratio is produced.

Question Number. 49. A high aspect ratio wing has a.

Option A. increased induced drag.

Option B. decreased skin friction drag.

Option C. decreased induced drag.

Correct Answer is. the highest lift/drag ratio is produced.

Explanation. Induced drag decreases with increasing aspect ratio. (However, skin friction drag also reduces with an increased chord length due to thickening of the boundary layer - but this is less significant.).

Question Number. 50. Minimum total drag of an aircraft occurs.

Option A. when induced drag is least.

Option B. at the stalling speed.

Option C. when profile drag equals induced drag.

Correct Answer is. when profile drag equals induced drag.

Explanation. Sketch the drag curves (drag against speed). Induced drag decreases exponentially with speed. Profile drag increases exponentially with speed. Vmd (minimum drag speed) is where they meet.

Question Number. 51. If the weight of an aircraft is increased, the induced drag at a given speed.

Option A. will increase.

Option B. will decrease.

Option C. will remain the same.

Correct Answer is. will increase.

Explanation. If weight is increased, for a given speed the aircraft must fly at a greater angle of attack (CL). Induced drag increases with increased AOA.

Question Number. 52. The transition point on a wing is the point where.

Option A. the boundary layer flow changes from laminar to turbulent.

Option B. the flow divides to pass above and below the wing.

Option C. the flow separates from the wing surface.
Correct Answer is. the boundary layer flow changes from laminar to turbulent.
Explanation. The transition point is a point on the surface of the wing where the boundary layer changes from laminar to turbulent.
Question Number. 53. The boundary layer of a body in a moving airstream is.
Option A. a layer of air over the surface where the airspeed is changing from free stream speed to zero speed.
Option B. a layer of separated flow where the air is turbulent.
Option C. a thin layer of air over the surface where the air is stationary.
Correct Answer is. a thin layer of air over the surface where the air is stationary. OR a layer of air over the surface where the airspeed is changing from free stream speed to zero speed.
Explanation. The boundary layer is a thin layer of slowed air in contact with the surface of the skin which is slowed by friction. Speed ranging from stationary to free stream speed.
Question Number. 54. A laminar boundary layer will produce.
Option A. more skin friction drag than a turbulent one.
Option B. the same skin friction drag as a turbulent one.
Option C. less skin friction drag than a turbulent one.
Correct Answer is. less skin friction drag than a turbulent one.
Explanation. Skin friction drag is greater in a turbulent boundary layer than in a laminar boundary layer.
Question Number. 55. The boundary layer is.
Option A. thickest at the leading edge.
Option B. thickest at the trailing edge.
Option C. constant thickness from leading to trailing edges.
Correct Answer is. thickest at the trailing edge.
Explanation. The boundary layer is thickest at the trailing edge.
Question Number. 56. The amount of thrust produced by a jet engine or a propeller can be calculated using.
Option A. Newton’s 3rd law.
Option B. Newton’s 2nd law.
Option C. Newton’s 1st law.
Correct Answer is. Newton’s 2nd law.
Explanation. Newton's second law is Force = Mass x Acceleration.
Question Number. 57. An engine which produces an efflux of high speed will be.
Option A. less efficient.
Option B. more efficient.
Option C. speed of efflux has no affect on the engine efficiency.
Correct Answer is. less efficient.
Explanation. A pure turbojet accelerates a low mass of air at a high rate and is less efficient than a turbo fan or turbo prop. This is because the wasted energy is $1/2mV^2$ of the jet efflux.
Question Number. 58. Wing loading is calculated by weight.
Option A. divided by lift.

Option B. divided by gross wing area.
Option C. multiplied by gross wing area.
Correct Answer is. divided by gross wing area.
Explanation. Wing loading is weight divided by wing area and measured in Newtons per square metre.
Question Number. 59. Induced drag is.
Option A. nothing to do with speed.
Option B. proportional to speed.
Option C. inversely proportional to the square of speed.
Correct Answer is. inversely proportional to the square of speed.
Explanation. Induced drag is inversely proportional to the square of the speed - i.e. it reduces with the square of the speed.
Question Number. 60. As the angle of attack increases the stagnation point.
Option A. moves towards the upper surface.
Option B. does not move.
Option C. moves towards the lower surface.
Correct Answer is. moves towards the lower surface.
Explanation. The stagnation point is the stationary air at the leading edge of the wing. As the angle of attack increases the stagnation point moves towards the lower surface.
Question Number. 61. The term pitch-up is due to.
Option A. compressibility effect.
Option B. ground effect.
Option C. longitudinal instability.
Correct Answer is. longitudinal instability.
Explanation. Pitch-up' is a longitudinal instability. It is caused by wingtip stall on swept wings, resulting ina drop of the tail.
Question Number. 62. In a steady climb at a steady IAS, the TAS is.
Option A. more than IAS.
Option B. the same.
Option C. less than IAS.
Correct Answer is. more than IAS.
Explanation. IAS = TAS x square root of sigma. Sigma is the ratio of density at altitude to density at sea- level. Sigma is always less than 1.
Question Number. 63. An untapered straight wing will.
Option A. have no yaw effect in banking.
Option B. stall at the root first.
Option C. have no change in induced drag in the bank.
Correct Answer is. stall at the root first.
Explanation. The straight wing will always stall at the root first. This is the desired stall characteristic.
Question Number. 64. With the ailerons away from the neutral, induced drag is.
Option A. higher on the lower wing plus profile drag increases.
Option B. unchanged but profile drag is higher.
Option C. higher on the upper wing plus profile drag increases.
Correct Answer is. higher on the upper wing plus profile drag increases.

Explanation. Induced drag is 'lift dependant drag'. The upper wing has more lift and hence more induced drag. It also has more profile drag due to the aileron's protrusion into the airflow.

Question Number. 65. All the lift can be said to act through the.
Option A. centre of pressure.
Option B. centre of gravity.
Option C. normal axis.
Correct Answer is. centre of pressure.
Explanation. All the lift is said to act through the centre of pressure.
Question Number. 66. The concept of thrust is explained by.
Option A. Bernoulli’s theorem.
Option B. Newton’s 3rd law.
Option C. Newton’s 1st law.
Correct Answer is. Newton’s 3rd law.
Explanation. Newton's Third Law states 'Every action has an equal and opposite reaction'.
Question Number. 67. The camber of an aerofoil section is.
Option A. the angle which the aerofoil makes with the relative airflow.
Option B. the curvature of the median line of the aerofoil.
Option C. the angle of incidence towards the tip of a wing.
Correct Answer is. the curvature of the median line of the aerofoil.
Explanation. Aerofoil camber is the curvature of the median line of the aerofoil.
Question Number. 68. Induced drag.
Option A. is caused by skin friction.
Option B. is associated with the lift generated by an aerofoil.
Option C. results from disturbed airflow in the region of mainplane. OR is associated with the lift generated by an aerofoil.
Correct Answer is. results from disturbed airflow in the region of mainplane attachments.
Explanation. Induced drag is often called 'lift dependant drag' because it increases with increasing lift (due to increased AOA).
Question Number. 69. As air flows over the upper cambered surface of an aerofoil, what happens to velocity and pressure?.
Option A. Velocity increases, pressure increases.
Option B. Velocity increases, pressure decreases.
Option C. Velocity decreases, pressure decreases.
Correct Answer is. Velocity increases, pressure decreases.
Explanation. As air flows over the upper cambered surface of an aerofoil, velcity increases and pressure decreases. This is Bernoulli's effect.
Question Number. 70. What is the force that tends to pull an aircraft down towards the earth?.
Option A. Thrust.
Option B. Weight.
Option C. Drag.
Correct Answer is. Weight.

Explanation. Weight tends to pull the aircraft down towards the earth.
Question Number. 71. The angle at which the chord line of the aerofoil is presented to the airflow is known as.
Option A. angle of attack.
Option B. resultant.
Option C. angle of incidence.
Correct Answer is. angle of attack.
Explanation. Angle of Attack is the angle at which the chord line of the aerofoil is presented to the airflow.
Question Number. 72. The imaginary straight line which passes through an aerofoil section from leading edge to trailing edge is called.
Option A. the chord line.
Option B. the direction of relative airflow.
Option C. centre of pressure.
Correct Answer is. the chord line.
Explanation. The Chord Line is the imaginary straight line which passes through the aerofoil from leading edge to trailing edge.
Question Number. 73. What is the angle between the chord line of the wing, and the longitudinal axis of the aircraft, known as?.
Option A. Angle of dihedral.
Option B. Angle of attack.
Option C. Angle of incidence.
Correct Answer is. Angle of incidence.
Explanation. Angle of incidence is the angle between the chord line of the wing and the longitudinal axis of the aircraft.
Question Number. 74. Wing tip vortices create a type of drag known as.
Option A. form drag.
Option B. profile drag.
Option C. induced drag.
Correct Answer is. induced drag.
Explanation. Induced drag is associated with wingtip vortices.
Question Number. 75. Which of the following describes the 'Empennage'?.
Option A. Tail section of the aircraft, including fin, rudder, tail plane and elevators.
Option B. Nose section of an aircraft, including the cockpit.
Option C. The wings, including the ailerons.
Correct Answer is. Tail section of the aircraft, including fin, rudder, tail plane and elevators.
Explanation. Empannage' is the whole tail of the aircraft including fin, rudder, tailplane and elevator.
Question Number. 76. As the angle of attack is increased (up to the stall point), which of the following is correct?.
Option A. Both a) and b) are correct.
Option B. Pressure difference between top and bottom of the wing increases.
Option C. Lift increases.
Correct Answer is. Both a) and b) are correct.

Explanation. As the angle of attack is increased the pressure difference between the upper and lower surfaces of the wing is increased. This causes the lift to increase.

Question Number. 77. What type of drag, depends on the smoothness of the body, and surface area over which the air flows?.

Option A. Form drag.

Option B. Parasite drag.

Option C. Skin friction drag.

Correct Answer is. Skin friction drag.

Explanation. Skin friction drag depends upon the smoothness of the body and the surface area.

Question Number. 78. When airflow velocity over an upper cambered surface of an aerofoil decreases, what takes place?.

Option A. Pressure decreases, lift increases.

Option B. Pressure increases, lift decreases.

Option C. Pressure increases, lift increases.

Correct Answer is. Pressure increases, lift decreases.

Explanation. When airflow velocity over the upper cambered surface of an aerofoil DECREASES, the pressure increases and thus the lift decreases.

Question Number. 79. When an aircraft stalls.

Option A. lift increases and drag decreases.

Option B. lift and drag increase.

Option C. lift decreases and drag increases.

Correct Answer is. lift decreases and drag increases.

Explanation. When an aircraft stalls the drag increases and the lift decreases.

Question Number. 80. Wing loading is.

Option A. the maximum all up weight multiplied by the total wing area.

Option B. the maximum all up weight divided by the total wing area.

Option C. the ratio of the all up weight of the aircraft to its basic weight.

Correct Answer is. the ratio of the all up weight of the aircraft to its basic weight. OR the maximum all up weight divided by the total wing area.

Explanation. Wing Loading is weight divided by wing area. Measured in Newtons per Square Metre.

Question Number. 81. An aircraft wing with an aspect ration of 6 : 1 is proportional so that.

Option A. the wing area is six times the span.

Option B. the mean chord is six times the thickness.

Option C. the wing span is six times the mean chord.

Correct Answer is. the wing span is six times the mean chord.

Explanation. If aspect ratio is 6 : 1 the wing span is 6 times the mean chord.

Question Number. 82. Upward and outward inclination of a mainplane is termed.

Option A. dihedral.

Option B. sweep.

Option C. stagger.

Correct Answer is. dihedral.

Explanation. Upward and outward inclination of a mainplane is termed dihedral.

Question Number. 83. Which of the following forces act on an aircraft in level flight?.

Option A. Lift, drag, thrust.

Option B. Lift, thrust, and weight.

Option C. Lift, thrust, weight, and drag.

Correct Answer is. Lift, thrust, weight, and drag.

Explanation. Lift, thrust, weight and drag act on an aircraft in level flight.

Question Number. 84. With reference to altimeters, QFE is.

Option A. the manufacturers registered name.

Option B. quite fine equipment.

Option C. setting aerodrome atmospheric pressure so that an altimeter reads zero on landing and take off.

Correct Answer is. setting aerodrome atmospheric pressure so that an altimeter reads zero on landing and take off.

Explanation. Q is the mathematical symbol for pressure. FE stands for Field Elevation. QFE refers to setting the altimeter to aerodrome atmospheric pressure so the altimeter reads zero on landing and takeoff.

Question Number. 85. Under the ICAO 'Q' code there are which three settings?.

Option A. QEF, QNH, QEN.

Option B. QE, QN, QQE.

Option C. QFE, QNH, QNE.

Correct Answer is. QFE, QNH, QNE.

Explanation. The ICAO 'Q' codes are QFE. QNE, QNH.

Question Number. 86. Wing loading is.

Option A. WING AREA * WING CHORD.

Option B. GROSS WEIGHT divided by GROSS WING AREA.

Option C. the ultimate tensile strength of the wing.

Correct Answer is. GROSS WEIGHT divided by GROSS WING AREA.

Explanation. Wing loading is gross weight divided by wing area measured in Newtons per Square Metre.

Question Number. 87. Weight is equal to.

Option A. mass * acceleration.

Option B. mass * gravity.

Option C. volume * gravity.

Correct Answer is. mass * gravity.

Explanation. Weight = mass * gravity in straight and level flight. In a manoeuvre, additional accelerations are present, which are sometimes considered to increase weight. The question can therefore be answered in two ways.

Question Number. 88. Induced drag.

Option A. increases with increase in aircraft weight.

Option B. increases with an increase in speed.

Option C. reduces with an increase in angle of attack.

Correct Answer is. increases with increase in aircraft weight.
Explanation. Induced drag increase with aircraft weight because it is 'lift dependant drag'.

Question Number. 89. Airflow over the upper surface of the wing generally.
Option A. flows towards the tip.
Option B. flows towards the root.
Option C. flows straight from leading edge to trailing edge.
Correct Answer is. flows towards the root.
Explanation. Due to wing tip vortices there is a general flow of air from tip to root on the top surface, and root to tip on the lower surface.
Question Number. 90. With an increase in aspect ratio for a given IAS, induced drag will.
Option A. reduce.
Option B. remain constant.
Option C. increase.
Correct Answer is. reduce.
Explanation. A long slender wing (high aspect ratio) has a low induced drag.

Question Number. 91. If the density of the air is increased, the lift will.
Option A. remain the same.
Option B. increase.
Option C. decrease.
Correct Answer is. increase.
Explanation. See the formula for lift. Lift is directly proportional to air density.

Question Number. 92. All the factors that affect the lift produced by an aerofoil are.
Option A. angle of attack, velocity, wing area, aerofoil shape, air density.
Option B. angle of attack, air temperature, velocity, wing area.
Option C. angle of attack, air density, velocity, wing area.
Correct Answer is. angle of attack, velocity, wing area, aerofoil shape, air density.
Explanation. Lift formula is CL (includes aerofoil shape and angle of attack) * 1/2 * air density * velocity squared.
Question Number. 93. A wing section suitable for high speed would be.
Option A. thin with high camber.
Option B. thick with high camber.
Option C. thin with little or no camber.
Correct Answer is. thin with little or no camber.
Explanation. A high speed wing is thin with little camber.
Question Number. 94. The induced drag of an aircraft.
Option A. increases if aspect ratio is increased.
Option B. decreases with increasing speed.
Option C. increases with increasing speed.
Correct Answer is. decreases with increasing speed.
Explanation. Induced drag decreases with increasing speed.
Question Number. 95. As the speed of an aircraft increases, the profile drag.

Option A. decreases at first then increase.
Option B. increases.
Option C. decreases.
Correct Answer is. increases.
Explanation. Profile drag increases with increasing speed.
Question Number. 96. The stagnation point on an aerofoil is the point where.
Option A. the boundary layer changes from laminar to turbulent.
Option B. the suction pressure reaches a maximum.
Option C. the airflow is brought completely to rest.
Correct Answer is. the airflow is brought completely to rest.
Explanation. The stagnation point on the aerofoil is the point where the airflow is brought completely to rest on the leading edge.
Question Number. 97. The stalling of an aerofoil is affected by the.
Option A. transition speed.
Option B. airspeed.
Option C. angle of attack.
Correct Answer is. angle of attack.
Explanation. The stall position of an aerofoil is determined by its angle of attack only.
Question Number. 98. The most fuel efficient of the following types of engine is the.
Option A. turbo-jet engine.
Option B. turbo-fan engine.
Option C. rocket.
Correct Answer is. turbo-fan engine.
Explanation. The turbo fan is the most fuel efficient engine.
Question Number. 99. The quietest of the following types of engine is the.
Option A. turbo-jet engine.
Option B. rocket.
Option C. turbo-fan engine.
Correct Answer is. turbo-fan engine.
Explanation. The turbo fan is the quietest engine.
Question Number. 100. Forward motion of a glider is provided by.
Option A. the weight.
Option B. the drag.
Option C. the engine.
Correct Answer is. the weight.
Explanation. The weight provides forward motion of a glider.
Question Number. 101. Profile drag consists of what drag types?.
Option A. Form, induced and interference.
Option B. Form, induced and skin friction.
Option C. Form, skin friction and interference.
Correct Answer is. Form, skin friction and interference.
Explanation. Profile drag (known as Parasite drag in the USA) consists of Form Drag, Skin Friction Drag and Interference Drag.
Question Number. 102. An aircraft in straight and level flight is subject to.
Option A. a load factor of 1.

Option B. a load factor of ½.
Option C. zero load factor.
Correct Answer is. a load factor of 1.
Explanation. An aircraft in straight and level flight is subject to a load factor of 1 (i.e. 1g).

Question Number. 103. Aspect ratio is given by the formula.
Option A. Mean Chord / Span.
Option B. $Span^2$ / Area.
Option C. $Span^2$ / Mean Chord.
Correct Answer is. $Span^2$ / Area.
Explanation. Aspect Ratio is span/mean chord. Multiply top and bottom by span and you get $span^2$/area.
Question Number. 104. An aspect ratio of 8 means.
Option A. the mean chord is 8 times the span.
Option B. the span is 8 times the mean chord.
Option C. the area is 8 times the span.
Correct Answer is. the span is 8 times the mean chord.
Explanation. An Aspect Ratio of 8 means the span is 8 times the chord.
Question Number. 105. A high aspect ratio wing.
Option A. has a higher stall angle than a low aspect ratio wing.
Option B. is stiffer than a low aspect ratio wing.
Option C. has less induced drag than a low aspect ratio wing.
Correct Answer is. has less induced drag than a low aspect ratio wing.
Explanation. A long slender wing (high aspect ratio) has less induced drag than a short stubby wing.
Question Number. 106. Induced downwash.
Option A. reduces the effective angle of attack of the wing.
Option B. increases the effective angle of attack of the wing.
Option C. has no effect on the angle of attack of the wing.
Correct Answer is. reduces the effective angle of attack of the wing.
Explanation. Induced downwash reduces the effective angle of attack of the wing.
Question Number. 107. A straight rectangular wing, without any twist, will.
Option A. have less angle of attack at the tip.
Option B. have greater angle of attack at the tip.
Option C. have the same angle of attack at all points along the span.
Correct Answer is. have the same angle of attack at all points along the span. OR have less angle of attack at the tip.
Explanation. Due to wingtip vortices, there is more downwash at the tip, and therefore there is less angle of attack at the tip.
Question Number. 108. Given 2 wings, the first with a span of 12m and a chord of 2 m. The second has a span of 6m and a chord of 1m. How do their Aspect Ratios compare?.
Option A. The first is higher.
Option B. They are the same.
Option C. The second is higher.
Correct Answer is. They are the same.

Explanation. Aspect ratio = Span/Chord.
Question Number. 109. The C of G moves in flight. The most likely cause of this is.
Option A. movement of passengers.
Option B. consumption of fuel and oils.
Option C. movement of cargo.
Correct Answer is. consumption of fuel and oils.
Explanation. Consumption of fuel and oil causes the C of G to move in flight.
Question Number. 110. A straight rectangular wing, without any twist, will.
Option A. stall equally along the span of the wing.
Option B. stall first at the tip.
Option C. stall first at the root.
Correct Answer is. stall first at the root.
Explanation. A straight rectangular wing will stall first at the root. This is because the effective angle of attack is reduced at the tips because of the greater downwash at the tips.
Question Number. 111. When an aircraft experiences induced drag.
Option A. air flows under the wing span wise towards the root and on top of the wing span wise towards the tip.
Option B. air flows under the wing span wise towards the tip and on top of the wing span wise towards the root.
Option C. Neither a) or b) since induced drag does not cause span wise flow.
Correct Answer is. Neither a) or b) since induced drag does not cause span wise. OR air flows under the wing span wise towards the tip and on top of the wing span wise towards the root.
Explanation. Induced drag causes air to flow under the wing span wise towards the tip and on top of the wing span wise towards the root.
Question Number. 112. An aeroplane wing is designed to produce lift resulting from relatively.
Option A. positive air pressure below and above the wing's surface.
Option B. positive air pressure below the wing's surface an negative air pressure above the wing's surface.
Option C. negative air pressure below the wing's surface and positive air pressure above the wing's surface. OR negative air pressure below the wing's surface and positive air.
Correct Answer is. negative air pressure below the wing's surface and positive air.
Explanation. The wing is designed to produce lift resulting from relatively positive air pressure below the wing surface and negative air pressure above the wing surface.
Question Number. 113. Aspect ratio of a wing is defined as the ratio of the.
Option A. wingspan to the mean chord.
Option B. wingspan to the wing root.
Option C. square of the chord to the wingspan.
Correct Answer is. wingspan to the mean chord.
Explanation. Aspect ratio is defined as the ratio of the wing span to mean chord.
Question Number. 114. Which of the following is true?.
Option A. Lift acts at right angles to the relative airflow and weight acts vertically down.

Option B. Lift acts at right angles to the wing chord line and weight acts vertically down.
Option C. Lift acts at right angles to the relative air flow and weight acts at right angles to the aircraft centre line.
Correct Answer is. Lift acts at right angles to the relative air flow and weight acts vertically down.
Explanation. Lift acts at right angles to the relative airflow and weight acts vertically down.
Question Number. 115. The airflow over the upper surface of a cambered wing.
Option A. increases in velocity and reduces in pressure.
Option B. increases in velocity and pressure.
Option C. reduces in velocity and increases in pressure.
Correct Answer is. increases in velocity and reduces in pressure.
Explanation. Airflow flowing over the upper surface of an aerofoil increases in velocity and decreases in pressure.
Question Number. 116. With increased speed in level flight.
Option A. profile drag increases.
Option B. induced drag increases.
Option C. profile drag remains constant.
Correct Answer is. profile drag increases.
Explanation. With increased speed in level flight, the profile drag increases and the induced drag decreases.
Question Number. 117. An aeroplane wing is designed to produce lift resulting from relatively.
Option A. positive air pressure below the wing's surface and negative air pressure above the wing's surface.
Option B. negative air pressure below the wing's surface and positive air pressure above the wing's surface.
Option C. positive air pressure below and above the wing's surface.
Correct Answer is. positive air pressure below and above the wing's surface.
Explanation. The wing is designed to produce lift resulting from relatively positive air pressure below the wing surface and negative air pressure above the wing surface.".
Question Number. 118. The angle of attack of an aerofoil section is the angle between the.
Option A. underside of the wing surface and the mean airflow.
Option B. chord line and the relative airflow.
Option C. chord line and the centre line of the fuselage.
Correct Answer is. chord line and the relative airflow.
Explanation. Angle of attack of an aerofoil is the angle between the chord line and the relative air flow.
Question Number. 119. A swept wing tends to stall first at the.
Option A. centre section.
Option B. root.
Option C. tip.
Correct Answer is. tip.
Explanation. A swept wing tends to stall first at the tip.

Question Number. 120. The trailing vortex on a pointed wing (taper ratio = 0) is.
Option A. at the tip.
Option B. equally all along the wing span.
Option C. at the root.
Correct Answer is. at the root.
Explanation. The vortex of a pointed wing concentrated at the root of the wing - exactly opposite to straight wings.
Question Number. 121. The lift curve for a delta wing is.
Option A. more steep than that of a high aspect ratio wing.
Option B. less steep than that of a high aspect ratio wing.
Option C. the same as that of a high aspect ratio wing.
Correct Answer is. less steep than that of a high aspect ratio wing.
Explanation. A delta wing produces less lift for any given angle of attack than any other type of wing.
Question Number. 122. An increase in the speed at which an aerofoil passes through the air increases lift because.
Option A. the increased speed of the airflow creates a greater pressure differential between the upper and lower surfaces.
Option B. the increased speed of the airflow creates a lesser pressure differential between the upper and lower surfaces.
Option C. the increased velocity of the relative wind increases the angle of attack.
Correct Answer is. the increased velocity of the relative wind increases the angle. OR the increased speed of the airflow creates a greater pressure differential between the upper and lower surfaces.
Explanation. Increasing the speed of an aerofoil increases the pressure differential between the upper and lower surface.
Question Number. 123. A delta wing has.
Option A. a lower stall angle than a straight wing.
Option B. a higher stall angle than a straight wing.
Option C. the same stall angle than a straight wing.
Correct Answer is. a higher stall angle than a straight wing.
Explanation. A delta wing has a much higher stall angle than a normal wing (some as much as 40 degrees).
Question Number. 124. The airflow over the upper surface of a cambered wing.
Option A. reduces in velocity and increases in pressure.
Option B. increases in velocity and reduces in pressure.
Option C. increases in velocity and pressure.
Correct Answer is. increases in velocity and reduces in pressure.
Explanation. Airflow over the upper surface of a cambered surface of the wing increases in velocity and decreases in pressure.
Question Number. 125. The speed of air over a swept wing which contributes to the lift is.
Option A. less than the aircraft speed.
Option B. the same as the aircraft speed.

Option C. more than the aircraft speed.
Correct Answer is. less than the aircraft speed.
Explanation. If aircraft speed is V, speed of airflow over wing which contributes to lift is Vcos(sweepangle). Cos(sweepangle) < 1. See AC Kermode, Mechanics of Flight (10th edition). Pg 359 Fig 11.16.
Question Number. 126. For a given angle of attack, induced drag is.
Option A. greater on a high aspect ratio wing.
Option B. greater towards the wing root.
Option C. greater on a low aspect ratio wing.
Correct Answer is. greater on a low aspect ratio wing.
Explanation. A low aspect ratio wing (short-stubby wing) has a greater induced drag.
Question Number. 127. In straight and level flight, the angle of attack of a swept wing is.
Option A. less than the aircraft angle to the horizontal.
Option B. more than the aircraft angle to the horizontal.
Option C. the same as the aircraft angle to the horizontal.
Correct Answer is. less than the aircraft angle to the horizontal.
Explanation. Since the 'effective' velocity vector over a swept wing is not parallel with the forward direction of the aircraft, a change in pitch of the aircraft has lesser effect upon the AOA of the wing.
Question Number. 128. Induced drag.
Option A. is equal to the profile drag at Vmd.
Option B. is equal to the profile drag at the stalling speed.
Option C. is never equal to the profile drag.
Correct Answer is. is equal to the profile drag at Vmd.
Explanation. Induced drag is equal to profile drag at Vmd.
Question Number. 129. A delta wing aircraft flying at the same speed (subsonic) and angle of attack as a swept wing aircraft of similar wing area will produce.
Option A. more lift.
Option B. less lift.
Option C. the same lift.
Correct Answer is. less lift.
Explanation. A delta wing aircraft at any given angle of attack and speed will produce less lift than any other type of wing.
Question Number. 130. The stagnation point is.
Option A. static pressure minus dynamic pressure.
Option B. dynamic pressure only.
Option C. static pressure plus dynamic pressure.
Correct Answer is. static pressure plus dynamic pressure.
Explanation. At stagnation, the pressure is total (static plus dynamic).
Question Number. 131. On a swept wing aircraft, due to the adverse pressure gradient, the boundary layer on the upper surface of the wing tends to flow.
Option A. towards the root.
Option B. towards the tip.
Option C. directly from leading edge to trailing edge.
Correct Answer is. towards the tip.

Explanation. Due to adverse pressure gradient on a swept wing, the boundary layer slides towards the tip and thickens at the tip. This is why swept wings stall first at the tips.

Question Number. 132. With increased speed in level flight.

Option A. induced drag increases.

Option B. profile drag increases.

Option C. profile drag remains constant.

Correct Answer is. profile drag increases.

Explanation. Profile drag increases with speed, induced drag decreases with speed.

Question Number. 133. If a swept wing stalls at the tips first, the aircraft will.

Option A. pitch nose up.

Option B. roll.

Option C. pitch nose down.

Correct Answer is. pitch nose up.

Explanation. Since the tips are behind the Centre of Gravity, losing the lift at the tips will cause the nose to rise.

Question Number. 134. The thickness/chord ratio of the wing is also known as.

Option A. fineness ratio.

Option B. mean chord ratio.

Option C. aspect ratio.

Correct Answer is. fineness ratio.

Explanation. The thickness/chord ratio of the wing is also known as the fineness ratio. (Technically, thickness/chord ratio = 1/fineness ratio).

Question Number. 135. Flexure of a rearward swept wing will.

Option A. increase the lift and hence increase the flexure.

Option B. increase the lift and hence decrease the flexure.

Option C. decrease the lift and hence decrease the flexure.

Correct Answer is. decrease the lift and hence decrease the flexure.

Explanation. Flexure of a rearward swept wing will decrease the lift (since the wing presents its upper surface to the airflow and the angle of attack reduces) and so the wing flexes back.

Question Number. 136. A High Aspect Ratio wing is a wing with.

Option A. short span, long chord.

Option B. long span, long chord.

Option C. long span, short chord.

Correct Answer is. long span, short chord.

Explanation. Aspect ratio is the ratio of span to chord.

Question Number. 137. Stall commencing at the root is preferred because.

Option A. it provides the pilot with a warning of complete loss of lift.

Option B. the ailerons become ineffective.

Option C. it will cause the aircraft to pitch nose up.

Correct Answer is. it provides the pilot with a warning of complete loss of lift.

Explanation. Stall commencing at the root causes turbulent air to hit the tailplane. The resulting 'buffet' warns the pilot just before complete stall.

Question Number. 138. An aircraft flying in 'ground effect' will produce.

Option A. the same lift as a similar aircraft outside of ground effect.

Option B. less lift than a similar aircraft outside of ground effect.
Option C. more lift than a similar aircraft outside of ground effect.
Correct Answer is. more lift than a similar aircraft outside of ground effect.
Explanation. An aircraft flying in ground effect will have more lift than an aircraft not flying in ground effect (which is why seagulls glide close to the water surface).
Question Number. 139. If the angle of attack of a wing is increased in flight, the.
Option A. CofP will move aft.
Option B. CofP will move forward.
Option C. C of G will move aft.
Correct Answer is. CofP will move forward.
Explanation. Increasing the AOA moves the CofP forward.
Question Number. 140. The Rams Horn Vortex on a forward swept wing will be.
Option A. more than a rearward swept wing.
Option B. less than a rearward swept wing.
Option C. the same as a rearward swept wing.
Correct Answer is. less than a rearward swept wing.
Explanation. A forward swept wing does not suffer from the Rams Horn Vortex.
Question Number. 141. For a cambered wing section the zero lift angle of attack will be.
Option A. 4 degrees.
Option B. zero.
Option C. negative.
Correct Answer is. negative.
Explanation. A non symmetrical wing will produce some lift at zero degrees. Therefore it must have a negative angle of attack to produce zero lift.
Question Number. 142. Airflow at subsonic speed is taken to be.
Option A. compressible.
Option B. either a or b depending on altitude.
Option C. incompressible.
Correct Answer is. incompressible.
Explanation. Subsonic airflow is always considered to be incompressible.
Question Number. 143. Bernoulli's equation shows that.
Option A. at constant velocity the kinetic energy of the air changes with a change of height.
Option B. with a change in velocity at constant height the static pressure will change.
Option C. with a change in speed at constant height both kinetic and potential energies change.
Correct Answer is. with a change in velocity at constant height the static pressure will change.
Explanation. Bernoulli's theorem states that if velocity increases, the static pressure decreases, and vice versa.
Question Number. 144. If fluid flow through a venturi is said to be incompressible, the speed of the flow increases at the throat to.
Option A. allow for a reduction in static pressure.

Option B. maintain a constant volume flow rate.
Option C. allow for an increase in static pressure.
Correct Answer is. maintain a constant volume flow rate.
Explanation. Volume flow rate is constant at all parts of the flow (if fluid in incompressible) regardless of cross sectional area.
Question Number. 145. To produce lift, an aerofoil must be.
Option A. asymmetrical.
Option B. symmetrical.
Option C. either symmetrical or asymmetrical.
Correct Answer is. either symmetrical or asymmetrical.
Explanation. To produce lift, the aerofoil can be either symmetrical or asymmetrical.
Question Number. 146. Lift is dependent on.
Option A. the net area of the wing ,the density of the fluid medium and the velocity.
Option B. the area of the wing, the density of the fluid medium, and the square of the velocity.
Option C. the frontal area of the wing, the density of the fluid medium and the velocity.
Correct Answer is. the area of the wing, the density of the fluid medium, and the square of the velocity.
Explanation. See the formula for lift.
Question Number. 147. A wing develops 10,000 N of lift at 100 knots. Assuming the wing remains at the same angle of attack and remains at the same altitude, how much lift will it develop at 300knots?.
Option A. 30,000 N.
Option B. 900,000 N.
Option C. 90,000 N.
Correct Answer is. 90,000 N.
Explanation. See the formula for lift. Velocity is squared, so if you triple the velocity, the lift is 9 times.
Question Number. 148. The angle of attack is.
Option A. related to angle of incidence.
Option B. always kept below 15 degrees.
Option C. not related to the angle of incidence.
Correct Answer is. not related to the angle of incidence.
Explanation. See definitions of angle of attack and angle of incidence.
Question Number. 149. The difference between the mean camber line and the chord line of an aerofoil is.
Option A. neither are straight.
Option B. they both may be curved.
Option C. one is always straight and the other may be straight.
Correct Answer is. one is always straight and the other may be straight.
Explanation. See the definitions of mean camber and chord line.
Question Number. 150. If the C of G is calculated after loading as within limits for take off.
Option A. a further calculation is required prior to landing to allow for fuel and oil consumption.
Option B. a further calculation is required prior to landing to allow for flap deployment.

Option C. no further calculation is required.
Correct Answer is. a further calculation is required prior to landing to allow for fuel and oil consumption.
Explanation. If the CG of the fuel is not directly on the empty aircraft CG, the loaded aircraft CG must be calculated twice (with and without fuel).
Question Number. 151. Helicopter rotor blades create lift by.
Option A. pushing the air down.
Option B. working like a screw.
Option C. creating low pressure above the blades.
Correct Answer is. creating low pressure above the blades.
Explanation. A pure aerodynamicist would say all three are correct. But probably a) is technically most correct.
Question Number. 152. The span wise component of the airflow is.
Option A. greater at higher speeds.
Option B. unaffected by speed.
Option C. less at higher speeds.
Correct Answer is. less at higher speeds.
Explanation. The tip vortices are less at high speed (due to lower AOA at high speed). The tip vortices cause the span wise flow.
Question Number. 153. A wing fence.
Option A. acts as a lift dumping device.
Option B. reduces span wise flow on a swept wing thus reducing induced drag.
Option C. increases lateral control.
Correct Answer is. reduces span wise flow on a swept wing thus reducing induced drag.
Explanation. A wing fence reduces span wise flow. Refer : Barnard and Phillpott Page 78.
Question Number. 154. With all conditions remaining the same, if the aircraft speed is halved, by what factor is the lift reduced?.
Option A. Half.
Option B. By a factor of 4.
Option C. Remains the same.
Correct Answer is. By a factor of 4.
Explanation. Lift is proportional to the square of aircraft speed.
Question Number. 155. The boundary layer over an aerofoil is.
Option A. a layer of air close to the aerofoil which is moving at a velocity less than free stream air.
Option B. a layer of turbulent air close to the aerofoil which is moving at a velocity less than free stream air.
Option C. a layer of air close to the aerofoil that is stationary.
Correct Answer is. a layer of air close to the aerofoil which is moving at a velocity less than free stream air.
Explanation. Boundary layer air consists of turbulent and laminar airflow.
Question Number. 156. On a swept wing aircraft, the fineness ratio of an aerofoil is.
Option A. highest at the root.
Option B. equal throughout the span.

Option C. highest at the tip.
Correct Answer is. highest at the tip.
Explanation. Fineness ratio (chord/thickness) is greatest at the tip. Fineness ratio is the inverse of thickness/chord ratio. Some textbooks differ on the definition of 'fineness ratio' but most state FR = chord/thickness. Quote A&P Mechanics Airframe Handbook Page 32 'If a wing has a high fineness ratio, it is a very thin wing. A thick wing has low fineness ratio'.
Question Number. 157. Streamlining will reduce.
Option A. induced drag.
Option B. skin friction drag.
Option C. form drag.
Correct Answer is. form drag.
Explanation. Form drag is a function of shape.
Question Number. 158. If an aircraft has a gross weight of 3000 kg and is then subjected to a total weight of 6000 kg the load factor will be.
Option A. 2G.
Option B. 9G.
Option C. 3G.
Correct Answer is. 2G.
Explanation. Load factor is a measure of how many times heavier the aircraft 'feels' compared to how heavy it actually is.
Question Number. 159. Ice formed on the leading edge will cause the aircraft to.
Option A. stall at a higher speed.
Option B. stall at a lower speed.
Option C. stall at the same stall speed and AOA.
Correct Answer is. stall at a higher speed.
Explanation. Ice change the wing section shape and hence lift (CL) is less and stall speed is greater.
Question Number. 160. Under what conditions will an aircraft create best lift?.
Option A. Hot damp day at 1200 ft.
Option B. Cold dry day at 200 ft.
Option C. Cold wet day at 1200 ft.
Correct Answer is. Cold dry day at 200 ft.
Explanation. Cold dry air at low altitude provides maximum air density hence best lift.
Question Number. 161. As Mach number increases, what is the effect on boundary layer?.
Option A. Becomes more turbulent.
Option B. Decreases in thickness.
Option C. Becomes less turbulent.
Correct Answer is. Becomes more turbulent.
Explanation. As speed increases (speed here is measured in Mach) the transition point moves forward, hence turbulent boundary layer increases.
Question Number. 162. During a glide the following forces act on an aircraft.
Option A. lift and weight only.
Option B. lift, drag, weight.

Option C. lift, weight, thrust.
Correct Answer is. lift, drag, weight.
Explanation. No thrust in a glide. The weight provides the forward motion.
Question Number. 163. If an aileron is moved downward.
Option A. the stalling angle of that wing is increased.
Option B. the stalling angle is not affected but the stalling speed is decreased.
Option C. the stalling angle of that wing is decreased.
Correct Answer is. the stalling angle of that wing is decreased.
Explanation. The aileron increases the 'local' AOA and provides a greater camber. Both will cause the stalling angle of the wing to decrease.
Question Number. 164. If the wing loading of an aircraft were reduced the stalling speed would.
Option A. increase.
Option B. not be affected.
Option C. decrease.
Correct Answer is. decrease.
Explanation. An increase in wing loading increases the stall speed. And vice versa.
Question Number. 165. The lift on a wing is increased with.
Option A. an increase in temperature.
Option B. an increase in pressure.
Option C. an increase in humidity.
Correct Answer is. an increase in pressure.
Explanation. Lift depends on density. Increases in humidity and temperature reduce density. Increase in pressure increases density.
Question Number. 166. The airflow behind a normal shockwave will.
Option A. always be subsonic and in the same direction as the original airflow.
Option B. always be supersonic and in the same direction as the original airflow.
Option C. always be subsonic and deflected from the direction of the original airflow.
Correct Answer is. always be subsonic and in the same direction as the original airflow.
Explanation. The airflow behind a normal shock is subsonic, and in the same direction. It is supersonic behind an oblique shock (and slightly deflected).
Question Number. 167. Induced drag can be reduced by the use of.
Option A. streamlining.
Option B. high aspect ratio wings.
Option C. fairings at junctions between fuselage and wings.
Correct Answer is. high aspect ratio wings.
Explanation. High aspect ratio wings have low induced drag (IE a glider wing).
Question Number. 168. Interference drag can be reduced by the use of.
Option A. fairings at junctions between fuselage and wings.
Option B. high aspect ratio wings.
Option C. streamlining.
Correct Answer is. fairings at junctions between fuselage and wings.
Explanation. Interference drag occurs as a result of turbulence at wing body joints.
Question Number. 169. Gliding angle is the angle between.
Option A. ground and the glide path.

Option B. aircraft and flight path.
Option C. aircraft and airflow.
Correct Answer is. ground and the glide path.
Explanation. The greater the L/D angle the less the glide angle is- therefore you can glide further.
Question Number. 170. Propeller Solidity can be increased by.
Option A. increasing the number of blades.
Option B. decreasing the length of the blades.
Option C. increasing the blade angle.
Correct Answer is. increasing the number of blades.
Explanation. A C Kermode Mechanics of Flight CH 4 Page 138 shows methods of increasing solidity.
Question Number. 171. Lift is generated by a wing.
Option A. mostly on the bottom surface.
Option B. mostly on the top surface.
Option C. equally on the top and bottom surfaces.
Correct Answer is. mostly on the top surface.
Explanation. 2/3 of lift is produced by the top surface.
Question Number. 172. Lift is dependent on.
Option A. the area of the wing, the density of the fluid medium and the square of the velocity.
Option B. the net area of the wing, the density of the fluid medium and the velocity.
Option C. the frontal area of the wing, the density of the fluid medium and the velocity.
Correct Answer is. the area of the wing, the density of the fluid medium and the square of the velocity.
Explanation. Lift = Lift Coefficient x 1/2 x density x velocity^2 x wing area (Lift formula).
Question Number. 173. To produce lift, an aerofoil must be.
Option A. symmetrical.
Option B. asymmetrical.
Option C. either (a) or (b).
Correct Answer is. either (a) or (b).
Explanation. A symmetrical wing will produce lift if presented at a suitable positive angle of attack.
Question Number. 174. If fluid flow through a venturi is said to be incompressible, the speed of the flow increases at the throat to.
Option A. allow for a reduction in static pressure.
Option B. allow for an increase in static pressure.
Option C. maintain a constant volume flow rate.
Correct Answer is. maintain a constant volume flow rate.
Explanation. Continuity of flow principle.
Question Number. 175. Bernoulli's equation shows that.
Option A. at constant velocity the total energy of the air changes with a change in height.
Option B. with a change in speed at constant height both kinetic and potential energies change.
Option C. with a change in velocity at constant height the static pressure will change.

Correct Answer is. with a change in velocity at constant height the static pressure will change.
Explanation. Bernoulli's theorem states that if velocity increases, the static pressure decreases, and vice versa.
Question Number. 176. Airflow at sub-sonic speed is taken to be.
Option A. incompressible.
Option B. compressible.
Option C. either (a) or (b) depending on altitude.
Correct Answer is. incompressible.
Explanation. NIL.
Question Number. 177. The total drag of an aircraft.
Option A. changes with speed.
Option B. increases with speed.
Option C. increases with the square of speed.
Correct Answer is. changes with speed.
Explanation. The graph of TOTAL drag against airspeed is 'U' shaped. c can be the only correct answer.
Question Number. 178. _____ angle of attack is known as optimum angle of attack.
Option A. 5 to 7 degrees.
Option B. 3 to 4 degrees.
Option C. 10 to 12 degrees.
Correct Answer is. 3 to 4 degrees.
Explanation. NIL.
Question Number. 179. Induced drag is _____ at root.
Option A. lowest.
Option B. greatest.
Option C. neutral.
Correct Answer is. lowest.
Explanation. NIL.
Question Number. 180. Profile drag is _____ to speed.
Option A. neutral.
Option B. inversely proportional.
Option C. proportional.
Correct Answer is. proportional.
Explanation. NIL.
Question Number. 181. A shock stall occurs at.
Option A. large angles of attack.
Option B. small angles of attack.
Option C. equally both large and small angles of attack.
Correct Answer is. small angles of attack.
Explanation. An arguable point. Shock stall is due to shock induced separation which can occur at any angle of attack, but it would be difficult to achieve the high speed necessary with a high angle of attack.
Question Number. 182. What happens to the wingtip stagnation point as the AOA increases?.

Option A. It moves down and under the leading edge.
Option B. It moves up and over the leading edge.
Option C. It remains unchanged.
Correct Answer is. It moves down and under the leading edge.
Explanation. It moves down and under the leading edge.
Question Number. 183. What does the term 'wing washout' mean?.
Option A. The design of the wing that gives the wing tip a lower angle of incidence.
Option B. The design of the wing that gives the wing tip a much greater angle of incidence.
Option C. The airflow moves toward the end of the wing.
Correct Answer is. The design of the wing that gives the wing tip a lower angle of incidence.
Explanation. Wing is twisted such that incidence is lower at the tip.
Question Number. 184. The point at which airflow ceases to be laminar and becomes turbulent is the.
Option A. boundary point.
Option B. transition point.
Option C. separation point.
Correct Answer is. transition point.
Explanation. transition point.
Question Number. 185. Which of the following is true about Profile drag?.
Option A. Profile drag = Skin Drag + Form Drag.
Option B. Profile drag = skin drag + induced drag.
Option C. Profile drag = induced drag + Form drag.
Correct Answer is. Profile drag = Skin Drag + Form Drag.
Explanation. Profile drag = Skin Drag + Form Drag.
Question Number. 186. Which statement is true?.
Option A. Both Induced drag and profile drag increase with the square of the airspeed.
Option B. Profile drag increases with the square of the airspeed.
Option C. Induced drag increases with the square of the airspeed.
Correct Answer is. Induced drag increases with the square of the airspeed.
Explanation. Profile drag increases with the square of the airspeed but induced drag decreases with the square of the airspeed.
Question Number. 187. Which statement is true?.
Option A. Rectangular wings stall at the root first.
Option B. Both tapered and rectangular wings will stall at the tip first.
Option C. Tapered wings stall at the root first.
Correct Answer is. Rectangular wings stall at the root first.
Explanation. Rectangular wings stall at the root first.
Question Number. 188. During inverted level flight an aircraft accelerometer shows.
Option A. -2g.
Option B. -1g.
Option C. 0g.
Correct Answer is. -1g.
Explanation. Inverted (level) flight is -1g.

Question Number. 189. During straight and level flight an aircraft accelerometer shows.
Option A. 4g.
Option B. 1g.
Option C. 2g.
Correct Answer is. 1g.
Explanation. Straight and level flight is 1g.
Question Number. 190. Which of the following is incorrect about induced drag?.
Option A. It will increase inversely to the square of the airspeed.
Option B. It will decrease in proportion to the square of the airspeed.
Option C. It will increase when the angle of attack is reduced.
Correct Answer is. It will increase when the angle of attack is reduced.
Explanation. Which is Incorrect.
Question Number. 191. What produces the most lift at low speeds?.
Option A. High camber.
Option B. Low aspect ratio.
Option C. High aspect ratio.
Correct Answer is. High aspect ratio.
Explanation. NIL.
Question Number. 192. If the angle of attack is zero, but lift is produced, the.
Option A. wing is symmetrical.
Option B. wing is cambered.
Option C. wing has positive angle of incidence.
Correct Answer is. wing is cambered.
Explanation. NIL.
Question Number. 193. When is the angle of incidence the same as the angle of attack?.
Option A. Never.
Option B. In descent.
Option C. When relative airflow is parallel to longitudinal axis.
Correct Answer is. When relative airflow is parallel to longitudinal axis.
Explanation. NIL.

08.3. Theory of Flight .

Question Number. 1. Flaps at landing position.
Option A. decrease landing speed.
Option B. decrease take off and landing speeds.
Option C. decrease take off speed.
Correct Answer is. decrease landing speed.
Explanation. Although an aircraft will take-off with flaps at landing position, this is not normal.
Question Number. 2. As a subsonic aircraft speeds-up, its Centre of Pressure.
Option A. moves aft.
Option B. moves forward.
Option C. is unaffected.
Correct Answer is. moves aft.

Explanation. Assuming that the aircraft is to remain at constant altitude, it must reduce its angle of attack as it speeds-up. This alone will move the CofP rearwards, in accordance with the sub-sonic angle of attack change theory.

Question Number. 3. Lowering of the flaps.

Option A. increases drag.

Option B. increases lift.

Option C. increases drag and lift.

Correct Answer is. increases drag and lift.

Explanation. Jeppesen A+P Technician General Textbook. Page 1-17.

Question Number. 4. Wing spoilers, when used asymmetrically, are associated with.

Option A. rudder.

Option B. elevators.

Option C. ailerons.

Correct Answer is. ailerons.

Explanation. Pallett Automatic Flight Control 4th Edition Page 51. Jeppesen A&P Technician Airframe Textbook Page 1-12.

Question Number. 5. What do ruddervators do?.

Option A. Control yaw and roll.

Option B. Control pitch and yaw.

Option C. Control pitch and roll.

Correct Answer is. Control pitch and yaw.

Explanation. Jeppesen A+P Technician General Textbook. Page 1-16 fig 1-36.

Question Number. 6. What controls pitch and roll on a delta wing aircraft?.

Option A. Ailerons.

Option B. Elevons.

Option C. Elevators.

Correct Answer is. Elevons.

Explanation. Jeppesen A+P Technician General Textbook. Page 1-17.

Question Number. 7. What does a trim tab do?.

Option A. Allows the C of G to be outside the normal limit.

Option B. Provides finer control movements by the pilot.

Option C. Eases control loading for pilot.

Correct Answer is. Eases control loading for pilot.

Explanation. A&P General Textbook Pg 2-35.

Question Number. 8. How does a balance tab move?.

Option A. In the same direction a small amount.

Option B. In the opposite direction proportional to the control surface it is attached to.

Option C. In the same direction proportional to the control surface it is attached to.

Correct Answer is. In the opposite direction proportional to the control surface it is attached to.

Explanation. A&P General Textbook Pg 2-36.

Question Number. 9. If an aircraft is yawing to the left, where would you position the trim tab on the rudder?.

Option A. To the centre.

Option B. To the left.

Option C. To the right.
Correct Answer is. To the left.
Explanation. Automatic flight control, Pallett, 4th Edition Page 43.
Question Number. 10. If an aircraft is flying with a left wing low, where would you move the left aileron trim tab?.
Option A. Down.
Option B. Up.
Option C. Moving the aileron trim tab will not correct the situation.
Correct Answer is. Up.
Explanation. Automatic flight control, Pallett, 4th Edition Page 43.
Question Number. 11. When a leading edge flap is fully extended, what is the slot in the wing for?.
Option A. To re-energise the boundary layer.
Option B. To increase the lift.
Option C. To allow the flap to retract into it when it retracts.
Correct Answer is. To re-energise the boundary layer.
Explanation. Pallett Automatic Flight Control 2nd Edition Page 50. Jeppesen A&P Technician Airframe Textbook Page 1-32.
Question Number. 12. With respect to differential aileron control, which of the following is true?.
Option A. The up going and down going ailerons both deflect to the same angle.
Option B. The up going Aileron moves through a smaller angle than the down going aileron.
Option C. The down going aileron moves through a smaller angle than the up going aileron.
Correct Answer is. The down going aileron moves through a smaller angle than the up going aileron.
Explanation. Mechanics of Flight, Kermode, Page 301. The down going aileron moves less, to reduce the induced drag which causes adverse aileron yaw.
Question Number. 13. The aeroplane fin is of symmetrical aerofoil section and will therefore provide a side-load.
Option A. only when the rudder is moved.
Option B. if a suitable angle of attack develops due either yaw or rudder movement.
Option C. only if a suitable angle of attack develops due to yaw.
Correct Answer is. if a suitable angle of attack develops due either yaw or rudder movement.
Explanation. Rudder deflection or yaw.
Question Number. 14. An aircraft left wing is flying low. The aileron trimmer control to the left aileron trim tab in the cockpit would be.
Option A. moved up causing the left aileron to move up.
Option B. moved up causing the left aileron to move down.
Option C. moved down causing the left aileron to move down.
Correct Answer is. moved up causing the left aileron to move down.
Explanation. Down aileron required - which requires up trim.
Question Number. 15. An elevator tab moves down.
Option A. to make the nose go down.

Option B. to counteract for the aircraft flying nose heavy.
Option C. to counteract for the aircraft flying tail heavy.
Correct Answer is. to counteract for the aircraft flying nose heavy.
Explanation. Elevator tab DOWN, elevator UP, aircraft nose UP.
Question Number. 16. The stall margin is controlled by.
Option A. speed bug cursor.
Option B. EPR limits.
Option C. angle of attack and flap position.
Correct Answer is. angle of attack and flap position.
Explanation. Flight Instruments and Automatic Flight Control Page 143/4.
Question Number. 17. Other than spoilers, where are speed brakes located?.
Option A. Under the Fuselage.
Option B. Either side of the Fuselage.
Option C. On the wing.
Correct Answer is. Either side of the Fuselage.
Explanation. Reference BAe 146 etc.
Question Number. 18. With a trailing edge flap being lowered, due to rising gusts, what will happen to the angle of attack?.
Option A. Tend to decrease.
Option B. Stay the same.
Option C. Tend to increase.
Correct Answer is. Tend to increase.
Explanation. Assuming that 'rising gust' means it has a vertical component.
Question Number. 19. A device used do dump lift from an aircraft is.
Option A. leading edge flaps.
Option B. trailing edge flaps.
Option C. spoiler.
Correct Answer is. spoiler.
Explanation. Spoilers are sometimes called 'lift dumps'.
Question Number. 20. The purpose of a slot in a wing is to.
Option A. provide housing for the slat.
Option B. speed up the airflow and increase lift.
Option C. act as venturi, accelerate the air and re-energise boundary layer.
Correct Answer is. act as venturi, accelerate the air and re-energise boundary layer.
Explanation. A slot is to act as venturi, accelerate the air and re-energise boundary layer.
Question Number. 21. Large flap deployment.
Option A. causes increased span wise flow towards tips on wing upper surface.
Option B. causes increased span wise flow towards tips on wing lower surface.
Option C. has no effect on span wise flow.
Correct Answer is. causes increased span wise flow towards tips on wing lower surface.
Explanation. Flaps increase the pressure differential between top and bottom surfaces, increase tip vortices and span wise flow.
Question Number. 22. Which part of the wing of a swept-wing aircraft stalls first?.

Option A. Tip stalls first.
Option B. Both stall together.
Option C. Root stalls first.
Correct Answer is. Tip stalls first.
Explanation. The tip of a swept wing stalls first.
Question Number. 23. During flight, an aircraft is yawing to the right. The aircraft would have a tendency to fly.
Option A. right wing low.
Option B. left wing low.
Option C. nose up.
Correct Answer is. right wing low.
Explanation. The leading wing (left wing) has increased lift, causing it to rise.
Question Number. 24. In the reversed camber horizontal stabilizer.
Option A. there is an increased tail plane up-force.
Option B. the elevator causes tail down movement i.e. increased tail plane down force.
Option C. there is an increased tailplane down-force.
Correct Answer is. there is an increased tailplane down-force.
Explanation. The lower cambered surface produces a down-force on the tail.
Question Number. 25. When the trailing edge flap is extended.
Option A. CP moves rearward.
Option B. the CP moves forward but the CG does not change.
Option C. the CP moves forward and the pitching moment changes to nose up.
Correct Answer is. CP moves rearward.
Explanation. CP moves rearwards when the flap is extended.
Question Number. 26. With a drop in ambient temperature, an aircraft service ceiling will.
Option A. rise.
Option B. not be affected.
Option C. lower.
Correct Answer is. rise.
Explanation. As ambient temperature drops, density increases and aircraft performance increases.
Question Number. 27. What type of flap is this?.
Option A. Split flap.
Option B. Plain flap.
Option C. Fowler flap.
Correct Answer is. Split flap.
Explanation. Split flap.
Question Number. 28. Servo tabs.
Option A. enable the pilot to bring the control surface back to neutral.
Option B. move in such a way as to help move the control surface.
Option C. provide artificial feel.
Correct Answer is. move in such a way as to help move the control surface.
Explanation. A&P Technician Airframe Textbook Pg.1-29.
Question Number. 29. Spring Tabs.
Option A. provide artificial feel.

Option B. enable the pilot to bring the control surface back to neutral.
Option C. move in such a way as to help move the control surface.
Correct Answer is. move in such a way as to help move the control surface.
Explanation. A&P Technician Airframe Textbook Pg.1-29.
Question Number. 30. Extending a leading edge slat will have what effect on the angle of attack of a wing?.
Option A. Increase the angle of attack.
Option B. Decrease the angle of attack.
Option C. No effect on angle of attack.
Correct Answer is. Decrease the angle of attack.
Explanation. NIL.
Question Number. 31. To ensure that a wing stalls at the root first, stall wedges are.
Option A. installed on the wing leading edge at the wing root.
Option B. installed on the wing leading edge at the wing tip.
Option C. installed at the wing trailing edge at the wing root.
Correct Answer is. installed on the wing leading edge at the wing root.
Explanation. NIL.
Question Number. 32. Krueger flaps make up part of the.
Option A. wing lower surface leading edge.
Option B. wing lower surface trailing edge.
Option C. wing upper surface leading edge.
Correct Answer is. wing lower surface leading edge.
Explanation. Jeppesen A&P Technician Airframe Textbook 1-37. Automatic Flight Control Pallett Page 53 fig 1.37 (Note : lower surface when retracted, upper surface when extended.).
Question Number. 33. In a turn, wing spoilers may be deployed.
Option A. to assist the up going aileron.
Option B. in unison with both the up going and down going ailerons.
Option C. to act as an airbrake, interacting with the ailerons.
Correct Answer is. to assist the up going aileron.
Explanation. NIL.
Question Number. 34. Dutch role is movement in.
Option A. yaw and pitch.
Option B. yaw and roll.
Option C. pitch and roll.
Correct Answer is. yaw and roll.
Explanation. Avionic Fundamentals Jeppesen page 291.
Question Number. 35. What is the main purpose of a frize aileron?.
Option A. Increase drag on the up going wing.
Option B. Decrease drag on the up going wing.
Option C. Help pilot overcome aerodynamic loads.
Correct Answer is. Decrease drag on the up going wing.
Explanation. The Frise aileron increases drag on the up-going aileron, which is on the downgoing wing. And Vise versa on the other aileron.
Question Number. 36. Flap asymmetry causes the aircraft to.

Option A. nose down.
Option B. go one wing down.
Option C. nose up.
Correct Answer is. go one wing down.
Explanation. NIL.
Question Number. 37. If an aircraft moves in yaw, what axis is it moving about?.
Option A. Longitudinal.
Option B. Lateral.
Option C. Normal.
Correct Answer is. Normal.
Explanation. NIL.
Question Number. 38. If an aircraft is aerodynamically stable.
Option A. aircraft returns to trimmed attitude.
Option B. CofP moves back.
Option C. aircraft becomes too sensitive.
Correct Answer is. aircraft returns to trimmed attitude.
Explanation. NIL.
Question Number. 39. What are ground spoilers used for?.
Option A. To assist the aircraft coming to a stop.
Option B. To slow the aircraft.
Option C. To dump lift.
Correct Answer is. To dump lift.
Explanation. NIL.
Question Number. 40. Mass balance weights are used to.
Option A. balance the trailing edge of flying control surfaces.
Option B. counteract flutter on control surfaces.
Option C. balance the tabs.
Correct Answer is. counteract flutter on control surfaces.
Explanation. NIL.
Question Number. 41. What is a slot used for?.
Option A. Increased angle of attack during approach.
Option B. Increase the speed of the airflow.
Option C. To reinforce the boundary layer.
Correct Answer is. To reinforce the boundary layer.
Explanation. Automatic Flight Control Pallett Page 53.
Question Number. 42. Angle of Attack is the angle between cord line and.
Option A. horizontal axis.
Option B. relative air flow.
Option C. tip path plane.
Correct Answer is. relative air flow.
Explanation. Automatic Flight Control Pallett Page 3.
Question Number. 43. A high lift device is used for.
Option A. take-off only.
Option B. take-off and landing.
Option C. landing only.

Correct Answer is. take-off and landing.
Explanation. Automatic Flight Control Pallett Page 50.
Question Number. 44. How is a spoiler interconnected to other flight control systems?.
Option A. Spoiler to elevator.
Option B. Spoiler to aileron.
Option C. Spoiler to flap.
Correct Answer is. Spoiler to aileron.
Explanation. Automatic Flight Control Pallett Page 54.
Question Number. 45. What is aileron droop?.
Option A. The droop of ailerons with no hydraulics on.
Option B. The leading edge of both ailerons presented to the airflow.
Option C. One aileron lowered.
Correct Answer is. The droop of ailerons with no hydraulics on.
Explanation. NIL.
Question Number. 46. Earths atmosphere is.
Option A. 3/5 oxygen, 2/5 nitrogen.
Option B. 4/5 oxygen, 1/5 nitrogen.
Option C. 1/5 oxygen, 4/5 nitrogen.
Correct Answer is. 1/5 oxygen, 4/5 nitrogen.
Explanation. NIL.
Question Number. 47. An anti-balance tab is used.
Option A. to relieve stick loads.
Option B. for trimming the aircraft.
Option C. to give more feel to the controls.
Correct Answer is. to give more feel to the controls.
Explanation. Jeppesen A&P Technician Airframe Textbook 1-29.
Question Number. 48. The fin helps to give.
Option A. directional stability about the normal axis.
Option B. directional stability about the longitudinal axis.
Option C. longitudinal stability about the normal axis.
Correct Answer is. directional stability about the normal axis.
Explanation. Jeppesen A&P Technician Airframe Textbook 1-22.
Question Number. 49. If an aircraft moves in roll, it is moving about the.
Option A. longitudinal axis.
Option B. normal axis.
Option C. lateral axis.
Correct Answer is. longitudinal axis.
Explanation. Mechanics of flight by A.C. Kermode page 241.
Question Number. 50. What effect does lowering the flaps for take-off have?.
Option A. Increases lift & reduces drag.
Option B. Increases lift and drag.
Option C. Increase lift only.
Correct Answer is. Increases lift and drag.
Explanation. Avionics Fundamentals. Jeppesen Page 244.

Question Number. 51. What effect does lowering flaps for takeoff have?.
Option A. Reduces takeoff speeds only.
Option B. Reduces landing speeds only.
Option C. Reduces takeoff and landing speeds.
Correct Answer is. Reduces takeoff speeds only.
Explanation. Avionics Fundamentals. Jeppesen Page 244.
Question Number. 52. When the flaps are lowered.
Option A. the lift vector moves rearward.
Option B. there is no effect on the lift vector.
Option C. the lift vector moves forward.
Correct Answer is. the lift vector moves rearward.
Explanation. Automatic Flight Control, Pallett Page 51.
Question Number. 53. At take-off, if the flaps are lowered there is a.
Option A. large increase in lift and drag.
Option B. large increase in lift and small increase in drag.
Option C. small increase in lift and drag.
Correct Answer is. large increase in lift and drag.
Explanation. Avionics Fundamentals. Jeppesen Page 244.
Question Number. 54. Wing spoilers be used.
Option A. to assist the respective down going aileron in a turn.
Option B. as ground spoilers on landing.
Option C. to assist the elevators.
Correct Answer is. as ground spoilers on landing.
Explanation. Automatic Flight Control. Pallett page 55. A&P Technician Airframe Textbook by Jeppesen. 1-14.
Question Number. 55. Differential aileron control will.
Option A. cause a nose down moment.
Option B. prevent yawing in conjunction with rudder input.
Option C. cause a nose up moment.
Correct Answer is. prevent yawing in conjunction with rudder input.
Explanation. NIL.
Question Number. 56. Dutch Roll affects.
Option A. pitch and yaw simultaneously.
Option B. yaw and roll simultaneously.
Option C. pitch and roll simultaneously.
Correct Answer is. yaw and roll simultaneously.
Explanation. Automatic Flight Control. Pallett page 26.
Question Number. 57. Which of the following are primary control surfaces?.
Option A. Elevators, ailerons, rudder.
Option B. Roll spoilers, elevators, tabs.
Option C. Elevators, roll spoilers, tabs.
Correct Answer is. Elevators, ailerons, rudder.
Explanation. NIL.
Question Number. 58. A split flap.
Option A. forms part of the trailing edge's lower surface when retracted.
Option B. forms part of the leading edge's lower surface when retracted.

Option C. forms part of the trailing edge's upper surface when retracted.
Correct Answer is. forms part of the trailing edge's lower surface when retracted.
Explanation. Jeppesen A&P Airframe Technician Textbook Page1-30 /31.
Question Number. 59. An anti-servo tab.
Option A. assists the pilot to move the controls back to neutral.
Option B. moves in the opposite direction to the control surface to assist the pilot.
Option C. moves in the same direction as the control surface to assist the pilot.
Correct Answer is. assists the pilot to move the controls back to neutral.
Explanation. NIL.
Question Number. 60. Slats.
Option A. keep the boundary layer from separating for longer.
Option B. increase the overall surface area and lift effect of wing.
Option C. act as an air brake.
Correct Answer is. keep the boundary layer from separating for longer.
Explanation. Jeppesen A & P technician airframe textbook page 1-32.
Question Number. 61. Due to the change of lift forces resulting from the extension of flaps in flight.
Option A. nose should be lowered, reducing AOA.
Option B. nose should be raised, increasing AOA.
Option C. nose should remain in the same position, maintaining same AOA.
Correct Answer is. nose should be lowered, reducing AOA.
Explanation. The main purpose of flaps is to increase lift so that the pilot can lower the nose, increase decent angle and get a better view of the runway.
Question Number. 62. Flight spoilers.
Option A. can be deployed on the down going wing in a turn to increase lift on that wing.
Option B. can be used to decrease lift to allow controlled decent without reduction of airspeed.
Option C. can be used with differential ailerons to reduce adverse yaw in a turn.
Correct Answer is. can be used to decrease lift to allow controlled decent without reduction of airspeed.
Explanation. NIL.
Question Number. 63. If the aircraft is flying nose heavy, which direction would you move the elevator trim tab?.
Option A. Up to move elevator down.
Option B. Up to move elevator up.
Option C. Down to move elevator up.
Correct Answer is. Down to move elevator up.
Explanation. NIL.
Question Number. 64. Wing tip vortices are strongest when.
Option A. flying high speed straight and level flight.
Option B. flying into a headwind.
Option C. flying slowly at high angles of attack.
Correct Answer is. flying slowly at high angles of attack.
Explanation. NIL.
Question Number. 65. Aerodynamic balance.

Option A. will reduce aerodynamic loading.
Option B. will cause CP to move forward of hinge and cause overbalance.
Option C. will cause CP to move towards the trailing edge and cause instability.
Correct Answer is. will reduce aerodynamic loading.
Explanation. NIL.
Question Number. 66. A balance tab.
Option A. effectively increases the area of the control surface.
Option B. assists the pilot to move the controls.
Option C. is used to trim the appropriate axis of the aircraft.
Correct Answer is. assists the pilot to move the controls.
Explanation. Jeppesen A & P Technician Textbook pg 1-29.
Question Number. 67. Elevons combine the functions of both.
Option A. rudder and elevator.
Option B. elevator and aileron.
Option C. rudder and aileron.
Correct Answer is. elevator and aileron.
Explanation. Jeppesen A&P Technician Airframe Textbook Page 1-16 Fig 1-36.
Question Number. 68. Flutter can be reduced by using.
Option A. a horn balance.
Option B. mass balancing.
Option C. servo tabs.
Correct Answer is. mass balancing.
Explanation. NIL.
Question Number. 69. An elevator provides control about the.
Option A. longitudinal axis.
Option B. lateral axis.
Option C. horizontal stabilizer.
Correct Answer is. lateral axis.
Explanation. NIL.
Question Number. 70. The outboard ailerons on some large aircraft.
Option A. are isolated at high speeds.
Option B. are isolated to improve sensitivity.
Option C. are isolated at low speeds.
Correct Answer is. are isolated at high speeds.
Explanation. NIL.
Question Number. 71. Which wing increases drag when the ailerons are moved?.
Option A. Both wings increase drag but the wing with the up-going aileron increases more.
Option B. Both wings have an equal increase in drag.
Option C. Both wings increase drag but the wing with the down-going aileron increases more.
Correct Answer is. Both wings increase drag but the wing with the down-going aileron increases more.
Explanation. Jeppesen A & P Technician Airframe Textbook page 1-26.
Question Number. 72. Which flap will increase wing area and camber?.

Option A. Slot.
Option B. Split.
Option C. Fowler.
Correct Answer is. Fowler.
Explanation. Jeppesen A&P Technician Airframe Textbook Page 20.
Question Number. 73. Wing loading of an aircraft.
Option A. varies with dynamic loading due to air currents.
Option B. is independent of altitude.
Option C. decreases with density.
Correct Answer is. is independent of altitude.
Explanation. Wing loading = aircraft weight/wing area.
Question Number. 74. An automatic slat will lift by itself when the angle of attack is.
Option A. high.
Option B. high or low.
Option C. low.
Correct Answer is. high.
Explanation. NIL.
Question Number. 75. On aircraft fitted with spoilers for lateral control, roll to the right is caused by.
Option A. left spoilers extending, right spoilers remaining retracted.
Option B. right spoilers extending, left spoilers remaining retracted.
Option C. left and right spoilers extending.
Correct Answer is. right spoilers extending, left spoilers remaining retracted.
Explanation. NIL.
Question Number. 76. A split flap increases lift by increasing.
Option A. the angle of attachment of the lower hinged portion.
Option B. the surface area.
Option C. the camber of the top surface.
Correct Answer is. the angle of attachment of the lower hinged portion.
Explanation. Jeppesen A & P Technician Airframe Textbook page 1-30.
Question Number. 77. When the trailing edge flaps are lowered, the aircraft will.
Option A. pitch nose up.
Option B. pitch nose down.
Option C. sink.
Correct Answer is. pitch nose down.
Explanation. Due to the centre of pressure moving.
Question Number. 78. In aileron control.
Option A. the up going aileron moves further than down going aileron.
Option B. the down going aileron moves further than up going aileron.
Option C. it is assisted by the rudder.
Correct Answer is. the up going aileron moves further than down going aileron.
Explanation. NIL.
Question Number. 79. The aircraft is controlled about the lateral axis by the.
Option A. ailerons.

Option B. elevator.
Option C. rudder.
Correct Answer is. elevator.
Explanation. NIL.
Question Number. 80. The aircraft is controlled about the normal axis by the.
Option A. ailerons.
Option B. elevator.
Option C. rudder.
Correct Answer is. rudder.
Explanation. NIL.
Question Number. 81. Dutch roll is.
Option A. a combined yawing and rolling motion.
Option B. primarily a pitching instability.
Option C. a type of slow roll.
Correct Answer is. a combined yawing and rolling motion.
Explanation. NIL.
Question Number. 82. The aircraft is controlled about the longitudinal axis by the.
Option A. ailerons.
Option B. elevator.
Option C. rudder.
Correct Answer is. ailerons.
Explanation. NIL.
Question Number. 83. Ruddervators when moved, will move.
Option A. opposite to each other only.
Option B. together only.
Option C. either opposite each other or together, depending on the selection.
Correct Answer is. either opposite each other or together, depending on the selection
Explanation. Jeppesen A&P Technician Airframe Textbook Page 16.
Question Number. 84. As a consequence of the C of G being close to its aft limit.
Option A. the stick forces will be high in fore and aft pitch, due to the high longitudinal stability.
Option B. the stick forces to manoeuvre longitudinally will be low due to the low stability.
Option C. the stick forces when pitching the nose down will be very high.
Correct Answer is. the stick forces when pitching the nose down will be very high.
Explanation. NIL.
Question Number. 85. What is the term used for the amount of water in the atmosphere?.
Option A. Relative humidity.
Option B. Absolute humidity.
Option C. Dew point.
Correct Answer is. Absolute humidity.
Explanation. NIL.
Question Number. 86. An anti-balance tab is moved.

Option A. via a fixed linkage.
Option B. hydraulically.
Option C. when the C.G. changes.
Correct Answer is. via a fixed linkage.
Explanation. NIL.
Question Number. 87. A servo tab is operated.
Option A. directly by the pilot to produce forces which in turn move the main control surfaces.
Option B. automatically, and moves in the same direction as the main control surfaces.
Option C. by a trim wheel and moves in the opposite direction to the main control surfaces when moved.
Correct Answer is. directly by the pilot to produce forces which in turn move the main control surfaces.
Explanation. Jeppesen A&P Technician Airframe Textbook Page 23.
Question Number. 88. On an aircraft with an all-moving tailplane, pitch up is caused by.
Option A. decreasing tailplane incidence.
Option B. up movement of the elevator trim tab.
Option C. increasing tailplane incidence.
Correct Answer is. decreasing tailplane incidence.
Explanation. NIL.
Question Number. 89. When checking full range of control surface movement, they must be positioned by.
Option A. moving them by hand directly until against the primary stops.
Option B. moving them by hand directly until against the secondary stops.
Option C. operating the control cabin controls until the system is against the primary stops.
Correct Answer is. operating the control cabin controls until the system is against the primary stops.
Explanation. NIL.
Question Number. 90. An excess of aerodynamic balance would move the control surface centre of pressure.
Option A. rearwards, resulting in too much assistance.
Option B. rearwards, resulting in loss of assistance.
Option C. forwards, resulting in an unstable overbalance.
Correct Answer is. forwards, resulting in an unstable overbalance.
Explanation. NIL.
Question Number. 91. A flying control mass balance weight.
Option A. keeps the control surface C of G as close to the trailing edge as possible.
Option B. tends to move the control surface C of G close to the hinge line.
Option C. ensures that the C of G always acts to aid the pilot thus relieving control column load.
Correct Answer is. tends to move the control surface C of G close to the hinge line.
Explanation. NIL.
Question Number. 92. The type of flap which extends rearwards when lowered is called a.

Option A. plain flap.
Option B. split flap.
Option C. Fowler flap.
Correct Answer is. Fowler flap.
Explanation. NIL.
Question Number. 93. Which of the following trailing edge flaps give an increase in wing area?.
Option A. Split flap.
Option B. Fowler flap.
Option C. Slotted flap.
Correct Answer is. Fowler flap.
Explanation. NIL.
Question Number. 94. Which of the following is not a primary flying control?.
Option A. Elevator.
Option B. Tailplane.
Option C. Rudder.
Correct Answer is. Tailplane.
Explanation. NIL.
Question Number. 95. A leading edge slat is a device for.
Option A. increasing the stalling angle of the wing.
Option B. decreasing the stalling angle of the wing.
Option C. decreasing wing drag.
Correct Answer is. increasing the stalling angle of the wing.
Explanation. NIL.
Question Number. 96. A Krueger flap is.
Option A. a flap which extends rearwards but does not lower.
Option B. a leading edge flap which hinges forward.
Option C. a leading edge slat which extends forward.
Correct Answer is. a leading edge flap which hinges forward.
Explanation. NIL.
Question Number. 97. A tab which assists the pilot to move a flying control by moving automatically in the opposite direction to the control surface is called a.
Option A. servo tab.
Option B. geared balance tab.
Option C. trim tab.
Correct Answer is. geared balance tab.
Explanation. NIL.
Question Number. 98. What is attached to the rear of the vertical stabilizer?.
Option A. Elevator.
Option B. Aileron.
Option C. Rudder.
Correct Answer is. Rudder.
Explanation. NIL.

Question Number. 99. What is fitted on the aircraft to enable the pilot to reduce his speed rapidly in event of severe turbulence, or speed tending to rise above the Never Exceed Limit?.
Option A. Lift dumpers.
Option B. Air brakes.
Option C. Wheel brakes.
Correct Answer is. Air brakes.
Explanation. NIL.
Question Number. 100. When spoilers are used asymmetrically, they combine with.
Option A. ailerons.
Option B. rudder.
Option C. elevators.
Correct Answer is. ailerons.
Explanation. NIL.
Question Number. 101. "What is used to correct any tendency of the aircraft to move towards an undesirable flight attitude?."
Option A. Trim tabs.
Option B. Spring tabs.
Option C. Balance tabs.
Correct Answer is. Trim tabs.
Explanation. NIL.
Question Number. 102. The layer of air over the surface of an aerofoil which is slower moving, in relation to the rest of the airflow, is known as.
Option A. none of the above are correct.
Option B. camber layer.
Option C. boundary layer.
Correct Answer is. boundary layer.
Explanation. NIL.
Question Number. 103. A control surface which forms a slot when deployed is called a.
Option A. slat.
Option B. slot.
Option C. flap.
Correct Answer is. slat.
Explanation. NIL.
Question Number. 104. Asymmetric flaps will cause.
Option A. the aircraft to descend.
Option B. the aircraft to ascend.
Option C. one wing to rise.
Correct Answer is. one wing to rise.
Explanation. NIL.
Question Number. 105. When airflow velocity over an upper cambered surface of an aerofoil decreases, what takes place?.
Option A. Pressure decreases, lift increases.
Option B. Pressure increases, lift decreases.

Option C. Pressure increases, lift increases.
Correct Answer is. Pressure increases, lift decreases.
Explanation. NIL.
Question Number. 106. What is a controlling factor of turbulence and skin friction?.
Option A. Countersunk rivets used on skin exterior.
Option B. Aspect ratio.
Option C. Fineness ratio.
Correct Answer is. Countersunk rivets used on skin exterior.
Explanation. NIL.
Question Number. 107. Changes in aircraft weight.
Option A. cause corresponding changes in total drag due to the associated lift change.
Option B. will not affect total drag since it is dependant only upon speed.
Option C. will only affect total drag if the lift is kept constant.
Correct Answer is. cause corresponding changes in total drag due to the associated lift change.
Explanation. NIL.
Question Number. 108. When an aircraft stalls.
Option A. lift increases and drag decreases.
Option B. lift and drag increase.
Option C. lift decreases and drag increases.
Correct Answer is. lift decreases and drag increases.
Explanation. NIL.
Question Number. 109. Spoiler panels are positioned so that when deployed.
Option A. roll will not occur.
Option B. pitch trim is not affected.
Option C. no yaw takes place.
Correct Answer is. pitch trim is not affected.
Explanation. NIL.
Question Number. 110. The aircraft stalling speed will.
Option A. only change if the MTWA were changed.
Option B. be unaffected by aircraft weight changes since it is dependant upon the angle of attack.
Option C. increase with an increase in weight.
Correct Answer is. increase with an increase in weight.
Explanation. NIL.
Question Number. 111. In a bank and turn.
Option A. extra lift is not required if thrust is increased.
Option B. extra lift is not required.
Option C. extra lift is required.
Correct Answer is. extra lift is required.
Explanation. NIL.
Question Number. 112. The method employed to mass balance control surfaces is to.
Option A. fit bias strips to the trailing edge of the surfaces.
Option B. attach weights forward of the hinge line.

Option C. allow the leading edge of the surface to project into the airflow.
Correct Answer is. attach weights forward of the hinge line.
Explanation. NIL.
Question Number. 113. Control surface flutter may be caused by.
Option A. excessive play in trim tab attachments.
Option B. high static friction in trim tab control tabs.
Option C. incorrect angular movement of trim tabs.
Correct Answer is. excessive play in trim tab attachments.
Explanation. NIL.
Question Number. 114. A differential aileron control system results in.
Option A. aileron drag being reduced on the inner wing in a turn.
Option B. aileron drag being reduced on the outer wing in a turn.
Option C. aileron drag being compensated by small rudder movements.
Correct Answer is. aileron drag being reduced on the outer wing in a turn.
Explanation. NIL.
Question Number. 115. The primary function of a flap is.
Option A. to trim the aircraft longitudinally.
Option B. to alter the position of the centre of gravity.
Option C. to alter the lift of an aerofoil.
Correct Answer is. to alter the lift of an aerofoil.
Explanation. Jeppesen A & P Technician Airframe Textbook page 1-30.
Question Number. 116. The angle of attack at which stall occurs.
Option A. can be varied by using flaps and slats.
Option B. depends on the weight of the aircraft.
Option C. cannot be varied, it is always constant.
Correct Answer is. can be varied by using flaps and slats.
Explanation. NIL.
Question Number. 117. The stalling speed of an aircraft.
Option A. is increased when it is heavier.
Option B. does not change.
Option C. is increased when it is lighter.
Correct Answer is. is increased when it is heavier.
Explanation. NIL.
Question Number. 118. A wing flap which has dropped or partially extended on one wing in flight will lead to.
Option A. a fixed banked attitude which would be corrected by use of the rudder.
Option B. a pitching moment which would be corrected by used of the elevators.
Option C. a steady rolling tendency which would be corrected by use of the ailerons.
Correct Answer is. a steady rolling tendency which would be corrected by use of the ailerons.
Explanation. NIL.
Question Number. 119. With an increase in the amount of flap deployment, the stalling angle of a wing.
Option A. remains the same.
Option B. increases.
Option C. decreases.

Correct Answer is. decreases.
Explanation. NIL.
Question Number. 120. Aerodynamic balance of a control surface may be achieved.
Option A. by a horn at the extremity of the surface forward of the hinge line.
Option B. by weights added to the control surface aft of the hinge line.
Option C. by a trimming strip at the trailing edge of the surface.
Correct Answer is. by a horn at the extremity of the surface forward of the hinge line.
Explanation. Jeppesen A&P Technician Airframe Textbook Page 24 Para 7.
Question Number. 121. A control surface is provided with aerodynamic balancing to.
Option A. assist the pilot in moving the control.
Option B. increase stability.
Option C. decrease the drag when the control is deflected.
Correct Answer is. assist the pilot in moving the control.
Explanation. Jeppesen A&P Technician Airframe Textbook Page 24 Para 7.
Question Number. 122. Downward displacement of an aileron.
Option A. increases the angle at which its wing stalls.
Option B. decreases the angle at which its wing will stall.
Option C. has no effect on its wing stalling angle, it only affects the stalling speed on that wing.
Correct Answer is. decreases the angle at which its wing will stall.
Explanation. NIL.
Question Number. 123. Due to the tailplane angle of attack change, the flap-induced downwash on the tailplane.
Option A. will tend to cause an aircraft nose-up pitch.
Option B. "may cause a nose-down or nose-up pitch depending upon the initial tailplane load
."
Option C. will tend to cause an aircraft nose down pitch.
Correct Answer is. will tend to cause an aircraft nose-up pitch.
Explanation. NIL.
Question Number. 124. Due to the change in lift coefficient accompanying extension of the flaps, to maintain the lift constant it would be necessary to.
Option A. raise the nose.
Option B. lower the nose.
Option C. keep the pitch attitude constant.
Correct Answer is. lower the nose.
Explanation. NIL.
Question Number. 125. The extension to the rudder (shaded portion shown on the diagram), is provided to.
Option A. make the pilot aware of the aerodynamic forces encountered when moving the control.
Option B. provide aerodynamic assistance for the pilot when moving the rudder.
Option C. prevent control surface flutter.

Correct Answer is. provide aerodynamic assistance for the pilot when moving the rudder.
Explanation. Jeppesen A&P Technician Airframe Textbook Page 25 Para 7.
Question Number. 126. A differential aileron control is one which gives.
Option A. the down-going aileron more travel than the up-going one.
Option B. equal aileron travel in each direction, but variable for stick movement.
Option C. a larger aileron up travel than down.
Correct Answer is. a larger aileron up travel than down.
Explanation. NIL.
Question Number. 127. Which leading edge device improves the laminar flow over the wing?.
Option A. Flap and slat.
Option B. Slat.
Option C. Flap.
Correct Answer is. Slat.
Explanation. NIL.
Question Number. 128. The balance tab is an auxiliary surface fitted to a main control surface.
Option A. operating automatically to assist the pilot in moving the controls.
Option B. operated independently at which point in the length of cable the tensiometer is applied.
Option C. operating automatically to provide feel to the controls.
Correct Answer is. operating automatically to assist the pilot in moving the controls.
Explanation. NIL.
Question Number. 129. Aerodynamic balancing of flight controls is achieved by.
Option A. placing a weight ahead of the hinge point.
Option B. placing a weight in the leading edge of the control surface.
Option C. providing a portion of the control surface ahead of the hinge point.
Correct Answer is. providing a portion of the control surface ahead of the hinge point.
Explanation. AL/3-24 para 4.2.
Question Number. 130. Aerodynamic balance is used to.
Option A. reduce the control load to zero.
Option B. make the flying controls easier to move.
Option C. prevent flutter of the flying controls.
Correct Answer is. make the flying controls easier to move.
Explanation. NIL.
Question Number. 131. A horn balance is.
Option A. a rod projecting forward from the control surface with a weight on the end.
Option B. a rod projecting upward from the main control surface to which the control cables are attached.
Option C. a projection of the outer edge of the control surface forward of the hinge line.
Correct Answer is. a projection of the outer edge of the control surface forward of the hinge line.
Explanation. Jeppesen A&P Technician Airframe Textbook Page 16.
Question Number. 132. A control surface is mass balanced by.

Option A. the attachment of weights acting on the hinge line.
Option B. fitting a balance tab.
Option C. the attachment of weights acting forward of the hinge line.
Correct Answer is. the attachment of weights acting forward of the hinge line.
Explanation. NIL.
Question Number. 133. The purpose of anti-balance tabs is to.
Option A. relieve stick loads.
Option B. trim the aircraft.
Option C. give more feel to the control column.
Correct Answer is. give more feel to the control column.
Explanation. NIL.
Question Number. 134. You have adjusted the elevator trim tab to correct for nose heavy. What was the direction of travel of the trim tab?.
Option A. The elevator trim tab has moved down.
Option B. The elevator trim tab has moved up.
Option C. The port elevator tab has moved up and starboard moved down.
Correct Answer is. The elevator trim tab has moved down.
Explanation. NIL.
Question Number. 135. The tropopause exists at about.
Option A. 18,000 ft.
Option B. 30,000 ft.
Option C. 36,000 ft.
Correct Answer is. 36,000 ft.
Explanation. NIL.
Question Number. 136. Induced drag curve characteristics of a slender delta wing are such that there is.
Option A. an increase in gradient with wing speed.
Option B. no change in gradient with wing speed.
Option C. decrease in gradient with wing speed.
Correct Answer is. decrease in gradient with wing speed.
Explanation. NIL.
Question Number. 137. If an aircraft is yawing left, the trim tab on the rudder would be positioned.
Option A. to the right, moving the rudder left.
Option B. to the centre.
Option C. to the left, moving the rudder right.
Correct Answer is. to the left, moving the rudder right.
Explanation. NIL.
Question Number. 138. Instability giving roll and yaw.
Option A. is dutch roll.
Option B. is longitudinal stability.
Option C. is lateral stability.
Correct Answer is. is dutch roll.
Explanation. NIL.
Question Number. 139. Vortex generators are fitted to.
Option A. move transition point rearwards.

Option B. move transition point forwards.
Option C. advance the onset of flow separation.
Correct Answer is. move transition point forwards.
Explanation. NIL.
Question Number. 140. Leading edge flaps.
Option A. increase stalling angle of the wing.
Option B. decrease stalling angle of the wing.
Option C. do not change the stalling angle.
Correct Answer is. increase stalling angle of the wing.
Explanation. NIL.
Question Number. 141. Krueger flaps are on.
Option A. the leading edge.
Option B. either the leading or training edge.
Option C. the trailing edge.
Correct Answer is. the leading edge.
Explanation. NIL.
Question Number. 142. Sweepback will.
Option A. decrease lateral stability.
Option B. not affect lateral stability.
Option C. increase lateral stability.
Correct Answer is. increase lateral stability.
Explanation. NIL.
Question Number. 143. A plain flap.
Option A. does not increase the wing area on deployment.
Option B. is attached to the leading edge of the wing.
Option C. forms part of lower trailing edge.
Correct Answer is. does not increase the wing area on deployment.
Explanation. NIL.
Question Number. 144. A split flap, when deployed.
Option A. is used only on high speed aircraft.
Option B. increases lift without a corresponding increase in drag.
Option C. increases drag with little lift coefficient increase, from intermediate to fully down.
Correct Answer is. increases drag with little lift coefficient increase, from intermediate to fully down.
Explanation. NIL.
Question Number. 145. A flying control mass balance weight.
Option A. keeps the control surface C of G as close to the trailing edge as possible.
Option B. tends to move the control surface C of G close to the hinge line.
Option C. tends to move the control surface C of G forward of the hinge line.
Correct Answer is. tends to move the control surface C of G close to the hinge line.
Explanation. NIL.
Question Number. 146. An elevator controls the aircraft motion in.
Option A. yaw.
Option B. roll.
Option C. pitch.

Correct Answer is. pitch.
Explanation. NIL.
Question Number. 147. Air above Mach 0.7 is.
Option A. compressible only when above the speed of sound.
Option B. incompressible.
Option C. compressible.
Correct Answer is. compressible.
Explanation. Aircraft Flight Barnard and Philpot, Second Edition Page123. Mechanics of Flight AC Kermode 10th Edition Page 385.
Question Number. 148. Supersonic air passing through a divergent duct causes the.
Option A. pressure to increase, velocity to increase.
Option B. pressure to increase, velocity to decrease.
Option C. pressure to decrease, velocity to increase.
Correct Answer is. pressure to decrease, velocity to increase.
Explanation. Mechanics of Flight AC Kermode 10th Edition Page 340.
Question Number. 149. An aircraft flying below the tropopause descends at a constant True Airspeed. Its Mach. No. will.
Option A. not change.
Option B. decrease.
Option C. increase.
Correct Answer is. decrease.
Explanation. Speed of sound INCREASES with DECREASING altitude, so mach number will decrease.
Question Number. 150. A nose down change of trim (tuck-under) occurs due to shock induced.
Option A. tip stall on a delta wing aircraft.
Option B. root stall on a delta wing aircraft.
Option C. tip stall on a straight wing aircraft.
Correct Answer is. root stall on a delta wing aircraft.
Explanation. Pallett Automatic Flight Control 2nd Edition Page 45.
Question Number. 151. A symmetrical aerofoil is accelerating through Mach 1 with an angle of attack of 0°. A shock wave will form.
Option A. on the upper and lower surface and will move aft until the point of maximum camber.
Option B. on the upper and lower surface and will move aft.
Option C. on the upper surface only and move aft.
Correct Answer is. on the upper and lower surface and will move aft.
Explanation. Shockwaves form on upper and lower surfaces BEGINNING at point of max curvature, gradually moving back.
Question Number. 152. Shock stall.
Option A. occurs at high speeds.
Option B. is a flap down stall and occurs at high speeds.
Option C. occurs at low speeds.
Correct Answer is. occurs at high speeds.

Explanation. Shock stall (or shock induced stall) is caused by the formation of shock waves in the transonic speed range.
Question Number. 153. As you approach supersonic speed.
Option A. thrust is reduced.
Option B. total drag is increased.
Option C. lift is reduced.
Correct Answer is. total drag is increased.
Explanation. An additional drag - wave drag - is added to the total drag.
Question Number. 154. Mach trim in some aircraft assists.
Option A. lateral stability.
Option B. vertical stability.
Option C. longitudinal stability.
Correct Answer is. longitudinal stability.
Explanation. Mach trim is used to correct the longitudinal trim upset during the transonic speed range.
Question Number. 155. Before an aircraft reaches critical mach.
Option A. the nose pitches up because the CP moves Forward.
Option B. the aircraft buffets because the CP moves to the shock wave.
Option C. the nose pitches down because the CP moves rear.
Correct Answer is. the nose pitches down because the CP moves rear.
Explanation. Mechanics of Flight 10th edition Barnard and Philpott Pg 341.
Question Number. 156. On a standard day, at which altitude will the speed of sound be the greatest?.
Option A. 20,000 ft.
Option B. 10,000 ft.
Option C. Sea level.
Correct Answer is. Sea level.
Explanation. NIL.
Question Number. 157. Which of the following will increase the Critical Mach Number of an aerofoil?.
Option A. Using a thin airfoil and sweeping the wings back.
Option B. Decreasing the fineness ratio of the wings.
Option C. Increasing the aspect ratio of the wings.
Correct Answer is. Using a thin airfoil and sweeping the wings back.
Explanation. NIL.
Question Number. 158. As an aircraft accelerates through the transonic region, the centre of pressure tends to.
Option A. turn into a shock wave.
Option B. move rearward.
Option C. move forward.
Correct Answer is. move rearward.
Explanation. NIL.
Question Number. 159. Supersonic air going through an incipient shock wave will decrease its speed and.
Option A. decrease temperature and increase density.
Option B. increase temperature and decrease density.

Option C. increase temperature and increase density.
Correct Answer is. increase temperature and increase density.
Explanation. Mechanics of Flight AC Kermode 10th Edition Page 326 fig 11.4.
Question Number. 160. An increase in mach number will cause the.
Option A. CofP to move rearwards giving more downwash on the tail plane.
Option B. CofP to move forwards giving less downwash on the tail plane.
Option C. CofP to move rearwards giving less downwash on the tail plane.
Correct Answer is. CofP to move rearwards giving less downwash on the tail plane.
Explanation. Automatic Flight Control, Pallett. Page 50.
Question Number. 161. At speeds above Mach 1, shockwaves will form above and below the wing.
Option A. at the trailing edge.
Option B. at both the leading edge and the trailing edge.
Option C. at the leading edge.
Correct Answer is. at both the leading edge and the trailing edge.
Explanation. NIL.
Question Number. 162. Above the critical mach number, the drag coefficient.
Option A. increases.
Option B. remains the same.
Option C. decreases.
Correct Answer is. increases.
Explanation. NIL.
Question Number. 163. Mach trim counters.
Option A. longitudinal instability.
Option B. vertical instability.
Option C. lateral instability.
Correct Answer is. longitudinal instability.
Explanation. Automatic Flight Control Pallett page 231 and 50.
Question Number. 164. At high Mach Numbers above Mach 2.2, some aircraft metals.
Option A. such as aluminium, become brittle.
Option B. lose their strength due to the kinetic heating effect.
Option C. will shrink due to the extreme pressures involved.
Correct Answer is. lose their strength due to the kinetic heating effect.
Explanation. NIL.
Question Number. 165. Mach trim operates.
Option A. along the longitudinal axis.
Option B. along the lateral axis.
Option C. to reduce Dutch roll.
Correct Answer is. along the longitudinal axis.
Explanation. NIL.
Question Number. 166. To increase critical mach number.
Option A. the wings are swept.
Option B. elevons are fitted.
Option C. tailerons are fitted.

Correct Answer is. the wings are swept.
Explanation. NIL.
Question Number. 167. When approaching the speed of sound the.
Option A. pressure above the wing exceeds the pressure below the wing in places.
Option B. pressure above the wing can never exceed the pressure below the wing.
Option C. pressure above the wing equals the pressure below the wing.
Correct Answer is. pressure above the wing exceeds the pressure below the wing in places.
Explanation. NIL.
Question Number. 168. Airspeeds above the speed of sound, but not exceeding 4 times the speed of sound are.
Option A. supersonic.
Option B. hypersonic.
Option C. hyposonic.
Correct Answer is. supersonic.
Explanation. NIL.
Question Number. 169. An aircraft experiences a large loss of lift and a big increase in drag in straight and level flight, what would be the most probable cause?.
Option A. Atmospheric conditions.
Option B. Aircraft reached its critical mach number.
Option C. Severe head winds.
Correct Answer is. Aircraft reached its critical mach number.
Explanation. NIL.
Question Number. 170. A Mach Trimmer is a device which.
Option A. prevents the aircraft from exceeding its critical Mach No.
Option B. automatically compensates for trim changes in the transonic region.
Option C. switches out trim control to prevent damage in the transonic speed range.
Correct Answer is. automatically compensates for trim changes in the transonic region.
Explanation. NIL.
Question Number. 171. Mach trim usually operates between.
Option A. 0.9 mach and 0.99 mach.
Option B. 0.7 and 0.8 mach.
Option C. 0.6 mach 0.7 mach.
Correct Answer is. 0.7 and 0.8 mach.
Explanation. NIL.
Question Number. 172. Mach trimming is initiated by an input signal from the.
Option A. IRS.
Option B. vertical gyro.
Option C. CADC.
Correct Answer is. vertical gyro.
Explanation. NIL.
Question Number. 173. Mach trim prevents.
Option A. the nose dropping in a low speed turn.
Option B. the nose dropping at high speed.

Option C. the nose lifting at high speed.
Correct Answer is. the nose dropping at high speed.
Explanation. NIL.
Question Number. 174. Critical Mach No. may be increased by.
Option A. using a higher thickness/chord ratio wing.
Option B. sweeping back the wing.
Option C. using more powerful engines.
Correct Answer is. sweeping back the wing.
Explanation. NIL.
Question Number. 175. Airflow either side of a normal shock wave is.
Option A. sonic upstream and downstream.
Option B. sonic upstream, subsonic downstream.
Option C. subsonic upstream, sonic downstream.
Correct Answer is. sonic upstream, subsonic downstream.
Explanation. NIL.
Question Number. 176. Mach Number is defined as.
Option A. speed of sound at sea level divided by local speed of sound.
Option B. IAS divided by the local speed of sound.
Option C. TAS divided by local speed of sound.
Correct Answer is. TAS divided by local speed of sound.
Explanation. Jeppesen A&P Technician Airframe Textbook Page 66.
Question Number. 177. The reason for sharp leading edged wings on high speed aircraft is to.
Option A. enable the shockwave to be accurately positioned.
Option B. decrease wave drag.
Option C. decrease boundary layer.
Correct Answer is. enable the shockwave to be accurately positioned.
Explanation. NIL.
Question Number. 178. Critical Mach Number is defined as.
Option A. that number at which the airflow becomes supersonic.
Option B. that free-stream Mach Number at which some part of the airflow over the aircraft becomes sonic.
Option C. the minimum mach number at which the aircraft can go supersonic.
Correct Answer is. that free-stream Mach Number at which some part of the airflow over the aircraft becomes sonic.
Explanation. NIL.
Question Number. 179. The transonic region is a region of.
Option A. all subsonic.
Option B. all supersonic.
Option C. mixed airflow.
Correct Answer is. mixed airflow.
Explanation. NIL.
Question Number. 180. Immediately downstream of an oblique shockwave is always.
Option A. supersonic.
Option B. the same as upstream.

Option C. subsonic.
Correct Answer is. supersonic.
Explanation. NIL.
Question Number. 181. Wave drag.
Option A. increases in the supersonic region.
Option B. increases at the low speed stall.
Option C. increases in the transonic region.
Correct Answer is. increases in the transonic region.
Explanation. NIL.
Question Number. 182. For increased Mcrit.
Option A. decrease thickness/chord ratio.
Option B. decrease sweepback.
Option C. decrease true airspeed.
Correct Answer is. decrease thickness/chord ratio.
Explanation. NIL.
Question Number. 183. Symptoms of shock stall are.
Option A. decrease in speed, buffet and movement of the centre of pressure.
Option B. buffet, loss of control, and instability.
Option C. compressibility effects, buffet and loss of control.
Correct Answer is. buffet, loss of control, and instability.
Explanation. NIL.
Question Number. 184. Sweepback increases Mcrit by.
Option A. decreasing the amount of airflow over the lowest point on the aerofoil section.
Option B. decreasing the amount of airflow over the highest point on the aerofoil section.
Option C. increasing the amount of airflow over the highest point on the aerofoil section.
Correct Answer is. decreasing the amount of airflow over the highest point on the aerofoil section.
Explanation. NIL.
Question Number. 185. Mach number is.
Option A. the ratio of the aircrafts TAS to the speed of sound at the same atmospheric conditions.
Option B. the ratio of the aircrafts IAS to the speed of sound at the same atmospheric conditions.
Option C. the ratio of the aircrafts TAS to the speed of sound at sea level.
Correct Answer is. the ratio of the aircrafts TAS to the speed of sound at the same atmospheric conditions.
Explanation. Flight Instruments and Automatic Flight Control, David Harris Page 19.
Question Number. 186. The critical Mach number is.
Option A. the Mach No. when a shock wave forms at the leading edge.
Option B. the Mach No. when the aircraft reaches the speed of sound.
Option C. the aircraft Mach. No. when the airflow reaches the speed of sound at some point on the aircraft.

Correct Answer is. the aircraft Mach. No. when the airflow reaches the speed of sound at some point on the aircraft.
Explanation. NIL.
Question Number. 187. Above the Critical Mach No. the drag coefficient will.
Option A. remain the same.
Option B. start to increase.
Option C. start to decrease.
Correct Answer is. start to increase.
Explanation. NIL.
Question Number. 188. A wing of low thickness/chord ratio, the Critical Mach No. will be.
Option A. lower than a wing of high thickness/chord ratio.
Option B. higher than a wing of high thickness/chord ratio.
Option C. the same as a wing of high thickness/chord ratio.
Correct Answer is. higher than a wing of high thickness/chord ratio.
Explanation. NIL.
Question Number. 189. An aeroplane flying above the Critical Mach No. will usually experience.
Option A. a nose up pitch.
Option B. an oscillation in pitch.
Option C. a nose down pitch
Correct Answer is. a nose down pitch.
Explanation. NIL.
Question Number. 190. Tuck-under can be counteracted by.
Option A. mach trim.
Option B. aileron reversal.
Option C. trim tabs.
Correct Answer is. mach trim.
Explanation. NIL.
Question Number. 191. What causes tuckunder?.
Option A. Flap back effect.
Option B. Shock stall.
Option C. Aileron reversal.
Correct Answer is. Shock stall.
Explanation. NIL.
Question Number. 192. When does a shock stall occur?.
Option A. When the aircraft forward speed is above Mach One.
Option B. At the critical Mach number of the aeroplane.
Option C. When the aircraft reaches speed of sound in a dive.
Correct Answer is. At the critical Mach number of the aeroplane.
Explanation. NIL.
Question Number. 193. With an increase in altitude under I.S.A. conditions, the temperature in the troposphere.
Option A. increases.
Option B. remains constant.

Option C. decreases.
Correct Answer is. decreases.
Explanation. NIL.
Question Number. 194. Air either side of an oblique shockwave is generally.
Option A. sonic.
Option B. supersonic.
Option C. subsonic.
Correct Answer is. supersonic.
Explanation. NIL.
Question Number. 195. Downstream of a normal shock wave.
Option A. pressure decreases temperature increases.
Option B. pressure and temperature increase.
Option C. pressure and temperature decrease.
Correct Answer is. pressure and temperature increase.
Explanation. NIL.
Question Number. 196. Speed of sound varies with.
Option A. altitude.
Option B. temperature.
Option C. pressure.
Correct Answer is. temperature.
Explanation. NIL.
Question Number. 197. Immediately downstream of a normal shockwave, air is always.
Option A. subsonic.
Option B. supersonic.
Option C. the same as upstream.
Correct Answer is. subsonic.
Explanation. NIL.
Question Number. 198. Increased sweepback.
Option A. improves tip stall characteristics.
Option B. raises Mcrit.
Option C. decreases stability.
Correct Answer is. raises Mcrit.
Explanation. NIL.
Question Number. 199. Aerodynamic heating.
Option A. increases as a function of airspeed.
Option B. increases with skin friction.
Option C. decreases with altitude.
Correct Answer is. increases as a function of airspeed.
Explanation. NIL.
Question Number. 200. To overcome ineffective control surface problems in the transonic region.
Option A. an all moving tailplane may be used.
Option B. hydraulic powered elevators may be used.
Option C. Frise ailerons may be used.
Correct Answer is. an all moving tailplane may be used.

Explanation. NIL.
Question Number. 201. An aircraft flying below the tropopause descends at a constant True Airspeed, its Mach. No. will.
Option A. remain the same.
Option B. increase.
Option C. decrease.
Correct Answer is. decrease.
Explanation. NIL.
Question Number. 202. To counter the effect of a shift of centre of pressure as an aircraft flies through the transonic region, fuel is pumped.
Option A. forwards.
Option B. backwards.
Option C. sideways.
Correct Answer is. backwards.
Explanation. NIL.
Question Number. 203. An aircraft flying above the tropopause descends at a constant True Airspeed, its Mach. No. will.
Option A. remain the same.
Option B. decrease.
Option C. increase.
Correct Answer is. remain the same.
Explanation. NIL.
Question Number. 204. The velocity of sound with an increase in altitude will.
Option A. remain constant.
Option B. increase.
Option C. decrease.
Correct Answer is. decrease.
Explanation. Flight Instruments and Automatic Flight Control Systems, David Harris Page 19.
Question Number. 205. Mach number equals the ratio of.
Option A. altitude to airspeed.
Option B. sonic speed to indicated airspeed.
Option C. true airspeed to local sonic speed.
Correct Answer is. true airspeed to local sonic speed.
Explanation. Flight Instruments and Automatic Flight Control Systems, David Harris Page 19.
Question Number. 206. Tuck-under is caused by.
Option A. tip stall on a straight wing aircraft.
Option B. tip stall on a swept wing aircraft.
Option C. root stall on a swept wing aircraft.
Correct Answer is. root stall on a swept wing aircraft.
Explanation. NIL.
Question Number. 207. The purpose of sweepback on an aerofoil is to.
Option A. decrease drag.
Option B. decrease Mcrit.

Option C. increase Mcrit.
Correct Answer is. increase Mcrit.
Explanation. NIL.
Question Number. 208. As the airspeed over a cambered wing is increased, a shock wave will appear initially.
Option A. at the leading edge.
Option B. at the trailing edge.
Option C. near the point of maximum curvature.
Correct Answer is. near the point of maximum curvature.
Explanation. NIL.
Question Number. 209. In the transonic speed range.
Option A. the position of the wing centre of pressure remains constant.
Option B. the centre of pressure movement may become oscillatory.
Option C. the centre of pressure initially moves forward, then back.
Correct Answer is. the centre of pressure movement may become oscillatory. OR the centre of pressure initially moves forward, then back.
Explanation. NIL.
Question Number. 210. The angle of attack of a blade is the.
Option A. angle between the spin axis and relative air flow.
Option B. angle between the chord line and plane of rotation.
Option C. angle between the chord line and relative airflow.
Correct Answer is. angle between the chord line and relative airflow.
Explanation. NIL.
Question Number. 211. On a helicopter, what is blade dragging?.
Option A. Movement of each blade vertically about their lateral hinges.
Option B. Contact of the blade tips on the ground.
Option C. Movement of each blade horizontally about their vertical hinge.
Correct Answer is. Movement of each blade horizontally about their vertical hinge.
Explanation. A&P General Textbook Pg 2-58.
Question Number. 212. Lift generated by a blade is proportional to the.
Option A. relative airflow and the pitch.
Option B. aircraft airspeed and angle of attack.
Option C. relative airflow and the angle of attack.
Correct Answer is. aircraft airspeed and angle of attack.
Explanation. NIL.
Question Number. 213. What effect does the ground have on a helicopter?.
Option A. No effect.
Option B. Increases lift.
Option C. Increases thrust.
Correct Answer is. Increases lift.
Explanation. A&P Airframe Technician Textbook Pg 1-58.
Question Number. 214. What damps vibrations on a helicopter?.
Option A. Swashplate.
Option B. Scissor levers.
Option C. Bifilar damper.
Correct Answer is. Bifilar damper.

Explanation. NIL.
Question Number. 215. What design factors govern RPM of a helicopter rotor?.
Option A. Weight of blade.
Option B. Fineness ratio.
Option C. Engine and gearbox.
Correct Answer is. Weight of blade.
Explanation. A&P Airframe Technician Textbook Pg 1-54. http : //www.tpub.com/content/hseries/TM-1-1520-265-23/css/TM-1-1520-265-23_104.htm
Question Number. 216. Relative velocity of a helicopter rotor.
Option A. increases at forward travelling blade.
Option B. is equal for all blades.
Option C. increases at retreating blade.
Correct Answer is. increases at forward travelling blade.
Explanation. A&P Airframe Technician Textbook Pg 1-59.
Question Number. 217. When OAT increases, what happens to an helicopter operating ceiling?.
Option A. Decrease.
Option B. Increase.
Option C. No effect.
Correct Answer is. Decrease.
Explanation. As temperature increases, density decreases and aircraft performance decreases.
Question Number. 218. With the helicopter in forward flight, parasitic drag will cause the helicopter to.
Option A. pitch nose down with an increase in forward airspeed.
Option B. pitch nose down with a decrease in forward airspeed.
Option C. pitch nose up with an increase in forward in airspeed.
Correct Answer is. pitch nose down with an increase in forward airspeed.
Explanation. NIL.
Question Number. 219. When a blade moves about the flapping hinge.
Option A. the pitch angle of the blade always reduces.
Option B. the drag forces on the blade change.
Option C. the drag forces on the blade change and the angle of attack (AOA) changes.
Correct Answer is. the drag forces on the blade change and the angle of attack (AOA) changes.
Explanation. NIL.
Question Number. 220. To maintain the position of the helicopter with a decrease in air density, the pilot must increase.
Option A. main rotor RPM.
Option B. cyclic pitch.
Option C. collective pitch.
Correct Answer is. collective pitch.
Explanation. NIL.
Question Number. 221. The forces which govern the coning angle are.
Option A. lift and centrifugal force.

Option B. thrust and centrifugal force.
Option C. lift and thrust.
Correct Answer is. lift and centrifugal force.
Explanation. NIL.
Question Number. 222. As a helicopter accelerates in level forward flight above approximately 15 knots, it will be necessary to : .
Option A. reduce power because of the additional lift due to translational flight.
Option B. increase power because rotor RPM is increasing.
Option C. reduce power because rotor profile drag is reduced.
Correct Answer is. reduce power because of the additional lift due to translational flight.
Explanation. NIL.
Question Number. 223. Assuming the phase lag of a rotor blade is 90o and the control advance angle is 15 degrees, then the pitch operating arm must be at the highest point of the swash plate : .
Option A. 90o ahead of the highest flapping position.
Option B. 75o ahead of the highest flapping position.
Option C. 105o ahead of the highest flapping position.
Correct Answer is. 75o ahead of the highest flapping position.
Explanation. NIL.
Question Number. 224. A helicopter is hovering and the pilot applies right pedal.Assuming the main rotor rotates anti clockwise viewed from above, the helicopter will.
Option A. descend, unless the pilot inches the throttle open.
Option B. ascend, unless the pilot decreases rotor RPM.
Option C. descend, unless the pilot applies more collective pitch.
Correct Answer is. descend, unless the pilot inches the throttle open.
Explanation. NIL.
Question Number. 225. A helicopter has a main rotor which rotates anti-clockwise viewed from above, and is fitted with an anti-torque tail rotor. It will tend to drift sideways to.
Option A. port, if the tail rotor is mounted on the left side of the aircraft.
Option B. starboard, whichever way the tail rotor is fitted.
Option C. port, if the tail rotor is mounted on the right side of the aircraft.
Correct Answer is. starboard, whichever way the tail rotor is fitted.
Explanation. NIL.
Question Number. 226. As the rotor head is tilted to travel forward, what happens to the rearward travelling blade's pitch angle?.
Option A. Increases.
Option B. Decreases.
Option C. No change.
Correct Answer is. Increases.
Explanation. A&P Technician Airframe Textbook Pg.1-59.
Question Number. 227. The tail rotor.
Option A. produces a force opposing torque reaction.
Option B. produces a force in the same direction as torque reaction.

Option C. is not subject to dissymmetry of lift.
Correct Answer is. produces a force opposing torque reaction.
Explanation. NIL.
Question Number. 228. With the tail rotor pedals in neutral, the tail rotor blade pitch will be.
Option A. positive.
Option B. negative.
Option C. neutral.
Correct Answer is. positive.
Explanation. NIL.
Question Number. 229. The main rotor drive shaft is tilted laterally on some helicopters to correct tail rotor.
Option A. drift.
Option B. torque.
Option C. roll.
Correct Answer is. drift.
Explanation. NIL.
Question Number. 230. Certain helicopters tend to tilt laterally when landing. This problem can be overcome by placing the tail rotor thrust.
Option A. below the line of the main rotor hub.
Option B. above the line of the main rotor hub.
Option C. in line with the main rotor hub.
Correct Answer is. in line with the main rotor hub.
Explanation. NIL.
Question Number. 231. Ground cushion effect is produced by.
Option A. recirculating air giving additional lift.
Option B. increased pressure under the main rotor disc.
Option C. increase in density above the fuselage.
Correct Answer is. increased pressure under the main rotor disc.
Explanation. NIL.
Question Number. 232. A helicopter hovering near a tall building will.
Option A. drift away from it.
Option B. be unaffected by it.
Option C. drift towards it.
Correct Answer is. drift towards it.
Explanation. NIL.
Question Number. 233. Drooping of helicopter blades is compensated by.
Option A. flapping.
Option B. dragging.
Option C. centrifugal force.
Correct Answer is. centrifugal force.
Explanation. Centrifugal force counteracts the droop of helicopter blades at low RPM.
Question Number. 234. During decent with power-on, on a helicopter.
Option A. lift, weight and thrust are acting on the helicopter.
Option B. lift, drag and thrust are acting on the helicopter.
Option C. lift, drag, thrust and weight are acting on the helicopter.

Correct Answer is. lift, drag, thrust and weight are acting on the helicopter.
Explanation. All four forces act on the helicopter.
Question Number. 235. A helicopter hovering 2m above the ground subject to a strong cross wind will.
Option A. lose lift due to the removal of the ground cushion effect.
Option B. increase lift due to ground cushion effect.
Option C. lose lift due to recirculation.
Correct Answer is. lose lift due to recirculation.
Explanation. NIL.
Question Number. 236. With a drop in ambient temperature, an aircraft service ceiling will.
Option A. lower.
Option B. rise.
Option C. not be affected.
Correct Answer is. rise.
Explanation. As ambient temperature drops, density increases and aircraft performance increases.
Question Number. 237. During an autorotative descent, rotor RPM will be.
Option A. higher than in powered flight.
Option B. lower than in powered flight.
Option C. substantially the same as in powered flight.
Correct Answer is. higher than in powered flight.
Explanation. NIL.
Question Number. 238. Helicopter blades are.
Option A. symmetrical.
Option B. highly cambered.
Option C. reverse cambered.
Correct Answer is. symmetrical.
Explanation. Helicopter blades are usually symmetrical section.
Question Number. 239. Autorotative force is the.
Option A. component of the total reaction which acts forward in the plane of rotation in opposition to drag.
Option B. force required to turn in a hover.
Option C. force the pilot must apply to the collective lever to obtain a controlled descent.
Correct Answer is. component of the total reaction which acts forward in the plane of rotation in opposition to drag.
Explanation. NIL.
Question Number. 240. Autorotation.
Option A. leaves the aircraft with no directional control.
Option B. results in a loss of power.
Option C. is the production of lift from freely rotating rotor blades.
Correct Answer is. is the production of lift from freely rotating rotor blades.
Explanation. NIL.

Question Number. 241. If the main rotor of a helicopter rotates in an anti-clockwise direction when viewed from above, and a hovering left turn is required, the following movements of the controls are selected : .
Option A. Rudder pedal to the left, and decrease throttle.
Option B. Rudder pedal to the left, and increase throttle.
Option C. Rudder pedal to the right, and increase throttle.
Correct Answer is. Rudder pedal to the left, and decrease throttle.
Explanation. NIL.
Question Number. 242. Helicopter derives its lift from.
Option A. air is pushed downward.
Option B. rotor acts as a airscrew.
Option C. the blade of the helicopter creates a low pressure above it.
Correct Answer is. the blade of the helicopter creates a low pressure above it.
Explanation. All three are correct, but an aerodynamicist would choose a 'creates a low pressure above it'.
Question Number. 243. A two bladed helicopter rotor on a central gimbal is called.
Option A. semi rigid rotor.
Option B. fully articulated rotor.
Option C. rigid rotor.
Correct Answer is. semi rigid rotor.
Explanation. A&P Technician Airframe Textbook Pg.1-53.
Question Number. 244. If a helicopter rotor disc is rotating anticlockwise, viewed from above where, would a pitch input be fed into the disc to move the helicopter backwards, (90 degrees to what)?.
Option A. In front of the lateral axis.
Option B. Left of the longitudinal axis.
Option C. Right of the longitudinal axis.
Correct Answer is. Right of the longitudinal axis.
Explanation. Due to precession of the rotor disc, the input to tilt the disc backwards must be placed 90 degrees before, in direction of motion of the disc.
Question Number. 245. On a helicopter, what is vortex ring state?.
Option A. Tip vortex build-up during hover.
Option B. Tip vortex interference at high forward speed.
Option C. Ground vortex interference when hovering close to the ground.
Correct Answer is. Tip vortex build-up during hover.
Explanation. During hover, the tip vortex of one blade adds to the tip vortices of the preceding blades, producing a large vortex ring and a very inefficient helicopter.
Question Number. 246. Climbs with forward speed require less power than vertical climbs, because of.
Option A. translational lift.
Option B. increased inertia.
Option C. forward momentum.
Correct Answer is. translational lift.
Explanation. NIL.
Question Number. 247. Translational flight is.

Option A. achieved by raising or lowering the collective lever.
Option B. when the helicopter changes from one steady flight condition to another.
Option C. achieved by tilting the rotor disc in the direction of flight.
Correct Answer is. achieved by tilting the rotor disc in the direction of flight.
Explanation. NIL.
Question Number. 248. The best design of a rotor blade is where the CofP.
Option A. moves freely along the length of the blade.
Option B. does not move.
Option C. is insignificant.
Correct Answer is. does not move.
Explanation. NIL.
Question Number. 249. When the cyclic stick is eased forward in the hover position.
Option A. altitude is increased.
Option B. forward thrust is decreased.
Option C. vertical lift is reduced.
Correct Answer is. vertical lift is reduced.
Explanation. NIL.
Question Number. 250. The rotor cone is formed by.
Option A. blade alignment.
Option B. centrifugal force and lift.
Option C. centrifugal force only.
Correct Answer is. centrifugal force and lift.
Explanation. NIL.
Question Number. 251. Tracking is carried out to_____the main rotor blade tip path.
Option A. restore.
Option B. align.
Option C. balance.
Correct Answer is. align.
Explanation. NIL.
Question Number. 252. The advancing blade of a helicopter is the one moving.
Option A. one moving forward into relative airflow.
Option B. highest blade.
Option C. one moving in direction of relative air flow.
Correct Answer is. one moving forward into relative airflow.
Explanation. NIL.
Question Number. 253. Lift is generated by.
Option A. down-wash below the blade.
Option B. high pressure above the blade.
Option C. low pressure above the blade.
Correct Answer is. low pressure above the blade.
Explanation. NIL.
Question Number. 254. Static stability of a helicopter is.
Option A. the stability of the helicopter when hovering.

Option B. the tendency move back toward neutral after disturbance.
Option C. the tendency to oscillate until the neutral is achieved.
Correct Answer is. the tendency move back toward neutral after disturbance.
Explanation. NIL.
Question Number. 255. Forward velocity causes the advancing blade to.
Option A. flap down to increase lift.
Option B. give increased lift due to blade flapping.
Option C. flap up to reduce lift.
Correct Answer is. flap up to reduce lift.
Explanation. NIL.
Question Number. 256. When moving from the hover to forward flight it is necessary to.
Option A. increase the engine power.
Option B. decrease the engine power.
Option C. maintain constant engine power.
Correct Answer is. increase the engine power.
Explanation. NIL.
Question Number. 257. After a change in collective pitch the Rotor RPM will rise and fall. This is called.
Option A. static droop.
Option B. transient droop.
Option C. under swing.
Correct Answer is. transient droop.
Explanation. The Helicopter and How it Flies by John Fay Page 20/21. The initial total fall in rotor RPM is called transient droop. The change in stabilised RPM is referred to as static droop. The RPM difference between transient droop and static droop is called the underswing.
Question Number. 258. After a change in pitch of a rotor blade, the blade will be at maximum flap at.
Option A. 90°.
Option B. 0°.
Option C. 180°.
Correct Answer is. 90°.
Explanation. NIL.
Question Number. 259. The rotor disc is.
Option A. the ground cushion.
Option B. the distance between tip to tip.
Option C. the rotor head hub.
Correct Answer is. the distance between tip to tip.
Explanation. Automatic Flight Control. Pallett. Page 59/60 fig 1.42.
Question Number. 260. The maximum forward speed of a helicopter is limited by.
Option A. retreating blade stall and the forward speed of the advancing blade.
Option B. engine power.
Option C. the shape of the fuselage.
Correct Answer is. retreating blade stall and the forward speed of the advancing blade.

Explanation. NIL.
Question Number. 261. What principle does the delta 3 hinge use?.
Option A. Triangular pitch change lever.
Option B. Flapping actuators.
Option C. Offset hinges.
Correct Answer is. Offset hinges.
Explanation. NIL.
Question Number. 262. As the angle of attack of a rotor blade increases, it affects the.
Option A. flapping forces.
Option B. dragging and the flapping forces.
Option C. dragging forces.
Correct Answer is. dragging and the flapping forces.
Explanation. NIL.
Question Number. 263. With an increase in its angle of attack, the drag acting on a rotor blade.
Option A. decreases.
Option B. increases.
Option C. remains constant.
Correct Answer is. increases.
Explanation. NIL.
Question Number. 264. Forces on a helicopter, in a power-on descent are.
Option A. lift, drag, thrust, weight.
Option B. lift, drag, thrust.
Option C. weight, drag, lift.
Correct Answer is. lift, drag, thrust, weight.
Explanation. NIL.
Question Number. 265. The bell stability augmentation system is based on.
Option A. flapping hinges.
Option B. offset hinges.
Option C. gyroscopic forces.
Correct Answer is. gyroscopic forces.
Explanation. NIL.
Question Number. 266. During forward flight the advancing blade will.
Option A. flap down.
Option B. flap up.
Option C. lag.
Correct Answer is. flap up.
Explanation. NIL.
Question Number. 267. What is the advancing blade on a helicopter doing?.
Option A. Going to the highest point.
Option B. Increasing in lift.
Option C. Increasing in drag.
Correct Answer is. Increasing in lift.
Explanation. NIL.
Question Number. 268. What is the swash plate on a helicopter used for?.

Option A. Control of the pitch of the rotor blades.
Option B. Control of the speed of the rotor blades.
Option C. Control of the flap of the rotor blades.
Correct Answer is. Control of the pitch of the rotor blades.
Explanation. Automatic Flight Control Pallett Page 61.
Question Number. 269. Upwash on a helicopter would result in.
Option A. decrease in lift.
Option B. increase in lift without an increase in power.
Option C. decrease in speed.
Correct Answer is. increase in lift without an increase in power.
Explanation. Upwash increases angle of attack.
Question Number. 270. After a roll to the left of a statically unstable helicopter, the helicopter would.
Option A. continue to roll further.
Option B. remain at the position that it had rolled to.
Option C. roll back to the horizontal.
Correct Answer is. continue to roll further.
Explanation. Automatic Flight Control Pallett Page 65.
Question Number. 271. The difference between transient droop and static droop is.
Option A. overswing.
Option B. underswing.
Option C. a hole in one.
Correct Answer is. underswing.
Explanation. The Helicopter history, piloting and how it flies John Fay ISBN81-70002-030-1 Page No 21".
Question Number. 272. What happens to a helicopter in autorotative flight?.
Option A. The rotor goes in the normal direction of rotation.
Option B. The rotor goes the opposite direction to the normal direction of rotation.
Option C. The cabin goes in the direction of rotation.
Correct Answer is. The rotor goes in the normal direction of rotation.
Explanation. NIL.
Question Number. 273. The RPM of the rotor blades is constant, within small limits to.
Option A. prevent blades over-speeding.
Option B. prevent blades folding up during flight.
Option C. reduce torque loading.
Correct Answer is. prevent blades folding up during flight.
Explanation. NIL.
Question Number. 274. To maintain the position of the helicopter, when hovering with a decrease in air density, the pilot must.
Option A. increase the collective pitch.
Option B. increase rotor RPM.
Option C. increase the cyclic pitch.
Correct Answer is. increase the collective pitch.
Explanation. NIL.

Question Number. 275. Relative airflow over a helicopter blade.
Option A. increases at the tip.
Option B. is unaffected by blade position.
Option C. increases at the root.
Correct Answer is. increases at the tip.
Explanation. NIL.
Question Number. 276. An helicopter fin helps to give.
Option A. longitudinal stability about the normal axis.
Option B. directional stability about the normal axis.
Option C. directional stability about the longitudinal axis.
Correct Answer is. directional stability about the normal axis.
Explanation. NIL.
Question Number. 277. After a roll to the left of a statically stable helicopter, the helicopter would.
Option A. continue to roll.
Option B. come back to level flight.
Option C. increases roll.
Correct Answer is. come back to level flight.
Explanation. NIL.
Question Number. 278. Solidity of the rotor is the ratio of the.
Option A. blade area to disc area.
Option B. all up weight to blade area.
Option C. all up weight to disc area.
Correct Answer is. blade area to disc area.
Explanation. NIL.
Question Number. 279. Which direction is the air flowing through the main rotor during autorotation?.
Option A. Upwards.
Option B. Parallel to the rotor chord line.
Option C. Downwards.
Correct Answer is. Upwards.
Explanation. NIL.
Question Number. 280. The purpose of an off-set vertical stabilizer is to.
Option A. provide stability during vertical flight.
Option B. relieve some of the load on the tail rotor during forward flight.
Option C. provide lift during forward flight.
Correct Answer is. relieve some of the load on the tail rotor during forward flight.
Explanation. NIL.
Question Number. 281. The purpose of the horizontal stabilizer is to.
Option A. maintain the aircraft in as near a horizontal attitude as possible, during forward flight.
Option B. to reduce rotor head loads during translational flight.
Option C. to stabilize the aircraft in the hover.
Correct Answer is. maintain the aircraft in as near a horizontal attitude as possible, during forward flight.
Explanation. NIL.

Question Number. 282. During autorotation, the rudder pedals.
Option A. would need to be backed off due to the loss of torque.
Option B. would have no effect on directional control.
Option C. would need to be advanced to counteract the increased torque.
Correct Answer is. would need to be backed off due to the loss of torque.
Explanation. NIL.
Question Number. 283. In forward flight, the advancing blade would be expected to.
Option A. lag.
Option B. increase pitch.
Option C. flap up.
Correct Answer is. flap up.
Explanation. NIL.
Question Number. 284. When the helicopter moves from the hover to translational flight, the lift vector will.
Option A. remain vertical.
Option B. move forward.
Option C. move aft.
Correct Answer is. move forward.
Explanation. NIL.
Question Number. 285. If the blade angle of attack increases.
Option A. lift increases only.
Option B. lift and drag increases.
Option C. drag increases only.
Correct Answer is. lift and drag increases.
Explanation. NIL.
Question Number. 286. When a blade is flapping up.
Option A. pitch will increase.
Option B. pitch will decrease.
Option C. lift and drag both increase.
Correct Answer is. pitch will decrease.
Explanation. NIL.
Question Number. 287. Vortex ring start requires.
Option A. retreating blade stall.
Option B. advancing blade stall.
Option C. power on descent.
Correct Answer is. power on descent.
Explanation. The helicopter and how it flies Page 117 by John Fay.
Question Number. 288. Rotor tip vortices are strongest when.
Option A. hovering with high weight.
Option B. flying high speed in straight and level flight.
Option C. flying into a headwind.
Correct Answer is. hovering with high weight.
Explanation. NIL.
Question Number. 289. Tail rotor effects the helicopter in.
Option A. pitch and roll.

Option B. vertical axis.
Option C. horizontal axis.
Correct Answer is. vertical axis.
Explanation. NIL.
Question Number. 290. A blade of a Helicopter Main Rotor is.
Option A. highly cambered.
Option B. reverse cambered.
Option C. symmetrically cambered.
Correct Answer is. symmetrically cambered.
Explanation. NIL.
Question Number. 291. Helicopter rotor blades produce lift by.
Option A. moving a small mass of air downwards slowly.
Option B. moving a large mass of air downwards quickly.
Option C. creating a lower pressure above the blade than below.
Correct Answer is. creating a lower pressure above the blade than below.
Explanation. NIL.
Question Number. 292. With an increase in forward velocity of a helicopter, the increase in parasitic drag will cause the fuselage attitude to.
Option A. pitch down.
Option B. remain level.
Option C. pitch up.
Correct Answer is. pitch down.
Explanation. The amount of parasitic drag increases with increasing airspeed, so that the thrust/parasite drag (nose down) couple becomes stronger.
Question Number. 293. On a helicopter, rotor disc lift happens.
Option A. 180° later.
Option B. 90° later.
Option C. immediately.
Correct Answer is. immediately.
Explanation. NIL.
Question Number. 294. During an autorotative decent, rotor RPM will be.
Option A. higher than in powered flight.
Option B. approximately the same as in powered flight.
Option C. lower than in powered flight.
Correct Answer is. higher than in powered flight.
Explanation. NIL.
Question Number. 295. Lift in a helicopter is a result of.
Option A. pitch * square root of speed.
Option B. angle of attack * velocity squared.
Option C. angle of attack * velocity squared and forward speed.
Correct Answer is. angle of attack * velocity squared.
Explanation. NIL.
Question Number. 296. After a change in pitch of a rotor blade the blade will be at maximum flap at.
Option A. 180°.
Option B. 90°.

Option C. 0°.
Correct Answer is. 90°.
Explanation. NIL.
Question Number. 297. When the rotor blade increases its angle of attack, the centre of pressure.
Option A. does not move.
Option B. moves rearwards.
Option C. moves forward.
Correct Answer is. does not move.
Explanation. NIL.
Question Number. 298. Autorotative force attempts to pull the rotor blade.
Option A. in the direction of normal rotation.
Option B. both in and against the direction of normal rotation.
Option C. against the direction of normal rotation.
Correct Answer is. in the direction of normal rotation.
Explanation. NIL.
Question Number. 299. The ground effect is effective up to a height equalling.
Option A. twice the diameter of the rotor disc.
Option B. the length of the fuselage.
Option C. the diameter of the rotor disc.
Correct Answer is. the diameter of the rotor disc.
Explanation. NIL.
Question Number. 300. Movement of the collective control will.
Option A. increase the pitch of the main rotor blades.
Option B. increase the pitch of the tail rotor.
Option C. tilt the disc and increase engine power.
Correct Answer is. increase the pitch of the main rotor blades.
Explanation. NIL.
Question Number. 301. Rotor blade sailing is a problem at.
Option A. low rotor RPM at engine shut down.
Option B. normal rotor RPM in gusty conditions.
Option C. high rotor RPM at engine start up.
Correct Answer is. low rotor RPM at engine shut down.
Explanation. NIL.
Question Number. 302. The layer of air over the surface of an aerofoil which is slower moving, in relation to the rest of the airflow, is known as.
Option A. camber layer.
Option B. boundary layer.
Option C. none of the above are correct.
Correct Answer is. boundary layer.
Explanation. NIL.
Question Number. 303. During helicopter forward flight the retreating blade will tend to.
Option A. flap down.
Option B. no change.

Option C. flap up.
Correct Answer is. flap down.
Explanation. NIL.
Question Number. 304. When airflow velocity over an upper cambered surface of an aerofoil decreases, what takes place?.
Option A. Pressure increases, lift decreases.
Option B. Pressure decreases, lift increases.
Option C. Pressure increases, lift increases.
Correct Answer is. Pressure increases, lift decreases.
Explanation. NIL.
Question Number. 305. What is a controlling factor of turbulence and skin friction?.
Option A. Countersunk rivets used on skin exterior.
Option B. Fineness ratio.
Option C. Aspect ratio.
Correct Answer is. Countersunk rivets used on skin exterior.
Explanation. NIL.
Question Number. 306. Changes in aircraft weight.
Option A. will only affect total drag if the lift is kept constant.
Option B. will not affect total drag since it is dependant only upon speed.
Option C. cause corresponding changes in total drag due to the associated lift change.
Correct Answer is. cause corresponding changes in total drag due to the associated lift change.
Explanation. NIL.
Question Number. 307. When an aerofoil stalls.
Option A. lift and drag increase.
Option B. lift decreases and drag increases.
Option C. lift increases and drag decreases.
Correct Answer is. lift decreases and drag increases.
Explanation. NIL.
Question Number. 308. When a helicopter rotor disc is tilted forward, what happens to the pitch of the retreating blade?.
Option A. Increases.
Option B. Remains constant.
Option C. Decreases.
Correct Answer is. Increases.
Explanation. NIL.
Question Number. 309. Airflow through the main rotor disc in autorotation is.
Option A. always down through the rotor disc.
Option B. always up through the rotor disc.
Option C. may be either up or down.
Correct Answer is. always up through the rotor disc.
Explanation. NIL.
Question Number. 310. The blade stalling speed will.
Option A. only change if the MTWA were changed.

Option B. increase with an increase in helicopter weight.
Option C. be unaffected by helicopter weight changes since it is dependant upon the angle of attack.
Correct Answer is. increase with an increase in helicopter weight.
Explanation. NIL.
Question Number. 311. Ground effect will be most apparent when.
Option A. taxiing in the hover.
Option B. hovering close to the ground.
Option C. taxiing on the ground.
Correct Answer is. hovering close to the ground.
Explanation. NIL.
Question Number. 312. When entering into a stable autorotative state, the main rotor RPM will initially.
Option A. increase.
Option B. decrease.
Option C. be unaffected.
Correct Answer is. decrease.
Explanation. NIL.
Question Number. 313. The stalling speed of an helicopter blade.
Option A. is increased when the helicopter is heavier.
Option B. is increased when the helicopter is lighter.
Option C. does not change.
Correct Answer is. is increased when the helicopter is heavier.
Explanation. NIL.
Question Number. 314. Helicopters in forward flight are usually.
Option A. directionally stable.
Option B. laterally stable.
Option C. longitudinally stable.
Correct Answer is. directionally stable.
Explanation. NIL.
Question Number. 315. Stability of a helicopter is its.
Option A. ability to hover at a fixed point above the ground.
Option B. ability to move in all 3 axis where and when required.
Option C. ability to return to original attitude after displacement.
Correct Answer is. ability to return to original attitude after displacement.
Explanation. NIL.
Question Number. 316. In forward flight the relative air velocity at each blade.
Option A. is greatest for the retreating blade.
Option B. is equal at all blades due to compensation.
Option C. is greatest for the advancing blade.
Correct Answer is. is greatest for the advancing blade.
Explanation. NIL.
Question Number. 317. What forces are acting on the helicopter during descent?.
Option A. Lift only.

Option B. Lift and weight.
Option C. Weight only.
Correct Answer is. Lift and weight.
Explanation. NIL.
Question Number. 318. The ground cushion effect is apparent.
Option A. in the hover only.
Option B. in the hover and at low translational flight close to the ground.
Option C. on the ground only.
Correct Answer is. in the hover and at low translational flight close to the ground.
Explanation. NIL.
Question Number. 319. If the angle of attack is increased on a main rotor blade.
Option A. there is no change in drag.
Option B. there is an increase in drag.
Option C. there is a reduction in drag.
Correct Answer is. there is an increase in drag.
Explanation. NIL.
Question Number. 320. A helicopter main rotor blade may be tapered from root to tip to.
Option A. equalise lift along the blade.
Option B. reduce induced drag.
Option C. reduce the blade weight.
Correct Answer is. equalise lift along the blade.
Explanation. NIL.
Question Number. 321. A helicopter main rotor blade is twisted from root to tip to.
Option A. permit the blade to straighten under aerodynamic load.
Option B. equalise lift along the blade.
Option C. give the blade additional strength.
Correct Answer is. equalise lift along the blade.
Explanation. NIL.
Question Number. 322. Translational drift is.
Option A. the tendency for the aircraft to drift laterally.
Option B. the tendency for the aircraft to turn to port.
Option C. the tendency for the aircraft to pitch nose up.
Correct Answer is. the tendency for the aircraft to drift laterally.
Explanation. NIL.
Question Number. 323. The choice of aerofoil section for a rotor blade is such that.
Option A. it has a stable centre of pressure.
Option B. the CofP moves very slowly.
Option C. the CofP moves rapidly in response to pitch changes.
Correct Answer is. it has a stable centre of pressure.
Explanation. NIL.
Question Number. 324. When the rotor blade is flapping up, the angle of attack.

Option A. remains the same as the pitch angle.
Option B. is less than the pitch angle.
Option C. is greater than the pitch angle.
Correct Answer is. is less than the pitch angle.
Explanation. NIL.
Question Number. 325. When the rotor blade is flapping down, the pitch angle.
Option A. is less than the angle of attack.
Option B. remains the same.
Option C. is greater than the angle of attack.
Correct Answer is. is less than the angle of attack.
Explanation. NIL.
Question Number. 326. The tropopause exists at about.
Option A. 18,000 ft.
Option B. 30,000 ft.
Option C. 36,000 ft.
Correct Answer is. 36,000 ft.
Explanation. NIL.
Question Number. 327. The rotor blades operate at the best Lift/Drag ratio when their.
Option A. angle of attack is 0 degrees.
Option B. pitch angles closely approach the stall angle.
Option C. angle of attack is about +3 degrees.
Correct Answer is. angle of attack is about +3 degrees.
Explanation. NIL.
Question Number. 328. The centre of pressure of an aerofoil is that point on the cord line.
Option A. which moves most, with changes in angle of attack, if the section is symmetrical.
Option B. at which the highest pressure is said to act.
Option C. at which the lift forces resultant is said to act.
Correct Answer is. at which the lift forces resultant is said to act.
Explanation. NIL.
Question Number. 329. The main rotor assembly of a helicopter provides.
Option A. both lift and horizontal thrust.
Option B. lift, a component of which is horizontal so thrust is obtained.
Option C. lift, but an unbalanced component in the direction of flight moves the aircraft forward.
Correct Answer is. lift, a component of which is horizontal so thrust is obtained.
Explanation. NIL.
Question Number. 330. An advantage of the symmetrical section blades used on helicopters is that.
Option A. the movement of the centre of pressure with changes of the angle of attack is greater than that of a fixed wing.
Option B. the centre of pressure moves forward with changes in angle of attack.

Option C. the position of the feather axis and the centre of pressure and centre of gravity coincide, providing stability.
Correct Answer is. the position of the feather axis and the centre of pressure and centre of gravity coincide, providing stability.
Explanation. NIL.
Question Number. 331. Which part of the rotor disc produces the most lift during forward flight?.
Option A. The mid-span portion.
Option B. The front portion.
Option C. The rear portion.
Correct Answer is. The front portion.
Explanation. NIL.
Question Number. 332. The aerofoil shape of a main rotor blade is symmetrical in order to make the blade have.
Option A. the highest possible lift co-efficient when hovering.
Option B. the best possible autorotative characteristics.
Option C. a relatively stable centre of pressure position with changes in angle of attack.
Correct Answer is. a relatively stable centre of pressure position with changes in angle of attack.
Explanation. NIL.
Question Number. 333. Aspect ratio is the ratio of the.
Option A. disc diameter to the chord.
Option B. blade chord to the disc area.
Option C. blade span to the chord.
Correct Answer is. blade span to the chord.
Explanation. NIL.
Question Number. 334. Disc loading is defined as the.
Option A. ratio of gross weight to disc area.
Option B. ratio of blade area to disc area.
Option C. ratio of gross weight to total blade area.
Correct Answer is. ratio of gross weight to disc area.
Explanation. NIL.
Question Number. 335. A helicopter has a main rotor which rotates anticlockwise viewed from above. What happens if a loss of anti-torque device at cruise speed in flight?.
Option A. Nose pitches up slightly + yaw to right.
Option B. Nose pitches up slightly + yaw to left.
Option C. No appreciable change.
Correct Answer is. Nose pitches up slightly + yaw to right.
Explanation. NIL.
Question Number. 336. Over pitch causes.
Option A. an increase in RPM.
Option B. a reduction in RPM.
Option C. blades to cone up.
Correct Answer is. blades to cone up.
Explanation. NIL.

Question Number. 337. A shrouded tail rotor.
Option A. reduces need for cyclic feathering.
Option B. gives control in pitch and yaw.
Option C. has increased airflow so yaw can be controlled by the rudder.
Correct Answer is. reduces need for cyclic feathering.
Explanation. NIL.
Question Number. 338. In a helicopter with its main rotor turning anti-clockwise, which way does the aircraft tend to drift?.
Option A. Port if tail rotor is mounted on the right.
Option B. Starboard, irrespective of which side the tail rotor is mounted on.
Option C. Port if tail rotor is mounted on the left.
Correct Answer is. Starboard, irrespective of which side the tail rotor is mounted on.
Explanation. NIL.

08.4. Flight Stability and Dynamics.

Question Number. 1. Dihedral wings combat instability in.
Option A. yaw.
Option B. side-slip.
Option C. pitch.
Correct Answer is. side-slip.
Explanation. As the aircraft side-slips, there is a greater angle of attack on the lower wing which increases lift,straightens the aircraft and stops the side-slip.
Question Number. 2. An aircraft, which is longitudinally stable, will tend to return to level flight after a movement in which axis?.
Option A. Pitch.
Option B. Yaw.
Option C. Roll.
Correct Answer is. Pitch.
Explanation. Longitudinal stability is stability about the pitch axis.
Question Number. 3. The normal axis of an aircraft passes through.
Option A. the centre of gravity.
Option B. a point at the centre of the wings.
Option C. at the centre of pressure.
Correct Answer is. the centre of gravity.
Explanation. All the axis of the aircraft (normal, longitudinal and lateral) pass through the centre of gravity.
Question Number. 4. Due to the change in downwash on an untapered wing (i.e. one of constant chord length) it will.
Option A. not provide any damping effect when rolling.
Option B. not suffer adverse yaw effects when turning.
Option C. tend to stall first at the root.
Correct Answer is. tend to stall first at the root.
Explanation. The change in downwash is caused by the wingtip vortices, which has a lesser affect inboard than it does at the tip. The downwash reduces the effective angle of attack (more so at the tip). This causes the root of the wing to stall before the tip.
Question Number. 5. Correcting for a disturbance which has caused a rolling motion about the longitudinal axis would re-establish which of the following?.

Option A. Lateral stability.
Option B. Longitudinal stability.
Option C. Directional stability.
Correct Answer is. Lateral stability.
Explanation. The aircraft's response to rolling is lateral stability.
Question Number. 6. Porpoising is an oscillatory motion in the.
Option A. yaw plane.
Option B. roll plane.
Option C. pitch plane.
Correct Answer is. pitch plane.
Explanation. Porpoising is an oscillatory motion in pitch, about the lateral axis.
Question Number. 7. Directional stability is maintained.
Option A. by the tailplane, and controlled by the elevators.
Option B. by the keel surface and fin, and controlled by the rudder.
Option C. by the mainplanes, and controlled by the ailerons.
Correct Answer is. by the keel surface and fin, and controlled by the rudder.
Explanation. Directional stability is maintained by the keel surface and the fin and controlled by the rudder.
Question Number. 8. Longitudinal stability is given by.
Option A. the fin.
Option B. the wing dihedral.
Option C. the horizontal tailplane.
Correct Answer is. the horizontal tailplane.
Explanation. The horizontal stabilizer (tailplane) provides longitudinal stability.
Question Number. 9. Lateral stability is given by.
Option A. the horizontal tailplane.
Option B. the ailerons.
Option C. the wing dihedral.
Correct Answer is. the wing dihedral.
Explanation. The wing dihedral provides lateral stability.
Question Number. 10. Stability about the lateral axis is given by.
Option A. the ailerons.
Option B. the horizontal tailplane.
Option C. wing dihedral.
Correct Answer is. the horizontal tailplane.
Explanation. Stability about the lateral axis is longitudinal stability. The horizontal stabilizer (tailplane) provides longitudinal stability.
Question Number. 11. Sweepback of the wings will.
Option A. decrease lateral stability.
Option B. not affect the lateral stability.
Option C. increase lateral stability.
Correct Answer is. increase lateral stability.
Explanation. When an aircraft rolls, it sideslips. A sideslipping aircraft with sweepback has a higher AR on the leading wing than than it has on the trailing wing. The lift is greater on a higher AR wing, so it corrects the roll. (10 degrees of sweepback has the same effect as 1 degree of dihedral).

Question Number. 12. Dutch Roll is.
Option A. primarily a pitching instability.
Option B. a combined rolling and yawing motion.
Option C. a type of slow roll.
Correct Answer is. a combined rolling and yawing motion.
Explanation. Dutch role is a combination of role and yaw.
Question Number. 13. A high wing position gives.
Option A. more lateral stability than a low wing.
Option B. less lateral stability than a low wing.
Option C. the same lateral stability as a low wing.
Correct Answer is. more lateral stability than a low wing.
Explanation. The pendulum effect produced by the fuselage of a high wing aircraft provides more lateral stability.
Question Number. 14. Directional stability may be increased with.
Option A. pitch dampers.
Option B. horn balance.
Option C. yaw dampers.
Correct Answer is. yaw dampers.
Explanation. Yaw dampers increase directional stability.
Question Number. 15. Lateral stability may be increased with.
Option A. increased lateral dihedral.
Option B. increased lateral anhedral.
Option C. increased longitudinal dihedral.
Correct Answer is. increased lateral dihedral.
Explanation. Lateral dihedral increases lateral stability. (BTW : Longitudinal dihedral is the difference between mainplane and tailplane angles of incidence).
Question Number. 16. Longitudinal stability is increased if the.
Option A. CG is forward of the CP.
Option B. Thrust acts on a line below the total drag.
Option C. CP moves forward of the CG.
Correct Answer is. CG is forward of the CP.
Explanation. If the CG is forward of the CP it will have a nose-down tendency which makes the aircraft less likely to stall and therefore it will have more longitudinal stability.
Question Number. 17. Directional stability is about the.
Option A. lateral axis.
Option B. longitudinal axis.
Option C. normal axis.
Correct Answer is. normal axis.
Explanation. Directional stability is stability about the normal axis.
Question Number. 18. Lateral stability is about the.
Option A. longitudinal axis.
Option B. normal axis.
Option C. vertical axis.
Correct Answer is. longitudinal axis.
Explanation. Lateral stability is stability about the longitudinal axis.
Question Number. 19. Longitudinal stability is provided by the.

Option A. horizontal stabilizer.
Option B. vertical stabilizer.
Option C. mainplane.
Correct Answer is. horizontal stabilizer.
Explanation. Longitudinal stability is provided by the horizontal stabiliser (tailplane).
Question Number. 20. If the aircraft turns and side-slips.
Option A. the sweepback of the wing will correct the sideslip.
Option B. the keel surface will correct the sideslip.
Option C. the dihedral of the wing will correct the sideslip.
Correct Answer is. the dihedral of the wing will correct the sideslip.
Explanation. http : //www.allstar.fiu.edu/aero/axes33.htm
Question Number. 21. An aircraft disturbed from its normal flight path, and automatically returns to that normal flight path, without any action on the part of the pilot is known as.
Option A. aircraft stall.
Option B. aircraft instability.
Option C. aircraft stability.
Correct Answer is. aircraft stability.
Explanation. Stability is the aircraft's ability for the aircraft to return to its normal flightpath after being disturbed.
Question Number. 22. The fin gives stability about which axis?.
Option A. Longitudinal axis.
Option B. Lateral axis.
Option C. Normal axis.
Correct Answer is. Normal axis.
Explanation. The fin gives stability about the normal axis.
Question Number. 23. If the nose of the aircraft is rotated about its lateral axis, what is its directional movement?.
Option A. Rolling or banking to the left or right.
Option B. Turning to the left or right.
Option C. Climbing or diving.
Correct Answer is. Climbing or diving.
Explanation. For an aircraft to climb or dive it must be rotated about ts lateral axis.
Question Number. 24. The function of an aircraft fin.
Option A. is to provide directional control.
Option B. is to provide straight airflow across the rudder.
Option C. is to provide stability about the normal axis.
Correct Answer is. is to provide stability about the normal axis.
Explanation. The function of the aircraft fin is to provide stability about the normal axis.
Question Number. 25. Movement of an aircraft about its normal axis.
Option A. is rolling.
Option B. is yawing.
Option C. is pitching.
Correct Answer is. is yawing.
Explanation. yawing' is movement of the aircraft about its normal axis.

Question Number. 26. If, after a disturbance, an aeroplane initially returns to its equilibrium state.
Option A. it has neutral stability.
Option B. it has static stability and may be dynamically stable.
Option C. it is neutrally unstable.
Correct Answer is. it has static stability and may be dynamically stable.
Explanation. Static stability is when an aircraft returns to its equilibrium (trimmed) state. Dynamic stability is the ability of the aircraft to oppose the disturbance.
Question Number. 27. Stability of an aircraft is.
Option A. the tendency of the aircraft to return to its original trimmed position after having been displaced.
Option B. the tendency of the aircraft to stall at low airspeed.
Option C. the ability of the aircraft to rotate about an axis.
Correct Answer is. the tendency of the aircraft to return to its original trimmed position after having been displaced.
Explanation. Stability is the tendency for the aircraft to return to its original position after being displaced.
Question Number. 28. The three axes concerned with stability of an aircraft have.
Option A. normal axis through C of G. Lateral axis - wing tip to wing tip. Longitudinal axis - nose to tail but not through C of G.
Option B. longitudinal, lateral and normal axis all passing through aircraft centre of gravity.
Option C. longitudinal axis nose to tail, lateral axis at furthest span point, normal axis through centre of pressure.
Correct Answer is. longitudinal, lateral and normal axis all passing through aircraft centre of gravity.
Explanation. The longitudinal, lateral and normal axis all pass through the aircraft's centre of gravity.
Question Number. 29. If an aircraft returns to a position of equilibrium it is said to be.
Option A. positively stable.
Option B. neutrally stable.
Option C. negatively stable.
Correct Answer is. positively stable.
Explanation. If an aircraft is positively stable it will return to its trimmed position.
Question Number. 30. The pendulum effect on a high wing aircraft.
Option A. has no effect on lateral stability.
Option B. increases lateral stability.
Option C. decreases lateral stability.
Correct Answer is. increases lateral stability.
Explanation. Pendulum effect on a high wing aircraft increases lateral stability.
Question Number. 31. After a disturbance in pitch, an aircraft continues to oscillate at constant amplitude. It is.
Option A. longitudinally unstable.
Option B. longitudinally neutrally stable.

Option C. laterally unstable.
Correct Answer is. longitudinally neutrally stable.
Explanation. If an aircraft oscillates in pitch without the oscillations increasing or decreasing it is longitudinally neutrally stable.
Question Number. 32. On an aircraft with an all-moving tailplane nose up pitch is caused by.
Option A. decreasing tailplane incidence.
Option B. increasing tailplane incidence.
Option C. up movement of the trim tab.
Correct Answer is. decreasing tailplane incidence.
Explanation. To make the nose pitch-up, the tailplane down load must be increased. This is done by decreasing its incidence (or increasing its negative incidence).
Question Number. 33. What gives the aircraft directional stability?.
Option A. Vertical stabiliser.
Option B. Elevators.
Option C. Horizontal stabiliser.
Correct Answer is. Vertical stabiliser.
Explanation. The vertical stabiliser gives the aircraft directional stability.
Question Number. 34. In flight if the aircraft nose gets an upward gust of wind, what characteristic will have the greatest effect to counteract it?.
Option A. Wing Sweep.
Option B. Horizontal stabiliser and fuselage length.
Option C. Position of the centre of pressure relative to the centre of gravity.
Correct Answer is. Horizontal stabiliser and fuselage length.
Explanation. Longitudinal stability is effected mainly by the stabiliser and length of fuselage behind the C of G.
Question Number. 35. To correct dutch roll you must damp oscillation around :
.
Option A. the longitudinal axis.
Option B. the lateral axis.
Option C. the vertical axis.
Correct Answer is. the vertical axis.
Explanation. Dutch Roll is a figure of eight oscillation around the vertical axis.
Question Number. 36. An elevator trim tab is used to.
Option A. counteract propeller torque.
Option B. prevent the control surface from stalling the airflow.
Option C. reduce control column forces on the pilot.
Correct Answer is. reduce control column forces on the pilot.
Explanation. See AC Kermode Chapter 9.
Question Number. 37. A high wing aircraft will be more.
Option A. laterally stable than a low wing aircraft.
Option B. longitudinally stable than a low wing aircraft.
Option C. directionally stable than a low wing aircraft.
Correct Answer is. laterally stable than a low wing aircraft.
Explanation. Due to pendulum effect of the fuselage, a high wing aircraft will be more laterally stable than a low wing aircraft.

Question Number. 38. After an aircraft has been disturbed from its straight and level flight, it returns to its original attitude with a small amount of decreasing oscillation.The aircraft is.
Option A. statically stable but dynamically unstable.
Option B. statically unstable but dynamically stable.
Option C. statically stable and dynamically stable.
Correct Answer is. statically stable and dynamically stable.
Explanation. Static stability is the ability of the aircraft to return to its untrimmed position. Dynamic stability is the ability of the aircraft to not oscillate about the trimmed position.
Question Number. 39. If there is an increase of density, what effect would there be in aerodynamic dampening?.
Option A. Decreased.
Option B. Increased.
Option C. None.
Correct Answer is. Increased.
Explanation. Flight forces (and hence aerodynamic dampening) are all increased with increasing density.
Question Number. 40. Yawing is a rotation around.
Option A. the lateral axis obtained by the rudder.
Option B. the normal axis obtained by the rudder.
Option C. the normal axis obtained by the elevator.
Correct Answer is. the normal axis obtained by the rudder.
Explanation. Yawing is rotation around the normal axis obtained by the rudder.
Question Number. 41. Lateral stability is reduced by increasing.
Option A. dihedral.
Option B. sweepback.
Option C. anhedral.
Correct Answer is. anhedral.
Explanation. Anhedral is a downward and outward inclination of the wing. It is opposite to dihedral.
Question Number. 42. Azimuth stability is dependent on.
Option A. dihedral.
Option B. keel and fin.
Option C. tailplane.
Correct Answer is. keel and fin.
Explanation. Azimuth is a fancy word for 'direction'.
Question Number. 43. Sweepback of the wings will.
Option A. increase lateral stability at high speeds only.
Option B. not affect lateral stability.
Option C. increase lateral stability at all speeds.
Correct Answer is. increase lateral stability at all speeds.
Explanation. 10 degrees of sweepback provides the same effect as 1 degree of dihedral.
Question Number. 44. If you have an aircraft that is more laterally stable then directionally stable it will tend to : .
Option A. bank.
Option B. slip.

Option C. skid.
Correct Answer is. skid.
Explanation. Skidding out of turns is symptomatic of dutch roll, extra vertical stabilisers are often added to correct this (Nimrod MR2).
Question Number. 45. A centre of gravity position close to its aft limit will cause the aircraft to.
Option A. pitch nose down and increase its longitudinal stability.
Option B. pitch nose up and decrease its longitudinal stability.
Option C. pitch nose up and increase its longitudinal stability.
Correct Answer is. pitch nose up and decrease its longitudinal stability.
Explanation. AC Kermode page 145 states that a pitch up will increase AOA and further destabilise the aircraft.
Question Number. 46. A sharply swept wing will promote.
Option A. excessive lateral instability.
Option B. excessive longitudinal stability.
Option C. excessive lateral stability.
Correct Answer is. excessive lateral stability.
Explanation. Swept wing fighter aircraft often have anhedral to promote greater roll rate, which is needed due to excessive stability.
Question Number. 47. Which control surfaces provide lateral control , also longitudinal control and stability?.
Option A. Ruddervators.
Option B. Tailerons.
Option C. Flapperons.
Correct Answer is. Tailerons.
Explanation. Tailerons are all moving tailplanes as fitted to the Tornado".
Question Number. 48. If, after a disturbance, an aeroplane initially returns to its equilibrium state.
Option A. it has neutral stability.
Option B. it has static stability and may be dynamically stable.
Option C. it is neutrally unstable.
Correct Answer is. it has static stability and may be dynamically stable.
Explanation. Question says nothing about overshooting and oscillating, so it could be dynamically unstable, even though it is statically stable.
Question Number. 49. Yaw dampers are designed to.
Option A. prevent dutch roll.
Option B. assist the pilot to move the rudder.
Option C. reduce the effect of crabbing due to cross winds.
Correct Answer is. prevent dutch roll.
Explanation. NIL.
Question Number. 50. Tuck under occurs when.
Option A. a shock stall occurs on the outboard portion of swept wing.
Option B. a shock stall warning occurs on the inboard position of a straight wing.
Option C. the aircraft reaches Mcrit.
Correct Answer is. the aircraft reaches Mcrit.
Explanation. NIL.

Question Number. 51. The lateral axis is.
Option A. a straight line through the CG at right angles to the longitudinal and lateral axis.
Option B. a straight line through the CG from nose to tail.
Option C. a straight line through the CG parallel to a line joining the wingtips.
Correct Answer is. a straight line through the CG parallel to a line joining the wingtips.
Explanation. A straight line through the CG parallel to a line joining the wingtip.
Question Number. 52. The main factors which affect longitudinal stability are.
Option A. design of the fuselage and position of the CG.
Option B. design of the mainplane and position of the CG.
Option C. design of the tailplane and position of the CG.
Correct Answer is. design of the tailplane and position of the CG.
Explanation. NIL.
Question Number. 53. A yawing motion provides what kind of Stability?.
Option A. Directional.
Option B. Lateral.
Option C. Longitudinal.
Correct Answer is. Directional.
Explanation. Yawing is directional stability.
Question Number. 54. Where would you find the normal axis?.
Option A. Through C of G at right angles to longitudinal and lateral axis.
Option B. Vertically through CofP.
Option C. In line with the wing tips through C of G.
Correct Answer is. Through C of G at right angles to longitudinal and lateral axis.
Explanation. NIL.
Question Number. 55. When a aircraft is in a slideslip and is yawing the.
Option A. the fin will correct the yawing motion.
Option B. the effective keel area will make the ac yaw further into the direction of the sideslip.
Option C. the dihedral will prevent the yaw motion.
Correct Answer is. the effective keel area will make the ac yaw further into the direction of the sideslip.
Explanation. Page 290 Mechanics of Flight Kermode.
Question Number. 56. As a consequence of the C of G being close to its aft limit.
Option A. the stick forces to manoeuvre longitudinally will be low due to low stability.
Option B. the stick forces will be high in fore and aft pitch, due to the high longitudinal stability.
Option C. the stick forces when pitching the nose down will be very high.
Correct Answer is. the stick forces when pitching the nose down will be very high.
Explanation. NIL.
Question Number. 57. With the C of G on its forward limit.
Option A. the change in control loading is dependant on the position of the CofP.
Option B. control loading decreases.

Option C. control loading increases.
Correct Answer is. control loading increases.
Explanation. NIL.
08.5.
Question Number. 1. A 'slug' is a unit of.
Option A. mass.
Option B. density.
Option C. volume.
Correct Answer is. mass.
Explanation. NIL.
Question Number. 2. An undercarriage leg in flight produces 3 lbs of drag at 100kts. If speed is increased to 200kts the drag would be.
Option A. 12 lbs.
Option B. 9 lbs.
Option C. 6 lbs.
Correct Answer is. 12 lbs.
Explanation. Profile drag rises with V squared.
Question Number. 3. A stall warning device must be set to operate.
Option A. at a speed just above stalling speed.
Option B. at a speed just below stalling speed.
Option C. at the stalling speed.
Correct Answer is. at a speed just above stalling speed.
Explanation. NIL.
Question Number. 4. In cruise the weight of an aeroplane is decreasing as fuel is used. A stall would occur.
Option A. at a lower speed.
Option B. at the same speed.
Option C. at a higher speed.
Correct Answer is. at a lower speed.
Explanation. Stall speed increases with increasing weight.
Question Number. 5. The purpose of 'streamlining' is to reduce.
Option A. profile drag.
Option B. skin friction drag.
Option C. induced drag.
Correct Answer is. profile drag.
Explanation. NIL.
Question Number. 6. As height increases, with angle of attack and speed constant.
Option A. lift will remain constant.
Option B. lift Increases.
Option C. lift decreases.
Correct Answer is. lift decreases.
Explanation. That is why a greater angle of attack is required at higher altitude.