central flying academy

AIRCRAFT TECHNICAL AND GENERAL

TYPICAL QUESTIONS

1. Using counter-rotation propellers has the effect of:

   a) Cancelling out the gyroscopic and torque effect.
   b) Cancelling out the gyroscopic effect and increasing the torque.
   c) Increasing the gyroscopic effect and the torque.

2. With an increase in temperature, the service ceiling would:

   a) Increase.
   b) Decrease.
   c) Remain unaffected.

3. In the choke tube area of the fuel nozzle an area of:

   a) High pressure is found.
   b) Low pressure is found.
   c) There is no difference in pressure.

4. As air density decreases, density altitude will:

   a) Increase.
   b) Decrease.
   c) Remain unaffected.

5. If the atmospheric pressure and temperature remain the same, how would an increase in humidity affect take-off performance?

   a) Shorter take-off distance, the air is less dense.
   b) Longer take-off distance, the air is dense.
   c) Longer take-off distance, the air is less dense.

6. Which airspeed would a pilot be unable to identify by the colour coding of an ASI?

   a) The maximum landing gear extended speed.
   b) The maximum flap operating speed.
   c) The never exceed speed.

7. If the landing gear on an aircraft moves forward during retraction the:

   a) Total moments will decrease.
   b) Total moments will remain the same.
   c) Total moments will increase.

8. The tendency of an aircraft to develop forces which restore it to its original condition, when disturbed from a condition of steady flight, is known as:

   a) Controllability.
   b) Manoeuvrability.
   c) Stability.

9. When carburettor heating is used, it:

   a) Riches the mixture.
   b) Leans the mixture.
   c) Puts more air into the mixture.

10. Differential ailerons are installed to:

   a) Improve lateral stability.
   b) Prevent spiral instability.
   c) Reduce adverse aileron yaw.

11. The “blow-out” process on turbine engines is:

   a) To get rid of excess fuel after an aborted start.
   b) When the turbine section explodes after overspeeding.
   c) Timing the run-down to check for structural failure.

12. Why is the angle of attack increased during a turn?

   a) To compensate for increased aeroplane drag.
   b) To compensate for the reduced horizontal lift component.
   c) To compensate for the reduced vertical lift component.

13. Where does a magneto get its current from?

   a) Battery.
   b) E.M.F. (generators).
   c) Magnets.

14. Aircraft A has a span of 50 ft and a chord of 5 ft.
   Aircraft B has a span of 80 ft and a chord of 10 ft.
   Aircraft C has a span of 48 ft and a chord of 4 ft.
   Which aircraft has the highest aspect ratio and which aircraft has the lowest aspect ratio?

   a) A & B.
   b) B & C.
   c) C & B.

15. Refer to question 14. Which of the aircraft mentioned has the highest stalling angle?

   a) A.
   b) B.
   c) C.

16. A tail-dragger aircraft with a propeller turning clockwise as viewed from the cockpit, tends to turn the aircraft:

    a) Left around the vertical axis and left around the longitudinal axis.
    b) Right around the vertical axis and left around the longitudinal axis.
    c) Left around the vertical axis and right around the longitudinal axis.

17. At sea level, the Manifold gauge will read?

    a) 29.92”.
    b) 1013.25 hPa.
    c) Static pressure.

18. The correct way to increase power on piston prop is:

    a) Throttle, RPM, Mixture.
    b) RPM, Mixture, Throttle.
    c) Mixture, RPM, Throttle.

19. When the weight of the aircraft is increased the stalling speed will:

    a) Increase.
    b) Decrease.
    c) Remain the same.

20. What power supply is used to supply an aircraft instrument that operates on alternating current?

    a) An alternator that is mechanically driven by the engine.
    b) An inverter.
    c) A transformer.

21. A crankshaft with counter balance can be damaged by:

    a) Carburettor icing.
    b) Closing and opening the throttle in rapid succession.
    c) Operating the engine with too rich a mixture.

22. When flying for endurance an aircraft must be flown at:

    a) Minimum power speed.
    b) Full throttle height.
    c) Minimum drag speed.

23. What is the reason for the twist in the propeller?

    a) To keep the propeller flying at the most efficient angle at all sections.
    b) To cancel out the effect of the high speed near the tips.
    c) Design requirement to keep the centrifugal twist axis in the centre.

24. Electrical power of a battery is measured by:

    a) Amp/hr.
    b) The number of cells in the battery.
    c) The voltage.

25. Pneumatic boots that are used for de-icing are:

    a) Fitted on the leading edge of the wing.
    b) Fitted around the propeller intakes.
    c) Fitted on the leading edge of the wing and stabilisers.

26. The use of fuel with an incorrect octane rating may lead to:

    a) Detonation.
    b) Pre-ignition.
    c) A higher manifold pressure.

27. Propeller efficiency is defined as:

    a) The ratio of shaft horsepower to brake horsepower.
    b) The ratio of brake horsepower to thrust horsepower.
    c) The ratio of thrust horsepower to brake horsepower.

28. When the aircraft exhaust smoke is blue, it means the aircraft:

    a) Has a too rich a mixture.
    b) Is burning oil.
    c) Has incorrect timing.

29. Carburettor icing occurs at:

    a) The engine air intake.
    b) The venturi, butterfly valve and manifold.
    c) The intake manifold only.

30. What is the purpose of the breather pipe on an engine?

    a) To blow excess oil.
    b) To vent excess temperature.
    c) To relieve excess sump pressure.

31. What is the purpose of the reverse current cut-out switch in the electrical system?

    a) To prevent the battery from losing its charge by driving the generator.
    b) To switch off the generator.
    c) To prevent the battery from being overcharge.

32. For what purpose are CBs (circuit breakers) installed in aircraft?

    a) To switch systems on and off.
    b) To prevent overloading of a system.
    c) To see how much power a system requires.

33. The SG of AVGAS is 0.7. How much does 100 Gallonss of fuel weigh?

    a) 700 lbs.
    b) 70 lbs.
    c) 7 000 lbs.

34. The load capacity of a battery is measured in:

    a) Volts.
    b) Amps/hr.
    c) Ohm.

35. Which generator supplies more power?

    a) AC generator.
    b) DC generator.
    c) AC/DC generator with TR unit.

36. Carb icing on an engine a variable pitch propeller can be noticed by:

    a) Drop in RPM.
    b) Drop in Manifold Pressure.
    c) Drop in RPM and Manifold Pressure.

37. On an EGT gauge (fixed pitch propeller) the mixture is set at lean when:

    a) The temperature and RPM peaks.
    b) The temperature and RPM have peaked & then 2 units richer.
    c) The temperature only peaks.

38. A suction pump supplies vacuum to:

    a) ASI, T&S, DI.
    b) ASI, Turn indicator and DI.
    c) AH, DI and Turn indicator.

39. On the power available/required versus TAS graph, the lowest value would be:

    a) Minimum drag.
    b) Speed for endurance.
    c) Speed for range.

40. The absolute ceiling is:

    a) The level beyond which the aircraft cannot climb.
    b) The level at which the aircraft can only climb at 100 ft/min.
    c) The maximum level aircraft can attain full throttle.

41. At the absolute ceiling the:

    a) Minimum speed is less than the maximum speed.
    b) Minimum speed is more than the maximum speed.
    c) Minimum speed is equal to the maximum speed.

42. Too low an octane rating (anti-knock value) can cause:

    a) Pre-ignition.
    b) Detonation.
    c) Overheating.

43. In level flight the following affects the balance of forces:

    a) Mass of the aircraft.
    b) Height of the aircraft.
    c) Fuel burn rate.

44. On a turbocharged aircraft the supercharger is powered by:

    a) The engine.
    b) An electrical motor.
    c) Exhaust gases.

45. With reference to aircraft fitted with constant speed propellers, when the MP is reduced:

    a) The blade angle increases.
    b) The blade angle decreases.
    c) The blade angle remains the same.

46. A battery rated for 40 amps/hr it will operate for:

    a) At 40 amps for 10 hours.
    b) At 10 amps for 40 hours.
    c) At 4 amps for 10 hours.

47. Conditions favourable for the formation of icing:

    a) High temperature and low humidity.
    b) High temperature and high humidity.
    c) High humidity and low temperature.

48. Choose the correct statement:

    a) An increase in temperature will cause an increase in density.
    b) An increase in humidity will cause a decrease in density.
    c) An increase in humidity will cause an increase in density.

49. Density is measured in:

    a) Kgs/cu metre.
    b) Pounds per square metre.
    c) Millibars.

50. The main load carrying part of the wing structure is:

    a) The leading edge.
    b) The spar.
    c) The rib.

51. The strength of the wing structure will have to be greater:

    a) With large variations of the position of the centre of pressure.
    b) The centre of pressure has no effect on wngh strength.
    c) With small movements of the centre of pressure.

52. A twenty-four volt lead acid battery would have:

    a) Six cells.
    b) Twelve cells.
    c) Twenty-four cells.

53. A twenty-four volt Nicad battery would probably have:

    a) Twelve cells.
    b) Twenty-four cells.
    c) Nineteen cells.

54. Combustion in a gas turbine engine occurs at:

    a) Constant volume.
    b) Constant pressure.
    c) Constant velocity.

55. The velocity of the gases through the turbine can be very high:

    a) Because of the high temperature and speed of sound.
    b) Because they are supersonic.
    c) Because of the speed of sound being low.

56. In relation to a generator, an alternator will:

    a) Provide less electrical power.
    b) Provide more power at lower RPM.
    c) Weigh more and be bigger.

57. An aircraft magneto depends on the following to generate electrical power.

    a) The battery.
    b) The generator.
    c) Magnets.

58. An oleo leg relies on the following for its operation:

    a) Torque link and shimmy damper.
    b) Rubber blocks or bunjees.
    c) Oil and air.

59. Absorption of water into aviation fuel is more likely:

    a) With cold fuel.
    b) In hot fuel.
    c) The temperature of the fuel has no effect.

60. To eliminate the risk of fire when refuelling:

    a) You should use plastic containers.
    b) Bond the aircraft to the fuel nozzle.
    c) Have an earth lead between ground, fuel truck, fuel nozzle and the aircraft.

61. Operation of the mixture control to the lean position controls:

    a) The amount of fuel entering the inlet manifold is reduced.
    b) The amount of air entering the inlet manifold is increased.
    c) The amount of air entering the inlet manifold is reduced.

62. A breakage or disconnection of the magneto earth wire will have the effect of:

    a) Stopping the engine.
    b) Causing the engine to run roughly.
    c) Make it impossible to stop the engine by switching off ignition.

63. An ignition system in which the spark can be lethal is used on:

    a) Piston engines and turbine engines.
    b) Turbine engines only.
    c) Piston engines only.

64. With a fixed pitch propeller during climb after take-off, what should be your actions if you suspect detonation is occurring:

    a) Increase rate of climb.
    b) Reduce power.
    c) Reduce speed.

65. To obtain best efficiency and effective fuel consumption with a constant speed propeller the best setting would be:

    a) Low RPM (high pitch) when cruising.
    b) High RPM (coarse pitch) for take-off.
    c) Low RPM (fine pitch) for take-off.

66. When establishing climb power after take-off the sequence should be:

    a) Throttle, Mixture, RPM.
    b) Throttle, RPM, Mixture.
    c) Mixture, RPM, Throttle.

67. Entering a climb from cruise flight the sequence should be:

    a) Throttle, RPM, Mixture.
    b) RPM, Throttle, Mixture.
    c) Mixture, RPM, Throttle.

68. If the cylinder head temperature and oil temperature are usually high, the probable causes would be:

    a) Using fuel of too low an octane value.
    b) Using fuel of too high an octane rating.
    c) Using too rich a mixture.

69. After about 20 minutes flight with full tanks the engine stops but restarts after selection of another tank:

    a) The possible cause was a blocked fuel tank vent.
    b) Detonation.
    c) Pre-ignition.

70. During operation of a reciprocating engine the piston is travelling up:

    a) During the induction stroke.
    b) During the power stroke.
    c) During the exhaust stroke.

71. In a piston engine ignition occurs during:

    a) The power stroke.
    b) The compression stroke.
    c) The exhaust stroke.

72. Valve overlap occurs between:

    a) The induction stroke and the power stroke.
    b) The compression stroke and the power stroke.
    c) The exhaust stroke and induction stroke.

73. High pressure oil is required in a piston engine:

    a) For lubricating the accessory gearbox.
    b) For lubricating the cylinder walls.
    c) For lubricating the big end and main bearings.

74. Which oil pump has greater capacity?

    a) The Scavenge pump.
    b) The Pressure pump.
    c) The Scavenge and Pressure pumps must have the same capacity.

75. The flow of fuel from the tank to the carburettor is controlled by:

    a) The float and diffuser.
    b) The needle valve and float.
    c) The accelerate pump.

76. Mass balance on an aileron is used:

    a) To assist the pilot in moving the controls.
    b) To eliminate flutter.
    c) To prevent aileron drag.

77. Aileron reversal is most likely to occur:

    a) At very low speeds.
    b) At large angles of attack.
    c) At very high speeds.

78. The speed at which full deflection of the flight controls can be made is:

    a) Va
    b) Vmd
    c) Vso

79. In a pressurised aircraft you are cruising at Flight Level 290 and are at Maximum Differential. You wish to climb to Flight Level 330. You must:

    a) Decrease the cabin altitude by at least 4 000 ft.
    b) Increase the cabin altitude by at least 4 000 ft.
    c) Increase the cabin altitude.

80. The type of reciprocating aero-engine that would use a wet sump would be:

    a) A horizontally opposed engine.
    b) A radial engine.
    c) An inverted in-line engine.

81. The part of the valve gear which absorbs the wear from the cam is:

    a) The tappet.
    b) The push rod.
    c) The rocker arm.

82. In a piston engine the spark would occur:

    a) About 20° after TDC.
    b) About 20° before TDC.
    c) 20° after BDC.

83. To avoid wake turbulence when taking off behind a heavy aircraft it is best to:

    a) Lift off before his rotate point and stay upwind of his flight path.
    b) Lift off before his lift off point and stay downwind of his flight path.
    c) Lift off after his lift off point and stay below his flight path.

84. A loss of power when opening the throttle from idle to 1 500 RPM would be prevented by:

    a) The enrichment jet.
    b) The main jet.
    c) A rich idling mixture.

85. Comparing a carburettor engine to a fuel injection engine:

    a) Only the fuel injection engine is affected by impact icing.
    b) Both are affected by impact icing.
    c) Only the injection engine is affected by fuel evaporation icing.

86. Aircraft ignition systems have the following characteristics:

    a) The HT system requires only a light harness.
    b) The LT system uses a light harness and a transformer coil.
    c) The LT system requires suppressors and is more likely to cause radio interference.

87. The jet engine compressor which provides the biggest frontal area is:

    a) The axial flow.
    b) An axial flow first stage and a centrifugal second stage.
    c) A centrifugal first stage and an axial flow second stage.

88. When a jet engine starts normally but fails to accelerate above 30% RPM it is:

    a) A hung start.
    b) A hot start.
    c) A wet start.

89. The most suitable property for a metal used to construct fairings would be:

    a) Its toughness.
    b) Its malleability.
    c) Its brittleness.

90. The lubricating system of a piston engine normally uses the following type of pump:

    a) A diaphragm type pump.
    b) A vane of pump.
    c) A gear type of pump.

91. The hydraulic service usually provided by the accumulator is:

    a) Emergency gear operation.
    b) Emergency brakes.
    c) Emergency flap operation.

92. The unit which is usually used in a hydraulic system to operate the various services is called:

    a) A hydraulic jack.
    b) An accumulator.
    c) A reservoir.

93. The best way to determine the pre-charge pressure in an hydraulic accumulator is to operate the following service until the pressure drops:

    a) The toe brakes.
    b) The undercarriage.
    c) The flaps.

94. When operating the wheel brake system when stopping distance is important, the best way to use the brakes would be:

    a) Wait until the speed has dropped to below 100 kts and then use maximum braking.
    b) Pump the brakes to allow cooling periods.
    c) Use maximum braking as soon as possible after touch down.

95. The most modern fire detection system uses:

    a) A bi-metallic type switch.
    b) A fire wire or live wire system.
    c) A thermo-couple warning system.

96. Fires originating in electrically powered equipment are classified as:

    a) Class A fires.
    b) Class B fires.
    c) Class C fires.

97. The main longitudinal member in a Truss type of fuselage construction would be:

    a) A stringer.
    b) A longeron.
    c) A former.

98. Manual reversion is possible on:

    a) A hydraulically assisted control system.
    b) A hydraulically operated control system.
    c) A cable operated control system.

99. In a modern automatic pilot system if one of the modes were inoperative, the pilot would be prevented from engaging by:

    a) The rate-rate system.
    b) The manual reversion system.
    c) The interlock system.

100. During flight, if a change is made in pitch attitude, an aircraft will rotate around its:

a) Centre of pressure.
b) Centre of lift.
c) Centre of gravity.

101. During a change in pitch attitude, an aircraft will rotate around its:

a) Gravity and longitudinal axis.
b) Pressure and lateral axis.
c) Gravity and lateral axis.

102. Rotation about the lateral axis is known as:

a) Yawing and is controlled with the rudder.
b) Rolling and is controlled with the ailerons.
c) Pitching and is controlled with the elevator.

103. During a change in bank, an aircraft will rotate around its:

a) Centre of gravity and longitudinal axis.
b) Centre of gravity and lateral axis.
c) Centre of pressure and longitudinal axis.

104. Rotation about the longitudinal axis is known as:

a) Yawing and is controlled with the rudder.
b) Rolling and is controlled with the ailerons.
c) Rolling and is controlled with the rudder.

105. The three axis of an aircraft intersect at the:

a) Centre of pressure.
b) Centre of gravity.
c) Midpoint of the datum line.

106. Aspect ratio of the wing is defined as:

a) Wingspan to the wingroot.
b) Square of the chord to the wingspan
c) Wingspan to the mean aerodynamic chord.

107. The angle between the chord line of a wing and the longitudinal axis of the aircraft is known as the angle of:

a) Dihedral.
b) Incidence.
c) Attack.

108. The acute angle between the chord of an airfoil and its direction of motion relative to the air is known as:

a) Dihedral angle.
b) Angle of attack.
c) Angle of incidence.

109. The angle between the chord line of an airfoil and the relative airflow is known as the angle of:

a) Attack.
b) Incidence.
c) Longitudinal dihedral.

110. Lift on wing is most properly defined as the:

a) Force produced perpendicular to the longitudinal axis.
b) Reduced pressure resulting from a smooth flow of air over a curved surface and acting perpendicular to the mean surface.
c) Force produced perpendicular to the relative airflow.

111. The lift produced by an airfoil is the force produced:

a) Halfway between the chord line and the relative airflow.
b) Opposite to the relative airflow.
c) Perpendicular to the relative airflow.

112. During flight with zero angle of attack, the pressure along the upper surface of the wing should be:

a) Less than atmospheric pressure.
b) Equal to atmospheric pressure.
c) Greater than atmospheric pressure.

113. Choose the correct statement re. angle of attack:

a) An increase in angle of attack will increase impact pressure below the wing, and decrease drag.
b) An increase in angle of attack will increase impact pressure below the wing, and increase drag.
c) A decrease in angle of attack will increase impact pressure below the wing, and increase drag.

114. What changes in aircraft control must be made to maintain altitude while the airspeed is being decreased:

    a) Increase the angle of attack to compensate for decreasing lift.
    b) Maintain a constant angle of attack until the desired airspeed is reached, then increase the angle of attack.
    c) Increase the angle of attack to produce more lift than weight.

115. The point of an airfoil through which lift acts, is the:

    a) Centre of pressure.
    b) Centre of gravity.
    c) Centre of rotation.

116. When the angle of attack of an airfoil is increased from 1° to 8° the centre of pressure will:

    a) Remain unaffected.
    b) Move forward.
    c) Move aft.

117. Both lift and drag of an airfoil are:

    a) Proportional to the square of the velocity (V^2) of the relative airflow.
    b) Proportional to the increases in the velocity of the relative airflow.
    c) Inversely proportional to the area of the wing.

118. If the airspeed of an aircraft is double while the angle of attack is held constant, the parasite drag will:

    a) Remain the same.
    b) Be four times greater.
    c) Double.

119. Assume an aircraft cruising at 100 mph and creating 1 000 lbs of drag, if the angle of attack remains the same but the airspeed is doubled, the total drag would be increased to:

    a) 4 000 lbs.
    b) 3 000 lbs.
    c) 2 000 lbs.

120. Which of the following statements generally describes the relationship of the forces acting on an aircraft that is climbing at a constant airspeed and at constant power:

    a) Thrust is greater than drag; lift is greater than weight.
    b) Thrust is greater than drag and lift is equal to weight.
    c) Total thrust is equal to total drag; total lift is equal to total weight.

121. The reason a light general aviation aeroplane tends to nose down during power reductions, is that the:

a) Thrust line acts horizontally and above the force of drag.
b) Centre of gravity is located forward of the centre of pressure.
c) Centre of pressure is located forward of the centre of gravity.

122. How is an aircraft's performance affected by frost on the wings:

a) Lift is decreased; drag is decreased.
b) Lift is increased; drag is decreased.
c) Lift is decreased; drag is increased.

123. Frost covering the upper surface of an airfoil (wing) will usually cause:

a) The aircraft to stall at an angle of attack that is lower than normal.
b) The aircraft to stall at an angle of attack that is higher than normal.
c) No problem for pilots of light aircraft.

124. What determines the angle of attack at which an aircraft stalls?

a) Design of the wing.
b) Load factor.
c) True airspeed.

125. In all aircraft, stalls are caused by:

a) A loss of airspeed.
b) Exceeding the critical angle of pitch.
c) Exceeding the critical angle of attack.

126. For a given airfoil, the angle of attack which results in a stall:

a) Remains constant regardless of bank, load factor or airspeed.
b) Varies directly with the degree of bank.
c) Varies with the speed on airflow around the airfoil.

127. The angle of attack at which an aircraft stalls:

a) Is dependant upon the speed of the airflow over the wings.
b) Is a function of speed and density altitude.
c) Will remain constant regardless of gross weight.

128. Which statement is true relating to factors which produce stalls:

a) The stalling angle of attack depends upon the speed of the airflow over the wings.
b) The critical angle of attack is a function of the degree of bank.
c) The stalling angle of attack is independent of the speed of airflow over the wings.

129. Indicated stall speed is affected by:

a) Angle of attack, weight and air density.
b) Weight, load factor and power.
c) Load factor, angle of attack and power.

130. An aircraft in a steep-banked turn stalls at a higher IAS than it does with the wings level, because in the turn:

a) The critical angle of attack has decreased.
b) The critical angle of attack is reached at a higher IAS.
c) Total lift has decreased.

131. Why can turbulent air cause an increase in stall speed:

a) The TAS is abruptly increased.
b) The load factor is suddenly decreased.
c) The angle of attack is increased.

132. To produce the desired effect, trim tabs must be adjusted:

a) In such a direction as to remain flush with the primary control surfaces they affect.
b) In the same direction as the primary control surfaces they affect.
c) In the opposite direction to the primary control surfaces they affect.

133. Choose the correct statement re. the use of rudder in conventional aircraft to compensate for the effects of torque:

a) If airspeed is decreased (power constant), right rudder pressure must be added.
b) If power is reduced (airspeed constant), right rudder pressure must be added.
c) If power is increased (airspeed constant), left rudder pressure must be added.

134. The primary function of rudder, while entering a turn from straight-and-level flight, is to:

a) Overcome the yaw caused by the lowered aileron on the higher wing.
b) Overcome the yaw caused by the lowered aileron on the lower wing.
c) Overcome the yaw caused by the raised aileron on the higher wing.

135. When entering a turn, the primary function of rudder is to:

a) Control yawing about the vertical axis.
b) Allow the aircraft to pitch about its lateral axis.
c) Prevent the aircraft from rolling about the longitudinal axis.

136. The hazardous vortex turbulence that might be encountered behind large aircraft is created only when that aircraft is:

a) Using high power settings.
b) Operating at high airspeeds.
c) Developing lift.

137. Choose the correct statement regarding wake turbulence:

a) The primary hazard is loss of control because of induced roll.
b) Vortex operation begins with the initiation of the take off roll.
c) Vortices tend to remain level for a period of time.

138. If wake turbulence is encountered, the probability of induced roll increases when the encountering aircraft's:

a) Airspeed is slower than that of the generating aircraft.
b) Altitude is higher than that of the generating aircraft.
c) Heading is aligned with the flight path of the generating aircraft.

139. Aerodynamically, propeller thrust is the result of the:

a) Angle of incidence of the blade.
b) Decreased pressure on the flat side of the blade and increased pressure on the curved side.
c) Shape and angle of attack of the blade.

140. Air deflection produced by a rotating propeller cause dynamic pressure on the engine side of the propeller to be greater than atmospheric pressure, thus generating:

a) Torque.
b) Drag.
c) Thrust.

141. During take-off, when maximum power and thrust are required, the constant speed propeller should be set at a propeller blade angle which:

a) Will produce a low slipstream velocity.
b) Will produce a small angle of attack with respect to its relative airflow.
c) Will produce a large angle of attack with respect to its relative airflow.

142. To develop maximum power and thrust, a constant speed propeller should be set to a blade angle which will produce:

    a) Large angle of attack and low RPM.
    b) Small angle of attack and high RPM.
    c) Large angle of attack and high RPM.

143. To establish a climb after take-off in an aircraft equipped with a constant speed propeller, the output of the engine is reduced to climb power by decreasing manifold pressure and:

    a) Increasing RPM by increasing propeller blade angle.
    b) Decreasing RPM by decreasing propeller blade angle.
    c) Decreasing RPM by increasing propeller blade angle.

144. In relation to an aerofoil the propeller provides:

    a) More thrust and less torque than lift and drag.
    b) Less thrust and more torque than lift and drag.
    c) More torque than lift and less thrust than drag.

145. Which is correct for the following statements:

    a) Blade angle consists of helix angle and angle of attack.
    b) Helix angle consists of blade angle and angle of attack.
    c) Angle of attack equals helix angle.

146. The blade angle of a propeller will:

    a) Be greatest at the tip.
    b) Be greatest at 7° radius.
    c) Be greatest at the root.

147. The force tending to twist a propeller blade of a constant speed propeller to fine pitch is:

    a) Torque.
    b) Centrifugal twisting moment.
    c) Aerodynamic twisting moment.

148. The use of flaps will produce:

    a) Increased lift and decreased drag.
    b) Increased lift and increased drag.
    c) Decreased lift and increased drag.

149. The primary function of flap is to:

a) Provide a steeper gliding angle.
b) Increase control-effectiveness at slow airspeeds.
c) Permit a safer take-off over high obstructions.

150. Lowering the flap during a landing approach will:

a) Increase the angle of descent with increasing airspeed.
b) Decrease the angle of descent with increasing power.
c) Permits approaches in aircraft with a good L/D ratio.

151. Which statement is true regarding the use of flaps during turns:

a) The addition of flaps decreases the stall speed.
b) The addition of flaps increases the stall speed.
c) Using a constant flap setting and varying the bank has no affect on the stall speed.

152. The lowering of flaps decreases the stalling angle except with:

a) Fowler flaps.
b) Slotted flaps.
c) Split flaps.

153. The effect of flaps is to:

a) Improve the L/D ratio.
b) Improve the L/D ratio at small flap settings.
c) Spoil the L/D ratio.

154. The ratio between the total air load imposed on the wing and the gross weight in flight is known as:

a) Power loading.
b) Load factor.
c) Yield load.

155. Assume an aircraft is certificated with a maximum gross weight of 2 500 lbs and a load factor of 3.8. If this aircraft were loaded to a gross weight of 2 650 lbs and flown in turbulence creating a 3.8 load factor, what air load would be imposed upon its structure?

a) 2 650 lbs and this aircraft should not be flown with this gross weight.
b) 570 lbs above maximum permissible, this aircraft should not be flown at this gross weight.
c) 150 lbs above maximum permissible and this aircraft should not be flown at this gross weight.

156. Wing loading of an aircraft is determined by a value which is the:

a) Gross weight of the aircraft divided by the wing area.
b) Ratio of the wing area to the horsepower.
c) Gross weight divided by the span.

157. Load factor is the actual weight supported by the wings at any given moment:

a) Divided by the normal weight of the aircraft.
b) Multiplied by the total weight of the aircraft.
c) Added to the total weight of the aircraft.

158. If the angle of bank were held constant and the airspeed varied, the load factor would:

a) Vary depending on the rate of turn.
b) Decrease when the airspeed decreases.
c) Remain constant.

159. The additional load imposed on the wings during a level co-ordinated turn in smooth air is dependent on the:

a) Angle of bank.
b) Rate of turn.
c) True airspeed.

160. For a given angle of bank, the load factor imposed on both the aircraft and pilot in a co-ordinated constant altitude turn:

a) Varies with the rate of turn.
b) Is directly related to the aircraft's gross weight.
c) Is constant.

161. In a constant altitude co-ordinated turn, the load factor imposed on an aircraft is the result of:

a) Rate of turn and airspeed.
b) Angle of attack and airspeed.
c) Centrifugal force and gravity.

162. If, while holding the angle of bank constant, the rate of turn is varied, the load factor would:

a) Remain constant.
b) Vary depending upon airspeed.
c) Increase if the speed were increased.

163. What increase in load factor would take place if the angle of bank were increased for 60 to 70 degrees?

a) 0.5 G.
b) 1.0 G.
c) 1.5 G.

164. What is the stall speed of an aircraft under a load factor of 2 if the unaccelerated stall speed is 60 knots?

a) 66 knots.
b) 74 knots.
c) 84 knots.

165. What is the stall speed of an aircraft under a load factor of 2 if the unaccelerated stall speed is 80 knots?

a) 90 knots.
b) 112 knots.
c) 120 knots.

166. At a constant power setting the rate of climb of an aircraft is greater when the wings are level than when in a climbing turn because, when level, the:

a) Wing loading is greater.
b) Centre of lift is nearer the trailing edge.
c) Vertical lift component is greater.

167. Which statement is correct with respect to rate and radius of turn for an aircraft in a co-ordinated turn at a constant altitude:

a) For any specific angle of bank and airspeed, the lighter the aircraft, the faster the rate and the smaller the radius of turn.
b) For a specific angle of bank and airspeed, the rate and radius of turn will not vary.
c) The lower the airspeed the less the rate of turn for a specific bank angle.

168. Which statement is true if, during a level co-ordinated turn, the load factor was kept constant:

a) A decrease in airspeed results in an increase in radius.
b) An increase in airspeed results in an increase in radius.
c) An increase in airspeed results in a decrease in radius.

169. Increasing the airspeed while maintaining a constant load factor during a level co-ordinated turn would result in:

a) The same radius of turn.
b) A decrease in the radius of turn.
c) An increase in the radius of turn.

170. If, during a level turn, the rate of turn is kept constant, an increase in airspeed will result in:

a) Constant load factor regardless of changes in angle of bank.
b) Need to decrease the angle of bank to maintain the same rate of turn.
c) Need to increase the angle of bank to maintain the same rate of turn.

171. The type of drag which decreases with increase in speed is:

a) Form drag.
b) Interference drag.
c) Induced drag.

172. It is not necessary to hold off bank in:

a) A gliding turn.
b) A climbing turn.
c) A level turn.

173. Aileron drag, or adverse yaw, is most likely at:

a) High speed.
b) High angle of attack.
c) Low angle of attack.

174. To be suitable for supersonic flight an aerofoil should have:

a) A well rounded leading edge.
b) A laminar flow section.
c) A very sharp leading edge.

175. The first shock wave on an aerofoil approaching the speed of sound occurs:

a) At the trailing edge.
b) On the top surface.
c) Under the bottom surface.

176. The characteristics which would improve lateral stability are:

a) High keel surface, Low centre of gravity, Dihedral.
b) Longitudinal dihedral, Low centre of gravity, Large keel surface.
c) Sweepback and High centre of gravity, Anhedral.

177. The effect of inertia moment would be increased with:

a) Forward centre of gravity.
b) Centre of pressure well aft.
c) Centre of gravity well aft.

178. The type of control balance used to oppose flutter is:

a) Inset hinge balance.
b) Servo tab balance.
c) Mass balance.

179. A wing would by called polymorphic if fitted with:

a) Split flaps.
b) Vortex generators.
c) Fowler flaps.

180. An aircraft is in a state of equilibrium in:

a) A steady rate 1 turn.
b) In a steady climb.
c) During take-off.

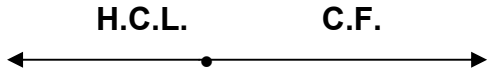
181. A heavy aircraft in relation to a lighter aircraft of the same type will glide:

a) Further in a tail wind.
b) The same distance in still air conditions.
c) More slowly in a head wind.

182. When taking off with an obstacle ahead, the best speed to use for the initial climb would be:

a) V_x.
b) V_a.
c) V_y.

183. The vectors shown below indicate:



a) A skidding left turn.
b) A slipping right turn.
c) A skidding right turn.

184. To achieve the correct Vref at maximum landing weight you would approach at:

a) 1.3 times the speed at the bottom of the ASI green arc.
b) 1.3 times the speed at the bottom of the ASI white arc.
c) 1.3 times the speed at the top of the ASI white arc.

185. Contra-rotating propellers have the effect of:

a) Eliminating both gyroscopic and torque effects.
b) Reducing gyroscopic effects but increasing torque effects.
c) Increasing gyroscopic but reducing torque effects.

186. The effect of size when considering aerodynamic forces is allowed for by:

a) Joules Law.
b) Bernoulli's Theorem.
c) Reynolds Number.

187. The dividing line between laminar flow and turbulent flow around an aerofoil is known as:

a) Separation point.
b) Transition point
c) Line of Mean camber.

188. The effect of induced drag can be reduced by:

a) Wash out.
b) Low aspect ratio.
c) Increasing the angle of incidence at the tip.

189. Apart from warning devices the aerodynamic warning of the approaching stall is:

a) Buffet of the tail surfaces.
b) The attitude of the aircraft.
c) A sharp dropping of the nose.

190. The possibility of a spin developing into a flat spin is greatest with:

a) A forward centre of gravity.
b) A small inertia moment.
c) An aft centre of gravity.

191. The density of the air at sea level is ISA is:

a) 1 225 Kgs/Cubic metre.
b) 1 225 gms/sq.metre.
c) 1225 gms/cubic metre.

192. The difference between RAS and EAS is:

a) Compressibility.
b) Position error.
c) Position error and instrument error.

193. The sum of Form drag, Skin Friction drag and Interference drag is:

a) Total drag.
b) Induced drag.
c) Profile drag.

194. Aileron reversal is most likely to occur at:

a) Large angles of attack.
b) Very high speed.
c) Very low speed.

195. If the humidity is high you would expect the take-off run:

a) To be unaffected because it is not given in the chart.
b) To be longer because of the lower density.
c) To be shorter because of the higher density.

196. The rate of climb of an aircraft is determined by:

a) Power available over power required.
b) Lift available over lift required.
c) The lift/drag ratio.

197. Ignoring the effect of Mach Number, the stalling speed (IAS):

a) Reduces with increasing height.
b) Remains the same with increasing weight.
c) Increases with reduced density.

198. If, while holding the angle of bank constant, the rate of turn is increased, the load factor would:

a) Remain the same.
b) Vary depending on speed.
c) Vary depending on weight.

199. Down movement of the elevator trimming tab will:

a) Overcome a tendency to fly nose heavy.
b) Overcome a tendency to fly tail heavy.
c) Make the aircraft nose heavy.

200. To correct for nose heaviness on an aircraft fitted with a variable incidence tailplane, the incidence of the tailplane would have to be:

a) Increased and this can be done by a mechanism which lowers the leading edge.
b) Decreased and this can be done by a mechanism which lowers the trailing edge.
c) Decreased and this can be done by a mechanism which lowers the leading edge.

201. You have adjusted the elevator trim tab to correct for nose heavy, what was the direction of travel of the trim tab:

a) The elevator trim has moved up.
b) The port elevator tab has moved up and starboard moved down.
c) The elevator trim tab has moved down.

202. When an aileron trim control in the cockpit is moved to counteract a tendency to fly left wing low, an aileron trim tab fitted to the port aileron will:

a) Move up and cause the left aileron to move down and the right aileron to move down to a lesser degree.
b) Move up and cause the left aileron to move down but the right aileron will remain neutral.
c) Move up and this will cause the left aileron to move down and the right aileron to move up.

203. The purpose of a trim tab is:

a) To provide “feel” when flying at high airspeeds.
b) To assist the pilot in initiating movement of the controls in both directions.
c) To zero the loads on the pilot’s control in the flight attitude required.

204. A free servo tab is operated:

a) Automatically and moves in the same direction as the main control surface.
b) Directly by the pilot to produce forces which in turn move the main control surfaces.
c) By a trimmer wheel, and moves in the opposite direction to the main control surface when moved.

205. If the control column is moved to the right, a balance tab on the port aileron should:

a) Move up relative to the aileron.
b) Move down relative to the aileron.
c) Not move unless the aileron trim control is operated.

206. On an aircraft with a variable incidence trimming tailplane, the tailplane incidence changes:

a) Automatically if the elevator moves.
b) If the control column is moved back or forward.
c) If the trim wheel is turned back or forward.

207. With the aircraft standing on the ground, if the control column is pulled back, a spring tab on the elevator:

a) Will remain in the neutral position relative to the elevator.
b) Will move down relative to the elevator.
c) Will move up relative to the elevator.

208. A stall warning must be set to operate:

a) At a speed just below stalling speed.
b) At a speed above stalling speed.
c) At a stalling speed.

209. In a steady turn an aircraft experiences 3g, the stalling speed will be:

a) Above the normal stalling speed.
b) Below the normal stalling speed.
c) The same as the normal stalling speed.

210. At altitudes above sea level the IAS stalling speed will be:

a) The same as at sea level.
b) Less than at sea level
c) Greater than at sea level.

211. A typical stalling angle of attack is:

a) 30
b) 15
c) 5

212. With engine power on, an aircraft will stall:

a) At the same speed as with power off.
b) At a lower speed than with power off.
c) At a higher speed than with power off.

213. If the aircraft weight changes by 6% the stalling speed will change by approximately.

a) 3%.
b) 12%.
c) 6%.

214. A fixed spoiler on the leading edge of the wing at the root will:

a) Prevent a root stall.
b) Induce a root stall.
c) Give a shorter landing run.

215. At angles of attack above the stalling angle:

a) The lift decreases and the drag decreases.
b) The lift decreases and the drag increases.
c) The lift increases and the drag increases.

216. A wing is stalled when:

a) The lift produced is less than the weight.
b) The airflow has separated from most of the upper surface.
c) The lift is zero.

217. A leading edge slat is a device for:

a) Increasing the stalling angle of the wing.
b) Decreasing the drag of the wing.
c) Decreasing the stalling angle of the wing.

218. The purpose of a leading edge droop is:

a) To give a more cambered section for high-speed flight.
b) To increase wing camber, and prevent separation of the airflow when trailing edge flaps are lowered.
c) To increase the wing area for take-off and landing.

219. The type of flap which increases wing area is:

a) A split flap.
b) A fowler flap.
c) A plain flap.

220. Lowering a flap to its landing setting will:

a) Give a large increase in drag and a lower stalling speed.
b) Give a large increase in drag but a higher stalling speed.
c) Give a smaller increase in drag but a lower stalling speed.

221. A stick shaker is:

a) A high Mach Number warning device.
b) An artificial stability device.
c) A device to vibrate the control column to give a stall warning.

222. The stalling speed is determined by:

a) The maximum value of C_L.
b) The C_L for zero lift.
c) The C_L for maximum L/D ratio.

223. A stick pusher is a device for:

a) Assisting the pilot to move the control against high air loads.
b) Preventing the aircraft from getting into a stall.
c) Automatically compensating pitch changes at high speeds.

224. If the control column is moved forward and to the right:

a) The left aileron will move down and the right aileron up, elevator up.
b) The left aileron will move up, and the right aileron down, elevator up.
c) The right aileron will move up, and the left aileron down, elevator down.

225. The purpose of a turnbuckle in a flying control system, is:

a) To enable the control cables to be cross-connected.
b) To enable the range of movement of the control surface to be adjusted.
c) To enable the cable tension to be adjusted.

226. With a differential aileron control systems:

a) The aileron moves further down than up.
b) The leading edge projects beneath the wing when the aileron is raised.
c) The aileron moves further up than down.

227. A duplicate inspection is required:

a) On both flying control and engine control systems.
b) On flying systems only.
c) On engine control systems only.

228. Locking of a turnbuckle in a flying control run is normally achieved by:

a) Locking wire through the turnbuckle and the end fittings.
b) Slotted nuts and split pins at each end.
c) Self-locking stop nuts in the end fittings.

229. Over tension cables of a flying control system could result in:

a) Excessive friction in the system.
b) Insufficient friction in the system.
c) Insufficient range of movement of the control surface.

230. The purpose of control locks on a flying control system is:

a) To prevent structural damage to the controls in gusty conditions.
b) The enable any free movement in the control system to be detected.
c) To keep the control surface rigid for ground handling.

231. A control surface is mass balanced by:

a) The attachment of weights acting on the hinge line.
b) Fitting a balance tab.
c) The attachment of weights acting forward of the hinge line.

232. A frise aileron is one on which:

a) Upward movement is greater than downward movement.
b) The leading edge protrudes above the wing when the aileron is lowered.
c) The leading edge protrudes below the wing when the aileron is raised.

233. To limit the range of control surface movement:

a) Cables are tensioned correctly.
b) Control cables are left a little slack.
c) Control stops are provided.

234. When left rudder is applied:

a) The left side of the rudder bar is moved forward and the rudder moves to the starboard.
b) The left side of the rudder bar moves forward and the rudder moves to port.
c) The right side of the rudder bar moves forward and the rudder moves to port.

235. Controls are mass balanced in order to:

a) Eliminate control flutter.
b) Aerodynamically assist the pilot in moving the controls.
c) Provide equal control forces on all three controls.

236. A duplicate inspection of flying controls by a pilot or flight engineer must cover the checking of several different aspects of the appropriate flying control system. Amongst these are checks to verify:

a) The operation of the controls in flight produces the intended effect on the flight path of the aircraft.
b) That full movement is in accordance with figures stated in the Certificate of Airworthiness.
c) That full, free and correct movement of control surfaces relative to the movement of their controls is obtained.

237. The airflow over the top surface of an aerofoil produces:

a) A smaller proportion of the total lift than the airflow past the lower surface.
b) An equal proportion of the total to that produced by the airflow past the lower surface.
c) A greater proportion of the total lift than the airflow past the lower surface.

238. The optimum angle of attack of an aerofoil is the angle at which:

a) The highest lift/drag ratio is produced.
b) The aerofoil produces zero lift.
c) The aerofoil produces maximum lift.

239. The factors which affect lift produced by an aerofoil are:

a) Angle of attack, air density, velocity, and wing area.
b) Angle of attack, air temperature, velocity, and wing area.
c) Angle of attack, velocity, wing area, aerofoil shape, and air density.

240. If the density of air is increased, the lift will:

a) Remain the same.
b) Decrease.
c) Increase.

241. A cambered aerofoil section set at zero angle of attack in an airstream will:

a) Produce negative lift.
b) Produce lift.
c) Produce no lift.

242. The stalling angle of attack of a typical aerofoil is approximately:

a) –1°
b) 15°
c) 5°

243. If the airspeed over a wing at a constant angle of attack is doubled:

a) The lift will be double.
b) The lift will increase four times.
c) The lift will increase eight times.

244. A high speed and high aspect ratio wing:

a) Decreases skin friction drag.
b) Decreases induced drag.
c) Increases induced drag.

245. The boundary layer of a body in a moving airstreams is:

a) A thin layer of air over the surface where the air is stationary.
b) A layer of separated flow where the air is turbulent.
c) A layer of air over the surface where the airspeed is changing from free stream to zero speed.

246. As the speed of an aircraft increases the profile drag:

a) Decreases.
b) Decreases at first then increases.
c) Increases.

247. Minimum total drag of an aircraft occurs:

a) When induced drag is least.
b) At the stalling speed.
c) When profile drag equals induced drag.

248. The induced drag of an aircraft:

a) Increases with increasing speed.
b) Increases as aspect ratio is increased.
c) Decreases with increasing speed.

249. Two geometrically similar streamlined bodies A and B have the same fineness ratio, but A is larger than B:

a) A would have a lower drag Coefficient than B.
b) A would have a higher drag Coefficient than B.
c) A would have the same drag Coefficient at B.

250. If the weight of an aircraft is increased, the profile drag at a given speed:

a) Will remain the same.
b) Will increase.
c) Will decrease.

251. A symmetrical aerofoil section set at zero angle of attack in an airstream will produce:

a) Drag but no lift.
b) No lift or drag.
c) Lift and drag.

252. A high wing position on an a/c gives:

a) The same lateral stability as a low wing.
b) Less lateral stability than a low wing.
c) More lateral stability than a low wing.

253. Increasing the size of the fin will:

a) Increase lateral stability.
b) Decrease lateral stability.
c) Not affect lateral stability.

254. After a disturbance in pitch an aircraft oscillates with increasing amplitude. It is:

a) Dynamically neutral.
b) Dynamically stable but statically unstable.
c) Dynamically unstable longitudinally.

255. To ensure longitudinally stability in flight, the position of the C of G:

a) Should not be forward of the neutral point.
b) Should not be aft of the neutral point.
c) Should coincide with the neutral point.

256. Moving the centre of gravity aft will:

a) Increase longitudinal stability.
b) Reduce longitudinal stability.
c) Have no effect on longitudinal stability.

257. After a disturbance in pitch, an aircraft continues to oscillate at a constant amplitude. It is:

a) Longitudinally neutrally stable.
b) Laterally unstable.
c) Longitudinally unstable.

258. Sweepback of the wing will:

a) Not affect the lateral stability.
b) Decrease lateral stability.
c) Increase lateral stability.

259. Longitudinal stability is given by:

a) The horizontal tailplane.
b) The wing dihedral.
c) The fin.

260. Lateral stability is given by:

a) The ailerons.
b) The wing dihedral.
c) The horizontal tailplane.

261. The static margin is equal to the distance between:

a) The C of G and the neutral point.
b) The C of P and the neutral point.
c) The C of G and the C of P.

262. An aircraft is constructed with dihedral to provide:

a) Longitudinal stability about the lateral axis.
b) Lateral stability about the longitudinal axis.
c) Lateral stability about the normal axis.

263. The fin gives:

a) Directional stability about the longitudinal axis.
b) Directional stability about the normal axis.
c) Longitudinal stability about the lateral axis.

264. The lift/drag ratio of a wing section at its stalling angle of attack is:

a) Of a negative quantity.
b) Low.
c) High.

265. For the same angle of attack a cambered wing will:

a) Give less lift than one with no camber.
b) Give the same lift as one with no camber.
c) Give more lift than one with no camber.

266. The Centre of Pressure is:

a) The centre of gravity of the wing.
b) The point on the chord line at which the resultant lift force may be said to act.
c) The point of maximum pressure on the under surface of the wing.

267. For a cambered wing section the zero lift angle will be:

a) Positive.
b) Negative.
c) Zero.

268. The type of drag which increases with increasing angle of attack:

a) Interference drag.
b) Induced drag.
c) Profile drag.

269. If an aircraft is flying 0° angle of attack, the pressure over the top surface of an aerofoil would be:

a) Above atmospheric pressure.
b) Below atmospheric pressure.
c) The same as atmospheric pressure.

270. In the narrow section of a Venturi Tube:

a) The velocity is minimum; pressure is decreasing.
b) The velocity is maximum; pressure is minimum.
c) The velocity is decreasing; pressure is minimum.

271. If kinetic energy increases in a Venturi Tube there will be a decrease in:

a) Potential energy.
b) Energy due to position.
c) Pressure energy.

272. Regarding angle of attack it is true to say that:

a) An increase in angle of attack will increase impact pressure below the wing and decrease drag.
b) An increase in angle of attack will increase impact pressure below the wing and increase drag.
c) A decrease in angle of attack will increase impact pressure below the wing and increase drag.

273. The lift produced by an aerofoil is the force produced:

a) Halfway between the chord line and the relative wind.
b) Opposite to the relative wind.
c) Perpendicular to the relative wind.

274. In an engine fitted with a convergent-divergent exhaust duct, the airflow:

a) In the convergent section reaches sonic velocities.
b) In the divergent section reaches sonic velocities.
c) In the divergent section undergoes a decrease in pressure.

275. In a carburettor engine which is running at high power, the fuel level in the diffuser is:

a) Lower than that in the carburettor bowl.
b) The same as that in the carburettor bowl.
c) Higher than that in the carburettor bowl.

276. The purpose of suppressors as close as possible to the generator is:

a) To prevent the switching of high voltage to low voltage within the cockpit.
b) To control the generator voltage output within close limits.
c) To suppress generator produced interferences, which are detrimental to the efficient operation of radio and radar services.

277. In a climb the resultant forces which combine to support the aircraft are:

a) Total reaction and lift.
b) Thrust and drag.
c) Lift and thrust.

278. The four flight fundamentals involved in manoeuvring an aircraft are:

a) Straight and level flight, turns, climbs and descents.
b) Starting, taxiing, take-off, landing.
c) Aircraft power, pitch, bank and trim.

279. Torsional flutter is a condition during which:

a) The wing twists in rapidly alternating directions at high IAS because of the attachment of poorly balanced control surfaces.
b) The control surfaces flutter, but not the wings to which they are attached.
c) The aircraft is stalled resulting in the rapid longitudinal movement in the centre of pressure.

280. Lift on a wing is most properly defined as the:

a) Force produced parallel to the relative wind.
b) Reduced pressure resulting from a smooth flow of air over a curved surface and acting perpendicular to the longitudinal axis.
c) Differential pressure acting perpendicular to the chord of the wing.

281. Lateral stability will be improved with:

a) Dihedral.
b) Anhedral.
c) Longitudinal dihedral.

282. The tendency for an aircraft to return to a previous trimmed flight condition is know as:

a) Controllability.
b) Stability.
c) Manoeuvrability.

283. As aircraft weight is reduced by fuel consumption, the stalling speed will:

a) Decease.
b) Remain the same.
c) Increase.

284. Density of the air will increase with:

a) An increase in temperature.
b) An increase in pressure.
c) An increase in humidity.

285. It is unwise to operate an aeroplane in excess of its maximum certificated gross weight primarily because:

a) Of the significant increase in fuel consumption.
b) An overload aeroplane is excessively stable in flight.
c) Excessive loads may be imposed on some parts of the structure.

286. Factors for lateral stability are:

a) Dihedral, large fin and low C of G.
b) Dihedral, high wing and low C of G.
c) Sweepback, large tail area.

287. Volumetric efficiency in a piston engine fitted with a constant speed propeller will be better at:

a) High engine RPM, and high manifold pressure.
b) High engine RPM, and low manifold pressure.
c) High manifold pressure and low engine RPM.

288. The main longitudinal members in a truss type fuselage construction are:

a) Longerons.
b) Formers.
c) The empennage.

289. The section of a piston engine requiring the highest oil pressure is:

a) The camshaft.
b) The main bearings.
c) The cylinder.

290. The valves are opened by:

a) A spring.
b) The camshaft.
c) The gudgeon pin.

291. Apart from lubrication, an advantage obtained from oil is that it:

a) Prevents detonation.
b) Prevents pre-ignition.
c) Assists with cooling.

292. Hazardous vortex turbulence that might be encountered behind large aircraft is created only when the aircraft is:

a) Heavily loaded.
b) Developing lift.
c) Operating at high speeds.

293. The loss of aircraft control which may occur if a light aeroplane is flown into the wake of a large aeroplane is caused principally by:

a) The tornado-like vortices produced by the wingtips of the large aeroplane.
b) Meteorological conditions which create wind-shear.
c) Turbulence created by the propellers of jet engine of the large aeroplane.

294. The first indication of carburettor icing in aeroplane equipped with a fixed pitch propeller would most likely be a:

a) Decrease in manifold pressure.
b) Increase in oil pressure.
c) Rough running engine and a decrease in RPM.

295. If fuel-air mixture adjustments are not made during operation at high altitudes, engine performance will be affected because of:

a) A constant volume of air and an increase in the amount of fuel metered by the carburettor.
b) A decrease in the weight of air while approximately the same amount of fuel is delivered by the carburettor.
c) A decrease in the amount of fuel and a decrease in the amount of air delivered by the carburettor.

296. In the choke tube area of the carburettor an area of:

a) High pressure is found.
b) Low pressure in found.
c) No difference in pressure in found.

297. Operating with too lean a mixture is likely to lead to:

a) More power.
b) Pre-ignition.
c) A very cool running engine.

298. The fuel system which is not susceptible to icing from fuel evaporation is:

a) Gravity feed.
b) Pump driven carburettor feed.
c) Fuel injection.

299. The compressor air into the can annular which is not used in the combustion process in a turbo-jet engine is used to:

a) Reduce the noise level in the exhaust gasses.
b) Reduce the temperature of the gasses at the turbine blades.
c) Provide power to the rear turbine.

300. If atmospheric pressure and temperature remain the same, an increase in humidity would affect take-off performance by:

a) A shorter take-off distance (the air is less dense).
b) A longer take-off distance (the air is more dense).
c) A longer take-off distance (the air is less dense).

301. With reference to starting aeroplane engines, “hydraulicing” refers to:

a) An excessive build-up of oil pressure in the oil pump due to cold oil and consequent overloading of the starter.
b) Possible damage due to excessive amounts of liquid in some engine cylinders.
c) Possible damage to bearings to hydraulic locks in the oil system because of cold oil.

302. With reference to aeroplane operating manual, the Vle refers to:

a) The maximum speed at which the undercarriage may be lowered.
b) The maximum speed at which the aeroplane may be flown with the undercarriage extended.
c) The maximum speed of the aeroplane in the landing configuration.

303. Propeller efficiency relates to:

a) The theoretical distance the propeller advances in one revolution.
b) The ratio of useful work produced by the propeller to the work put into the propeller by the engine.
c) The effect that slippage has on the propeller.

304. An aircraft loaded with the C of G too far aft is:

a) Nose heavy and less stable.
b) Tail heavy and less stable.
c) Tail heavy and more stable.

305. Cabin differential is:

a) The difference between cabin altitude and aircraft altitude and is usually negative.
b) The difference between cabin pressure and ambient pressure and is usually positive.
c) The difference between cabin pressure and ambient pressure is negative.

306. The capacity of a battery is given in:

a) Volts.
b) Amp/hour.
c) Amps.

307. Warning of an electrical overload would be given by:

a) Low amps.
b) Generator warning light.
c) High amps.

308. If while starting a jet engine there is no indication of a rise in EGT, it indicates:

a) A huge start.
b) A wet start.
c) A hot start.

309. The advantage of the centrifugal compressor in relation to the axial flow compressor is that:

a) It gives a greater pressure rise in one stage.
b) It has a smaller frontal area.
c) The flow of the gases into the combustion chambers is straighter.

310. Flexural aileron flutter would by reduced by:

a) Horn balance.
b) Insert hinge balance.
c) Mass balance.

311. The pilot's movement of the controls will be made easier by:

a) Mass balance.
b) Servo tab.
c) Anti-servo tab.

312. The strokes in a four stroke engine are:

a) Induction, power, exhaust, compression.
b) Power, exhaust, induction, compression.
c) Compression, power, induction, exhaust.

313. In four stroke reciprocating engine the:

a) Camshaft turns at twice the speed of the crankshaft.
b) Crankshaft turns at twice the speed of the camshaft.
c) The crankshaft and the camshaft turn at the same speed.

314. In an engine fitted with a carburettor, a worn needle and seat will cause difficulty in starting because of:

a) An excessively rich mixture.
b) Too lean a mixture.
c) A fuel blockage to the carburettor bowl.

315. An aircraft engine fitted with a dry sump system has a scavenge pump which pumps at:

a) A lower capacity than the pressure pump.
b) A greater capacity than the pressure pump.
c) The same capacity as the pressure pump.

316. A high by-pass fan engine, compared with a low by-pass fan engine:

a) Produces less thrust at a specific fuel flow, but is much quieter.
b) Has reduced take-off performance, but enjoys improved cruise fuel efficiency.
c) Produces more thrust for a specific fuel flow and has a reduced noise level.

317. At the critical Mach number of the aircraft:

a) Local airflows may reach Mach 1.
b) All the local airflows are less than Mach 1.
c) The aircraft has reached the local speed of sound.

318. The load factor experienced by an aircraft is a function of:

a) The speed and rate of turn.
b) The rate of turn.
c) Neither by the above is correct, as the load factor is purely a function of the bank angle.

319. Two aircraft are of the same type but are loaded to different weights. The heavier aircraft will:

a) Not be able to glide as far as the lighter aircraft.
b) Be able to glide further than the lighter aircraft provided that the heavier aircraft is flown at a lower IAS.
c) Will be able to glide at the same glide angle as the lighter aircraft

320. When flying for range, the aircraft should be flown at a speed which provides the:

a) Lowest safe TAS, at an altitude which requires full throttle to achieve that TAS.
b) Lowest value of thrust required.
c) Lowest value of thrust horsepower required by the airframe.

321. Autorotation will result at or near the stalling angle of attack when:

a) The wing producing the greater lift is producing the least drag.
b) The wing producing the least lift is producing the least drag.
c) The wing experiencing the smaller angle of attack produces the greater drag value.

322. During a climbing turn in an aircraft powered by a clockwise rotating propeller as viewed from the rear, the required bank angle is maintained by sustained:

a) Out of turn aileron.
b) Into turn aileron.
c) Neutral aileron.

323. When flying for maximum endurance, the aircraft must be flown:

a) As high as possible, at a speed which provides for minimum drag.
b) As high as possible, at a speed which provides for minimum THP.
c) At the recommended endurance speed, which usually approximates the speed recommended for best angle of climb.

324. During a climb, the thrust is:

a) Equal to the aerodynamic drag.
b) Equal to the weight apparent drag.
c) Neither of the above statements is correct.

325. When gliding into a head wind the best glide angle will be achieved at:

a) An IAS, which produces the best lift/drag ratio.
b) An IAS, which is higher than that for best lift/drag ratio.
c) An IAS which is lower than that for best lift/drag ratio, but which is higher than that required for best endurance speed.

326. An aircraft in level flight has a stalling speed of 107 kts at 1.8g. The stalling speed in straight and level flight will be:

a) 143 kts.
b) 59 kts.
c) 80 kts.

327. Application of aileron alone when rolling into a turn will result in unbalanced flight for the duration of the aileron input and will result in:

a) Sideslip
b) Skid.
c) Either of the above may be correct depending on the direction of the turn.

328. Experimental mean pitch is the advance per revolution when the propeller:

a) Produces zero thrust.
b) At zero angle of attack.
c) Is feathered and may be taken at two thirds of the blade length.

329. In forward flight:

a) The thrust developed by a propeller is greater than the torque reaction.
b) A propeller's torque reaction is greater than the thrust.
c) The trust from a propeller is greater than the lift to ensure propeller efficiency.

330. A reciprocating piston engine which is fitted with an oil cooler will have a relief bypass valve fitted between:

a) The engine and the oil cooler.
b) The oil cooler and the oil tank.
c) The oil temperature gauge and the engine.

331. If ambient conditions determine that carburettor heat should be sustained during flight, it will be necessary to:

a) Enrich the mixture to adjust for the changing density.
b) Lean the mixture further to adjust for changing density.
c) Enrich the mixture and throttle back slightly to prevent detonation.

332. On engine shut down, the manifold pressure gauge in an engine fitted with this gauge will read:

a) Sea level pressure.
b) Ambient air pressure.
c) Zero.

333. Normally aspirated engines are designed to run on fuels with a specific anti-knock capability. However, when need to:

a) A fuel with a higher anti-knock rating may be used for limited periods.
b) A fuel with a lower anti-knock rating may be used for limited periods.
c) None of the above statements is correct, as damage will result if the design anti-knock rated fuel is not used.

334. A transformer which halves the voltage will have:

a) Half as many turns on the secondary coil as on the primary coil.
b) Twice as many turns on the secondary as on the primary.
c) Four times as many turns on the secondary as on the primary.

335. The moving part of the AC generator is:

a) The rotor.
b) The stator.
c) The exciter.

336. Output from an AC generator is taken from:

a) The exciter.
b) The stator windings.
c) The rotor windings.

337. The voltage of an AC generator:

a) Rises to a maximum in one direction, falls to zero, and then rises in the same direction to a maximum and falls to zero.
b) Rises to a maximum in one direction and then remains constant.
c) Rises to a maximum in one direction, falls to zero and then rises to a maximum in the opposite direction and falls to zero.

338. An alternator is:

a) A static inverter.
b) A rotary switch for a de-icing system.
c) An AC generator.

339. Impedance is:

a) $\frac{\text{Volts}}{\text{Watts}}$

b) $\frac{\text{Volts}}{\text{Amps}}$

c) $\frac{\text{Volts}}{\text{Frequency}}$

340. If the frequency is increased in an inductive circuit:

a) Impedance will decrease.
b) Impedance will increase.
c) Impedance will remain constant.

341. In an AC circuit which is mainly inductive:

a) Current will lead voltage.
b) Current and voltage will be in phase.
c) Current will lag voltage.

342. If frequency increases, capacitive reactance will:

a) Increase,
b) Not change.
c) Decrease.

343. Power factor is:

a) $\frac{\text{Real load}}{\text{Apparent load}}$

b) $\frac{\text{Apparent load}}{\text{Real load}}$

c) $\frac{\text{Real load}}{\text{Wattless load}}$

344. In a non-paralleled constant frequency AC system the generator loadmeters will normally measure:

a) KVA or Amps.
b) KVA and power factor.
c) KVA and KW.

345. A 400 Hz supply has:

a) A capacity of 400 000 watts.
b) An impedance of 400 ohms.
c) A frequency of 400 cycles per second.

346. One advantage of a main AC supply system is:

a) Easy, and almost losses stepping up or down of voltage.
b) Voltage does not need to be changed.
c) Batteries are not needed.

347. One of the advantages of three phases generation over single phase generation is:

a) That most aircrafts services required three phase supply.
b) That there is more efficient conversation of mechanical energy to electrical energy.
c) That it gives lower cable weights and more compact generators.

348. In a typical aircraft constant frequency paralleled AC system the line voltage is:

a) 115 Volts.
b) 208 Volts.
c) 200 Volts.

349. In an AC generator, voltage regulation:

a) Is by varying the drive RPM.
b) Is by varying the excitation current.
c) Is by the insertion of variable resistors into the circuit.

350. In a constant speed AC generation system which is paralleled:

a) All generators are run off the same engine.
b) All engines are run at the same RPM.
c) A generator has its own constant speed drive.

351. A low reactive load on one generator is compensated for in paralleled system:

a) Through the excitation circuit of the generator.
b) By altering the rotor speed.
c) By increasing the real load on the other generators.

352. To increase the real load taken by a paralleled AC generator, the:

a) Generator drive torque is increased.
b) Generator excitation is increased.
c) Generator drive torque and excitation are increased.

353. The frequency of aircraft constant frequency systems is maintained:

a) Between 380 and 420 Hz.
b) Between 350 and 450 Hz.
c) Between 395 and 495 Hz.

354. Frequency is controlled by:

a) Excitation voltage.
b) Speed of rotation.
c) Excitation current.

355. Load sharing circuits are necessary:

a) Whenever generators are operating in series.
b) Whenever generators are operating independently.
c) Whenever generators are operating in parallel.

356. Paralleled AC generators will have:

a) One load meter to measure total system load.
b) One volt meter for each generator.
c) One load meter for each generator.

357. If an AC generator control relay tripped, the:

a) Generator circuit breaker for that generator will have opened.
b) Generator circuit breaker for that generator will close.
c) Generator circuit breaker for that generator trips and busbar tiebreaker will also trip.

358. On an aircraft AC generator, the output is usually taken from:

a) The stator windings.
b) The rotor.
c) The exciter.

359. The CSD function is:

a) To maintain a constant ratio between engine speed and generator speed.
b) To vary the generator speed in proportion to load.
c) To maintain constant generator speed.

360. If the CSD disconnect switch is used, the drive can be:

a) Only reinstated when the aircraft is on the ground.
b) Re-instated in flight from the electrical supply compartment.
c) Re-instated in flight from the flight deck.

361. In the event of a mechanical failure occurring in the generator the CSD is protected by:

a) A hydraulic clutch.
b) A universal joint.
c) Quill drive.

362. An APU is driven:

a) By its own dedicated gas turbine.
b) By a hydraulic motor.
c) By a ram air turbine.

363. An auto-transformer:

a) Varies the turns ratio automatically to maintain a constant output voltage with varying input voltage.
b) Has only one coil, which is used as both primary and secondary.
c) Will maintain a constant output frequency with a varying supply frequency.

364. As the torque load increases on an induction motor, it will:

a) Slow down.
b) Maintain RPM.
c) Speed up.

365. The valves of a four stroke piston engine will each:

a) Open twice during the normal “Otto” cycle.
b) Open once during the normal “Otto” cycle.
c) Open four times during the normal “Otto” cycle.

366. Tappet and rocker arm clearance is essential:

a) To allow lubrication between the contact surface.
b) To allow for valve operation by the cam.
c) To allow for expansion throughout the working temperature range of the engine.

367. Valve “Dwell” is:

a) The period a valve remains open.
b) The period a valve remains closed.
c) The period taken by the rocker to take up the clearance gap before operating the valve.

368. Valve overlap occurs:

a) At the end of the power stroke.
b) At the end of the exhaust stroke.
c) At the end of the induction stroke.

369. The weight of charge induced into a piston engine cylinder during normal operation:

a) Is increased by closing the exhaust valve before TDC.
b) Is reduced by closing the inlet valve after BDC.
c) Is increased by delaying the closing of the inlet valve.

370. The exhaust valve of a piston engine:

a) Normally has a hollow stem partially filled with sodium.
b) Is normally manufactured from metallic sodium to assist with cooling.
c) Normally has a hollow head filled with sodium.

371. Valve springs are primarily duplicated:

a) To ensure a gas tight seal when the valve is closed.
b) To prevent the valve dropping into the cylinder in the event a spring breaks.
c) To reduce valve bounce.

372. When the piston of a four stroke piston engine is towards the end of the power stroke:

a) The gas temperature will be at its highest.
b) The gas temperature will be reducing.
c) The gas temperature will remain constant until BDC.

373. The compression ratio of a piston engine is the:

a) Ratio of the cylinder volume when the piston is at BDC to the cylinder volume when at TDC.
b) Difference in pressure generated when the piston is at BDC to that generated at TDC.
c) Variation between the volume of the combustion chamber and the swept volume.

374. The majority of aircraft piston engine lubrication systems are of the:

a) Self-lubricating type.
b) Wet sump type.
c) Dry sump type.

375. A dry sump lubrication system:

a) Maintains a reserve of oil in a separate tank.
b) Maintains a reserve of oil in the sump.
c) Requires no reserve of oil.

376. The pressure pump of a dry sump lubrication system:

a) Has a greater capacity than the scavenge pump.
b) Has less capacity than the scavenge pump.
c) Is driven on a common shaft and has the same capacity as the scavenge pump.

377. The pressure filter in a dry sump lubrication system is:

a) Located between the pressure pump and tank.
b) Located after the pressure pump.
c) Located between the scavenge pump and the tank.

378. The by-pass valve of a dry sump lubrication system is:

a) Normally activated during low temperature engine starting.
b) Normally activated during high temperature engine stating.
c) Is a relief valve for excess oil pressure.

379. Normally on most piston engines the lubrication oil of a dry sump system is cooled:

a) On leaving the pressure pump.
b) Before returning to the oil tank.
c) Before returning to the sump.

380. The reserve of lubricating oil of a wet sump piston engine is stored in:

a) The sump.
b) A separate tank.
c) The pipe system.

381. The oil tank of a dry sump lubrication system has a space above the oil to provide for:

a) Jack ram displacement.
b) Pressurisation.
c) Expansion of the oil and frothing.

382. The oil tank of a dry sump lubrication system is normally cooled by:

a) Water.
b) Compressor oil.
c) Ram air.

383. Excessive arcing across the contact breaker points of a magneto when the point are open is prevented by:

a) A diode being fitted.
b) A condense being fitted.
c) Insulation of the contacts.

384. On a four stroke engine the ignition spark will occur:

a) Once each revolution of the engine.
b) Once every forth revolution of the engine.
c) Once every two revolutions of the engine.

385. On engine start up, the generator warning light fails to extinguish, this will result in:

a) The engine stopping when the battery is totally discharged.
b) Failure of the initial excitation of the magneto.
c) The engine continuing to run normally.

386. The distributor rotor on a four stroke engine rotates at:

a) The same speed as the engine.
b) Twice the speed of the engine.
c) Half the speed of the engine.

387. With increase of engine speed, ignition timing:

a) Will advance.
b) Will retard.
c) Will remain constant.

388. Fuel pumps:

a) Should not be run when the fuel system is dry.
b) Of all types are lubricated by the fuel that passes through them.
c) Are normally electrically operated.

389. Booster pumps are:

a) Normally driven by the engine.
b) Electrically operated.
c) Normally used for priming the engine only.

390. If the fuel pressure warning light comes on in flight the:

a) Booster pump must be isolated.
b) Main fuel pump must be isolated.
c) Booster pumps must be switched on.

391. In the event of booster pump failure, the:

a) Fuel will continue to be drawn through the booster pump bypass by the engine driven pump.
b) Pump must be isolated and the remaining fuel in the tank transferred by the transfer pumps.
c) Fuel will be isolated in the tank.

392. Fuel pump delivery is normally:

a) Supplied at a constant flow rate to the engine.
b) Supplied at a constant pressure, controlled by a pressure relief valve.
c) Supplied at a constant volume.

393. In an air-cooled piston engine:

a) Fins are incorporated to increase the cylinder and head surface area.
b) Air is ducted through drillings in the cylinder head walls.
c) Air is used to cool the cooling oil.

394. Air is directed over the cylinder wall fins by:

a) Cowl gills.
b) Baffles.
c) Air deflection plates.

395. Cooling air is normally provided by:

a) Airflow from a supercharger.
b) Airflow from a compressor bleed.
c) Ram air.

396. In a liquid cooled engine cooling system:

a) Temperature is controlled by a thermostat.
b) Temperature is controlled by a master pump.
c) Fuel is used to cool the coolant.

397. An alternative name sometimes given to the choke is the:

a) Butterfly.
b) Venturi.
c) Intake controller.

398. To prevent fuel starvation due to sudden opening of the throttle:

a) The enrichment jet is fitted.
b) The pressure balance duct is fitted.
c) The accelerator pump is fitted.

399. When an aircraft is inverted in flight, fuel starvation of the engine may be prevented by:

a) The carburettor balance duct.
b) The power jet.
c) A stand tube.

400. Carburettor anti-icing is normally provided by:

a) Hot air from the cooling system.
b) Hot oil from the engine lubrication system.
c) Spray mat heater elements.

401. The supercharger is normally positioned:

a) In the exhaust manifold.
b) Before the carburettor.
c) Between the carburettor and the inlet manifold.

402. The impeller of a supercharger rotates:

a) Twice the speed of the engine.
b) Half the speed of the engine crankshaft.
c) Nine to ten times the speed of the engine crankshaft.

403. The supercharger is normally located:

a) At the side of the engine.
b) At the rear of the engine.
c) At the front of the engine.

404. Manifold boost pressure is:

a) The indicated pressure in the inlet manifold between the impeller and the inlet valves.
b) The indicated pressure in the inlet prior to the carburettor.
c) The pressure indicated in the supercharger.

405. The turbocharger impeller is situated:

a) Prior to the fuel injector.
b) After the carburettor.
c) In the exhaust system.

406. Turbocharger main bearings are lubricated by:

a) The engine hydraulic system.
b) The engine lubrication system.
c) Grease packs.

407. The turbocharger impeller is:

a) Driven by intake ram air.
b) Driven by exhaust gases.
c) Mounted on the same shaft as the turbine.

408. If landing gear is lowered:

a) Total drag increases, and Vmd is increased.
b) Total drag increases, and Vmd is decreased.
c) Total drag decreases, and Vmd is decreased.

409. For a constant weight, Vmd (IAS):

a) Increase as altitude increases.
b) Decrease as altitude increases.
c) Remain constant as altitude increases.

410. For an aircraft flying at a speed above Vmd:

a) A speed increase causes a drag increase, which will cause a deceleration.
b) A speed increase causes a drag decreases causing further acceleration.
c) A speed increase causes a drag increase causing acceleration.

411. If weight is increased the stalling angle of attack is:

a) Increased.
b) Decreased.
c) The same.

412. If an aircraft is flying close to the stall, and ailerons are operated:

a) A stall could occur on the wing with the down aileron.
b) A stall could occur on the wing with the up aileron.
c) There would be no effect on stalling.

413. The effect of increasing aspect ratio is to:

a) Increase the maximum lift/drag ratio.
b) Decrease the maximum lift/drag ratio.
c) Not affect the maximum lift/drag ratio.

414. On a highly tapered without wing twist the stall will commence:

a) At the tip.
b) At the centre of the span.
c) At the root.

415. On an untapered wing without twist the downwash.

a) Increases from root to tip.
b) Increases from tip to root.
c) Is constant across the span.

416. When flaps are lowered the spanwise flow on the upper surface of the wing:

a) Does not change.
b) Increases towards the tip.
c) Increases towards the root.

417. If the flaps are lowered asymmetrically, this will cause:

a) A nose-up pitching moment.
b) A nose-down pitching moment.
c) A rolling moment.

418. As the elevator is lowered:

a) The tailplane download is increased.
b) The tailplane download is reduced.
c) The tailplane upload is reduced.

419. If the control hinge is too far back from the control surface leading edge:

a) Control effectiveness will be reduced.
b) Control will be too heavy.
c) Control Centre of Pressure may move ahead of the hinge and cause overbalance.

420. Controls are mass balanced in order to:

a) Eliminate control flutter.
b) Aerodynamically assist the pilot in moving the controls.
c) Provide equal control forces on all three controls.

421. When the rudder is moved to the right, the force acting on the fin:

a) Gives a yawing moment but no rolling moment.
b) Gives a rolling moment to the left.
c) Gives a rolling moment to the right.

422. Lift spoilers on the upper wing surface may be used:

a) To augment the lift.
b) As lift dumpers during the landing run.
c) To reduce buffet at high speed.

423. The higher speed of the upper wing in a steady banked turn causes it to have more lift than the lower wing. This may be compensated for by:

a) Use of the rudder control.
b) Operating the ailerons in the opposite sense once the correct angle of bank has been reached.
c) Increasing the nose up pitch by using the elevators.

424. To cover the greatest distance when gliding, the gliding speed must be:

a) Near to the stalling speed.
b) As high as possible within Vne limits.
c) The one that gives the highest Lift/Drag ratio.

425. As altitude increases the excess thrust at a given IAS:

a) Decreases because drag increases and thrust decreases.
b) Increases because drag decreases and thrust is constant.
c) Decreases because thrust deceases and drag is constant.

426. As altitude increases the excess power available:

a) Decreases because the power available decreases and power required is constant.
b) Increases because the power required decreases and power available is constant.
c) Decreases because the power available decreases and power required increases.

427. As bank angle is increased in a level turn at a constant IAS, the load factor will:

a) Remain the same.
b) Increase.
c) Decrease.

428. In a level turn at a constant IAS:

a) The drag will be greater than in level flight because of the increased induced drag.
b) The drag will be the same as in level flight because the IAS is the same.
c) The drag will be less than in level flight because the lift is less.

429. For a level turn a constant IAS if the radius of turn is decreased, the bank angle and load factor will:

a) Increase.
b) Decrease.
c) Remain the same.

430. To counteract a right wing low tendency, a fixed tab on the port aileron would:

a) Be moved up causing the left aileron to come up.
b) Be moved down causing the left aileron to come up.
c) Be moved up causing the right aileron to come down.

431. Down movement of the elevator trimming tab will:

a) Make the aircraft nose heavy.
b) Overcome a tendency to fly nose heavy.
c) Overcome a tendency to fly tail heavy.

432. To achieve the same degree of longitudinal trim, the trim drag:

a) Would be higher for a variable incidence tailplane than for an elevator.
b) Will be the same for both variable incidence tailplane and an elevator.
c) From an elevator would be higher, than from a variable incidence tailplane.

433. The thrust required to fly at a given IAS:

a) Decreases as altitude increases.
b) Is unaffected by altitude.
c) Increases as altitude increases.

434. The speed at which the power required is a minimum is:

a) Minimum drag speed Vmd.
b) Above Vmd.
c) Below Vmd.

435. When the C of G is close to the forward limit:

a) Very small forces are required on the control column to produce pitch.
b) Longitudinal stability is reduced.
c) Larger stick forces are required to pitch because the aircraft is very stable.

436. In a sideslip:

a) The dihedral will cause a rolling moment, which reduces the sideslip.
b) The fin will cause a rolling moment, which increases the sideslip.
c) The dihedral will cause a yawing moment, which reduces the sideslip.

437. With increase in altitude the damping in roll:

a) Decreases.
b) Increases.
c) Remains the same.

438. The angle of attack of a fixed pitch propeller:

a) Depends on forward speed only.
b) Depends on forward speed and engine rotational speed.
c) Depends on engine rotational speed only.

439. The blade angle of a fixed pitch propeller would be set to give the optimum angle:

a) During take-off.
b) During cruise.
c) During landing.

440. If an aircraft is stable, this means that:

a) It is a state of balance.
b) If it is displaced it will return to its original position without any correction by the pilot.
c) If it is displaced it must be returned to its original position by the pilot operating the controls.

441. For an aircraft which is neutrally stable in roll, following a wing drop:

a) The wing would tend to return to the level position.
b) The wing would continue to drop.
c) The wing would remain in its displaced position.

442. After a disturbance in pitch an aircraft oscillates in pitch with increasing amplitude. It is:

a) Statically and dynamically unstable.
b) Statically stable but dynamically unstable.
c) Statically unstable but dynamically stable.

443. If the aircraft has nose-up pitch displacement, the effective angle of attack of the tail plane:

a) Remains the same.
b) Changes and causes the tailplane to apply a restoring moment.
c) Will not change if the pitch up was due to elevator selection.

444. To ensure longitudinal stability in flight, the position of the C of G:

a) Must always coincide with the C of P.
b) Must be forward of the Neutral Point.
c) Must be aft of the Neutral Point.

445. Wing dihedral gives a stabilising rolling moment by causing an increase in lift:

a) On the down going wing when the aircraft rolls.
b) On the lower wing when the aircraft sideslips.
c) On the lower wing whenever the aircraft is in a banked altitude.

446. A high wing configuration gives:

a) More lateral stability than a low wing.
b) Less lateral stability than a low wing.
c) The same lateral stability as a low wing.

447. After a disturbance in pitch an aircraft oscillates for a long time with only small reductions of amplitude on each oscillation. It would be said to have:

a) Low damping.
b) High damping.
c) Negative damping.

448. With increase in altitude the damping in roll:

a) Decreases.
b) Increases.
c) Remains the same.

449. The presence of the fuselage in an aircraft with a high wing during a sideslip:

a) Increases the lift on the lower wing and decreases the lift on the upper wing thus creating a stabilising moment.
b) Increases the lift on both wings thus creating a stabilising moment.
c) Decreases the lift on the lower wing and increases the lift on the upper wing thus creating a destabilising moment.

450. If an aircraft is yawed to large angle of sideslip:

a) Directional stability will be lost.
b) If the sideslip angle is too large the fin may stall and directional stability will be decreased.
c) The rudder will always have to be used to return the aircraft to its original position.

451. Increasing the size of the fin:

a) Reduces lateral stability.
b) Increases longitudinal stability and directional control.
c) Increases the size of the keel surface giving increased directional stability.

452. Pendulum stability is a property possessed by:

a) Aircraft with swept back wings.
b) Aircraft with high wing configuration.
c) Aircraft with low wing configuration.

453. An aircraft with a Dutch roll instability will:

a) Go into a spiral dive following a lateral disturbance.
b) Experience simultaneous oscillations in roll and yaw.
c) Experience oscillation in pitch.

454. Dutch roll may be prevented by:

a) Having the wings swept back.
b) Reducing the size of the fin.
c) Fitting yaw dampers.

455. An aircraft is yawed to starboard and the rudder is then centralized. If it then yaws to port it is:

a) Directionally neutrally stable.
b) Directionally statically stable.
c) Directionally dynamically stable.

456. Reducing the static margin will:

a) Increase static stability.
b) Reduce static stability.
c) Not affect static stability.

457. Reducing the static margin will result in:

a) Reduction of the stick forces in pitch.
b) Increase the stick forces in pitch.
c) The forces will remain unaffected because of balance tab effects.

458. Reducing the static margin will result in:

a) Larger elevator angles to trim.
b) Lesser elevator angles to trim.
c) Elevator angles to trim are not affected.

459. Increasing the static margin will result in:

a) Less trim drag.
b) Lower fuel consumption.
c) Heavier stick forces in pitch.

460. Increasing the static margin will result in:

a) Decrease in lateral stability.
b) Increase in lateral stability.
c) Higher stalling speed.

461. Increasing the static margin will normally result in:

a) Greater stability in yaw.
b) Lower stability in yaw.
c) Stability in yaw will not be affected.

462. If an aircraft has a very tall fin:

a) Oscillatory stability will be reduced.
b) Lateral stability will be reduced.
c) Oscillatory stability will be increased.

463. A large fin will result in:

a) Greater spiral stability.
b) Lower lateral stability.
c) Lower spiral stability.

464. If an aircraft experience a divergence it is:

a) Statically unstable.
b) Statically and dynamically unstable.
c) Dynamically unstable.

465. As the speed of an aircraft in straight and level flight is increased, normally:

a) The centre of pressure will move forward.
b) The centre of pressure will remain stationary.
c) The centre of pressure will move aft.

466. With the C of G on the aft limit, compared with the forward limit, the wing lift required for level flight will be:

a) Greater.
b) The same value.
c) Less.

467. At a given weight, for level flight, lift is normally held constant with changes in speed by.

a) The trailing edge flaps.
b) Varying the deflection of the leading edge.
c) Varying the angle of attack.

468. The longitudinal axis of an aircraft will:

a) Be below the centre of gravity.
b) Be above the centre of gravity.
c) Pass through the centre of gravity.

469. The lift of a wing will increase with an increase in:

a) The temperature of the atmosphere.
b) The pressure of the atmosphere.
c) The humidity of the atmosphere.

470. The drag of an aircraft will increase with:

a) Increase in air temperature.
b) Decrease in air density.
c) Increase in air pressure.

471. The trim drag of a variable incidence tailplane compared with the trim drag of a fixed tailplane and elevator will be:

a) More.
b) The same.
c) Less.

472. On an aircraft fitted with differential aileron control:

a) The down going aileron moves through a greater range of movement than the up going aileron.
b) The up going aileron moves through a greater range of movement than the down going aileron.
c) Both ailerons will move through the same distance of travel.

473. Aileron control surface flutter is normally avoided by:

a) The fitment of mass balance.
b) Aerodynamic horn balance.
c) Fitting negative balance tabs.

474. Spanwise movement of the airflow in flight may be reduced by:

a) Leading edge slats.
b) Wing fences.
c) Anhedral.

475. A spoiler is normally used to:

a) Control the aircraft about the longitudinal axis.
b) Control the aircraft in both the lateral and longitudinal planes.
c) Control the aircraft about the lateral axis.

476. On an aircraft fitted with servo tabs, rearward movement of the control column in flight will:

a) Move the elevator up and automatically through mechanical linkage, the servo tab down.
b) Move the servo tab up causing the elevator to be deflected down.
c) Move the servo tab down.

477. An aircraft in flight is flying port wing low, the trim tab on the starboard aileron will require to be:

a) Moved down deflecting the aileron up.
b) Moved up deflecting the aileron down.
c) Moved down deflecting the aileron down.

478. The angle of incidence of an aircraft wing is:

a) The upward and outward inclination of the wing.
b) The angle between the wing chord line and the normal axis.
c) The angle between the wing chord line and the longitudinal axis.

479. The dihedral angle is the:

a) Angle between the lateral axis and the normal axis.
b) Angle between the average chord and the lateral axis.
c) Upward and outward inclination of the wings.

480. An aircraft fitted with powered flying controls is flying nose heavy, to bring the aircraft back to level flight:

a) The control column will be biased aft.
b) The elevator trim tab must be moved down.
c) The elevator trim tab must be moved up.

481. Ailevons normally:

a) Carry out the function of elevators.
b) Carry out the function of elevators and ailerons.
c) Carry out the function of elevators and rudder.

482. Exhaust valve cooling is normally achieved by:

a) Air ducted through the cylinder head.
b) Ram air flowing over the cylinder head cooling fins.
c) The valve being partially filled with sodium.

483. An over-rich mixture on starting a piston engine may be due to:

a) Boost reversal.
b) The hand priming pump plunger in the out position.
c) The timing being retarded.

484. Carburettor hot air will:

a) Reduce power on take-off.
b) Not seriously effected power on take-off.
c) Increases power on take-off.

485. As a supercharged engine climbs to high altitude, the cylinder head temperature will:

a) Reduce due to the reduction in ambient temperature.
b) Remain approximately the same.
c) Increase due to the increase weight of charge.

486. Vapour locks in fuel system pipelines are prevented by:

a) The main engine pump.
b) Booster pumps.
c) Fuel tank vents.

487. A supercharger normally rotates at:

a) Twice the crankshaft RPM.
b) Four times the engine RPM.
c) Ten times engine crankshaft RPM.

488. The supercharger main bearings are lubricated by:

a) The engine lubrication system.
b) Grease packs.
c) A self-contained oil system.

489. When engine starting is initiated the waste gate of a turbocharger will be:

a) Fully open.
b) Partially open.
c) Fully closed.

490. A slight increase in power of a supercharger engine up to its rated altitude is due to:

a) A slight increase in the volume of charge, due to the reduction in temperature, entering the cylinders.
b) A reduction in air density resulting in a richer mixture.
c) An increase in the weight of charge entering the cylinders due to temperature reduction.

491. If a leak occurs in the exhaust system of a turbocharged piston engine prior to the turbine:

a) Critical height will be increased.
b) The waste gate will fail to close as altitude is increased.
c) The waste gate will close normally as altitude increases.

492. The waste gate of a turbocharger is:

a) Opened by spring pressure.
b) Opened by oil pressure.
c) Opened by electric actuator.

493. A supercharger's output is normally controlled by:

a) The waste gate.
b) Boost control lever.
c) The throttle valve.

494. Automatic mixture control capsules are:

a) Prevented from sticking in their cylinders by a coil spring.
b) Lubricated to prevent sticking by the engine oil system.
c) Heated to prevent seizing at altitude.

495. Piston engine hydraulicing is caused by:

a) Excessive oil pressure in the engine lubrication system.
b) Oil leaking into the combustion chambers when the engine is static.
c) Oil leaking into the combustion chambers when the engine is running.

496. At low engine RPM, black smoke from the exhaust of a piston engine may indicate:

a) Oil leaking past the piston rings.
b) Contaminated fuel.
c) A rich mixture.

497. Permitted take-off boost may not be obtainable due to:

a) High manifold velocity reducing mixture pressure.
b) Low ram air affect at take-off speeds.
c) Carburettor heating switched off.

498. When a supercharged engine reaches its rated altitude with the throttle valve fully open, any further opening of the throttle in the cockpit will:

a) Increase RPM allowing further altitude to be gained.
b) Increase boost.
c) Be lost motion.

499. On a supercharged engine, on start up the boost pressure will:

a) Fail.
b) Remain constant.
c) Rise.

500. When operating a hand operated fuel priming pump the plunger should be depressed:

a) Once for each cylinder.
b) Until the fuel pressure warning light is extinguished.
c) Until resistance to its operation is felt.

501. A turbocharger's main bearing are lubricated by:

a) The engine lubrication system.
b) A self-contained lubrication system.
c) The aircraft hydraulic system.

502. When starting a piston engine which is primed by an electrical pump:

a) The pump must be switched off before the engine is started.
b) The pump must be switched off once the engine has fired.
c) The pump must be switched off when the engine reaches normal operating temperature.

503. When a generator is on line:

a) It is at correct RPM.
b) The battery indicates a discharge.
c) It is connected to the busbar.

504. A short circuit:

a) Has high resistance.
b) Has low current.
c) Allows excessive current.

505. To prevent a circuit overheating:

a) Ram air is directed over major components.
b) Fuses are fitted.
c) Capacitors are fitted.

506. Circuit breakers are fitted:

a) In parallel with the load.
b) In series with the load.
c) In parallel with the fuses.

507. Battery state of charge must be checked every:

a) Six months.
b) Three months.
c) Year.

508. DC generators are normally:

a) Initially excited by direct current from the battery busbar.
b) Initially excited by residual magnetism.
c) Initially excited by ground power.

509. If a Ni-Cad battery has a thermal runaway condition:

a) The generator must be isolated to prevent further overcharging of the battery.
b) The engine must be shut down to prevent fire.
c) The battery must be isolated.

510. Batteries are normally fitted to aircraft:

a) In series to increase voltage.
b) In parallel to increase voltage.
c) In parallel to increase ampere-hour capacity.

511. Aircraft fuses which have blown must:

a) Be changed twice only and then the engineer must be consulted.
b) Be reported to the engineer immediately.
c) Be changed once only and then reported to the engineer.

512. An earth return circuit is one which:

a) Uses the aircraft structure as the return.
b) Has a common earth return lead for all circuits.
c) Has a return lead for that circuit.

513. Load shedding will cause the:

a) Current to increase.
b) Voltage to increase.
c) Current to reduce.

514. In a hydraulic system, when the engine is at idle RPM, the system pressure fails to rise above two thirds maximum normal working pressure, the probable fault is:

a) Accumulator charge pressure is to low.
b) The engine RPM is too low.
c) A pressure relief valve is stuck slightly open.

515. The purpose of an accumulator is to:

a) Prevent cavitation at the pump.
b) Provide, in an emergency, a supply of fluid for the pump.
c) Assist in damping out system pressure fluctuations.

516. A one-way restrictor valve may be fitted to:

a) A flap circuit to reduce the rate of movement in both directions.
b) An undercarriage circuit to reduce the speed of operation on lowering.
c) A speed brake to ensure it moves out quickly and moves in slowly.

517. A vico-static fluid is one which:

a) Maintains a constant viscosity at all working temperatures.
b) Maintains a constant viscosity at a specific working temperature.
c) Will not form sludge or thicken when it is stationary in the system.

518. A variable volume pump:

a) Maintains a constant volume of fluid to the circuits at all times.
b) Maintains a constant pressure in the system.
c) Maintains a constant temperature throughout the system.

519. In a wheelbrake circuit, the hydraulic accumulator will provide an increase in the number of brake applications in an emergency:

a) If the initial charge pressure is increased.
b) If the initial charge pressure is reduced.
c) If the initial charge pressure is exhausted.

520. System fluid must be released:

a) To check accumulator system pressure.
b) Prior to checking reservoir fluid pressure.
c) To check hydraulic pressure failure warning devices.

521. Excessive pressure due to thermal expansion in a closed circuit may be relieved by a:

a) Flow control valve.
b) Pressure reducing valve.
c) Pressure relief valve.

522. Excessive system pressure fluctuations may be due to:

a) High accumulator charge pressure.
b) Low accumulator system pressure.
c) Low accumulator charge pressure.

523. Most modern hydraulic reservoirs are pressurised to:

a) Eliminate cavitation in the pump supply.
b) To provide pressure for emergency use.
c) To eliminate hydraulic hammering.

524. A mineral based hydraulic fluid will require all components to be fitter with:

a) Natural rubber seals.
b) Butyl rubber seals.
c) Synthetic rubber seals.

525. The geometric pitch of a propeller is the:

a) Increased blade pitch angle from to tip.
b) Distance it should move onward in one revolution with blade slip.
c) Distance it should move forward without blade slip in one revolution.

526. In normal flight the air loads which tend to oppose the centrifugal twisting moment of a propeller will:

a) Tend to make the blade move to fine pitch.
b) Have no serious effect on the propeller.
c) Tend to make the blade coarsen its pitch.

527. The pressure face of a propeller is the:

a) Face of the propeller as seen from the cockpit.
b) Face of the propeller as seen when facing the aircraft when stood in front of it.
c) Leading edge of the propeller.

528. Ground fine pitch locks are fitted to some types of propeller to:

a) Permit a very fine pitch to be selected for engine starting.
b) Permit a very fine pitch to be selected to prevent underspeeding of the propeller take-off.
c) Permit a very fine pitch to be selected in flight to reduce the torque on the engine.

529. Propeller slip is the difference between the:

a) Geometric pitch and the effective pitch of the blade.
b) Effective pitch and the actual thrust.
c) Angular velocity and the true air speed.

530. The power absorption of a propeller may be improved by:

a) Reducing the chord of the blades.
b) Increasing the camber of the blades aerofoil sections.
c) Reduce the number of blades.

531. When reverse pitch is selected the blades of the propeller will move:

a) Through coarse pitch to feather and then to reverse pitch.
b) To reverse pitch through fine and very fine pitch.
c) To reverse pitch through coarse pitch to super coarse then to reverse pitch.

532. When feathering a propeller fitted with a constant speed unit:

a) The throttle must be closed after feather is selected to maintain power to the pump.
b) The throttle must be closed prior to feather being selected.
c) The throttle must be left in the fully open position to ensure the engine is fully primed for restart when unfeathering.

533. In the fully feathered position the:

a) Blade leading edge faces forward.
b) Blade trailing edge faces forward.
c) Blade is said to be superfine.

534. In a propeller fitted with a CSU:

a) Oil drains from the cylinder to increases pitch.
b) Oil is pumped into the airscrew cylinder to increase pitch.
c) The pilot valve closes aircrew oil duct to increase pitch.

535. The booster pump in a CSU is basically a:

a) Constant volume pump.
b) Variable pump.
c) Swash plate type controlled by accumulator pressure.

536. When a constant speed propeller fitted with a CSU overspeeds:

a) High pressure oil is directed to the airscrew cylinder.
b) The pilot valve closes main airscrew duct.
c) High pressure oil is released from the airscrew cylinder.

537. The normal maximum attainable speed for piston engined aircraft is:

a) +/- 500 mph.
b) +/- 500 kts.
c) M0.75

538. The speed of sound is defined as:

a) The speed at which sound travels through air.
b) The speed at which a very small pressure disturbance is propagated in a fluid under specified conditions.
c) The speed at which a very small pressure disturbance can be measured in a fluid under specified conditions.

539. The speed of a sound wave varies with:

a) Temperature and density of the medium through which it is travelling.
b) Height of the density atmosphere.
c) Aircraft height.

540. The formula for calculating the true air speed of sound at any altitude is:

a) MN = k$\sqrt{T}$ where K is a known constant and °T are in Celsius.
b) LSS = k$\sqrt{T}$ where K is a known constant and °T are in Absolute.
c) Mn = k$\sqrt{T}$ where K is a known constant and °T are in Absolute.

541. Small pressure changes around a wing at low speeds cause:

a) Small but measurable changes in the compressibility of the air.
b) Small variations in the density of the air which cannot be measured.
c) Significant variations in the density of the air.

542. The disturbance around a wing which are caused by its passage through the medium surrounding it travel at:

a) A speed proportional to Mcrit.
b) The speed of sound.
c) A speed, which is quite unpredictable.

543. When a wing moves through the air, the speed at which the pressure waves produced by its interaction with the air:

a) Travel forward from the aircraft as long as the aircraft speed is below M1.0.
b) Travel forward from the aircraft at all speeds.
c) Travel in all directions radiating from the nose of the aircraft at the speed of sound.

544. The pressure waves produced by an aircraft travelling at subsonic speed:

a) Completely cover the aircraft.
b) Cover those parts of the aircraft, which are ahead of the Mcrit pressure wave.
c) Cover those parts of the aircraft aft of the Mcrit pressure wave.

545. A compression wave forms at M1.0:

a) At the “blow” wave.
b) At the leading edge of the wing.
c) At the foremost part of the aircraft.

546. At true air speeds above the local speed of sound:

a) The air ahead of the wing is accelerated to the local free Mach No.
b) The air ahead of the aircraft is completely unaffected by the pressure field formed around the wing.
c) The air ahead of the aircraft is affected by the pressure field formed around the wing to a greater of lesser degree according to the Mcrit.

547. Free Stream Mach Number is:

a) The Mn of the fastest moving airflow associated with the passage of an aircraft.
b) The Mn of the airflow in contact with the Mcrit pressure wave.
c) The true Mn of the aircraft.

548. The local speed of sound can be defined as:

a) The ratio of the actual speed of the airflow around a point and the speed of sound at the point.
b) The ratio of the maximum speed of the airflow around a point and the speed of sound at the point.
c) The ratio of the maximum speed of the airflow around a point and the speed of sound at Mcrit at that point.

549. It is true to say that:

a) An alternator provides more electrical power at lower engine RPM than a generator.
b) A generator charges the battery during low engine RPM so the battery will stay charged longer than with an alternator providing charge.
c) A generator always provides more electrical current than an alternator.

550. When the airflow above the wing reaches LSS a shock wave is formed:

a) Above the wing at right angles to the angle of attack.
b) Above the wing at right angles to the airflow.
c) Above the wing at right angles to chord.

551. At M_{crit}:

a) The air immediately in front of the shock wave is transonic and the air immediately behind the shock wave is supersonic.
b) The air immediately in front of the shock wave is supersonic and the air immediately behind the shock wave is transonic.
c) The air immediately in front of the shock wave is supersonic and the air immediately behind the shock wave is subsonic.

552. M_{crit} is the Mach number when:

a) M_{fg} reaches unity.
b) Any M_l reaches unity.
c) A shock wave is formed ahead of the wing.

553. A machmeter is preferred at high altitudes and speeds because:

a) The ASI cannot register small changes in RAS/CAS accurately, which will affect the values of TAS.
b) The ASI is difficult to read accurately in the high-speed range.
c) Temperature changes are compensated for in the Machmeter.

554. Compressibility can be experienced in flight:

a) At speeds when the free air stream is below LSS.
b) At any speed.
c) At speeds when the free air stream is below Mcrit.

555. AC current for an aircraft instrument can be obtained from:

a) An inverter.
b) An alternator.
c) A battery

556. When a supersonic airstreams passes through a shock wave:

a) The static pressure behind the wave increases.
b) The static pressure behind the wave decreases.
c) The airflow direction immediately behind the wave alters.

557. The normal number of spark igniters fitted to a turbojet engine is:

a) 2.
b) 4.
c) 6.

558. At high Mach numbers, “tuck under” will tend to cause the aircraft nose to:

a) Drop.
b) Rise.
c) Rise or drop according to the MI.

559. Vortex generators:

a) Increase the speed of the air layer close to the aircraft wing.
b) Decrease the speed of the air layer close to the aircraft wing.
c) Energise the area immediately next to the shock wave.

560. The turbocharger impeller is situated:

a) Prior to the fuel injector.
b) After the carburettor.
c) In the exhaust system.

561. The impeller of a supercharger rotates:

a) Twice the speed of the engine.
b) Half the speed of the engine crankshaft.
c) Nine to ten times the speed of the engine crankshaft.

562. The flow in the combustion chamber of a turbine engine is:

a) Convergent.
b) Divergent.
c) Divergent / convergent.

563. The flow sequence of the air through a jet engine flying at supersonic speed is:

a) Supersonic, subsonic, subsonic.
b) Supersonic, subsonic, supersonic.
c) Supersonic, supersonic, supersonic.

564. The type of turbine blades most commonly used in jet engines is:

a) Impulse.
b) Reaction.
c) Impulse / reaction.

565. The pressure rise per compressor stage is higher in a:

a) Centrifugal compressor.
b) Axial compressor.
c) Combination axial / centrifugal flow compressor.

566. The effectiveness of speed brake deployment:

a) Is greater at high altitude.
b) Is greater at low altitude.
c) If a function of IAS, increasing with high IAS.

567. Mcrit can be raised by:

a) Increasing slimness and sweepback.
b) Decreasing aircraft weight.
c) Increasing the power to weight ratio.

568. High speed flight requires a wing with:

a) A low thickness / chord ratio.
b) A high thickness / chord ratio.
c) A high coefficient of lift.

569. The Reverse Thrust Operating light is illuminated:

a) When the thrust reversers are away from the forward thrust locked position.
b) When the reverse thrust levers are moved out of the stowed position.
c) Only when the reverse thrust gas flow sequence is initiated.

570. The stage of the Brayton cycle are:

a) Inlet / compression / expansion / combustion / exhaust.
b) Inlet / compression / combustion / expansion / exhaust.
c) Inlet / compression / expansion / combustion / expansion / exhaust.

571. The compressor in the turbojet engine:

a) Drives the turbine.
b) Is driven by the turbine.
c) Is not connected directly to the turbine.

572. The majority of the energy of the total gas flow after combustion:

a) Is used to power the compressor.
b) Is used to provide thrust.
c) Is dissipated when it is cooled by the unburnt gases.

573. The turbojet engine is efficient at:

a) Most of the speed range.
b) High speed.
c) A narrow speed band.

574. In the turbofan engine, the majority of the air passing through the fan:

a) Is used in the combustion process.
b) Is used to cool the burnt gases.
c) Is used to provide thrust.

575. Turbofan engines are usually:

a) Single spool engines.
b) Single shaft engines.
c) Multi spool / shaft engines.

576. Turboprop engines use extra turbine stages to extract more energy from the combustion gases:

a) Because the power required is too high for a single stage to handle within the speed range of the engine.
b) To improve efficiency over the airspeed range.
c) To provide power for ancillary service.

577. The efficiency of a turbojet engine increases with:

a) A lower rotational speed of the compressor impeller.
b) A higher rotational speed of the compressor impeller.
c) Operation of the impeller within a specified range.

578. One source of inefficiency in a turbo jet engine is:

a) High exhaust velocity relative to the TAS.
b) A large mass of air is accelerated to a low velocity relative to the airframe.
c) Too large a gap between the compressor blades and the engine shroud.

579. The pressure rise for each stage of the compressor in an axial flow compressor is relatively small because:

a) The closeness of each stage prevents high pressure rises, which, if too high, will make the compressor stall.
b) It is easier to compress air to a required value in stages rather than in one operation.
c) Air leakage between stages is reduced with low pressure rises.

580. The initial temperature of the combustion gases after initial exit from the burners is:

a) +/- 1 8000 to 2 000°C.
b) +/- 1 000 to 1 500°C.
c) +/- 800 to 1 200°C.

581. The gases released immediately after combustion are too hot to enter the nozzle guide vanes of the turbine. These gases are cooled by:

a) Compression.
b) Sunburnt fuel.
c) Mixing with unburnt air from the compressor and cooling of the flame tube.

582. The multiple combustion chamber is found nowadays in:

a) Centrifugal compressor engines.
b) Axial compressor engines.
c) Centrifugal and axial compressor engines.

583. The combustion efficiency of a normal gas turbine engine:

a) Increases from sea level to high altitude.
b) Decreases from sea level to high altitude.
c) Remains constant at all altitudes.

584. The compressor is driven by:

a) Air which is induced into the engine by the rotation of the turbine.
b) The turbine.
c) The gearbox which is driven by the turbine.

585. AVGAS may by used in a turbojet engine:

a) Under no circumstances whatsoever.
b) In emergency only.
c) Under certain defined circumstances only.

586. Select the correct statement:

a) Two igniters are required for starting a turbojet engine.
b) One igniter is sufficient for starting a turbojet engine.
c) Some turbo jet engines are not equipped with igniters.

587. Engines can be re-started in flight:

a) At any altitude.
b) If fitted with the correct equipment.
c) So long as certain parameters are met.

588. During a normal landing, the application of reverse thrust should be made:

a) During the latter part of the landing run before applying wheel brakes.
b) After the nose wheel contacts the runway and early in the landing run.
c) At pilot's discretion.

589. Revere thrust is applied during the landing phase:

a) By diverting of the exhaust gases flow after the engine has reached idle speed.
b) By blocking airflow to the turbine.
c) By reversing the direction of the airflow through the engine.

590. High lift devices in high speed aircraft are used:

a) To raise the approach speed.
b) To increase lift and to lower the approach speed.
c) To generate sufficient lift at a lower speed than would otherwise be possible.

591. Net thrust is expressed as:

a) Gross thrust less intake drag.
b) Gross thrust less intake ram pressure.
c) MVj, where m is the m is the mass throughflow and Vj is the exhaust gas velocity.

592. Engine thrust is produced by:

a) Fuel flow / RPM / inlet pressure.
b) Exhaust velocity.
c) Mass flow and velocity change.

593. The indications of approaching Mcrit are:

a) The nose tends to rise.
b) The nose tends to drop.
c) The Machmeter indicates M1.0 (after correction).

594. In order to raise the nose of an aircraft fitted with an all-moving tailplane:

a) The trim tab must be lowered.
b) The trim tab must be raised.
c) The angle of incidence must be increased.

595. Devices used to counter spanwise airflow include:

a) Washout.
b) Saw tooth leading edges.
c) Stall fences.

596. The maximum operating speed of a turboprop engine aircraft is approximately:

a) 400 kts TAS.
b) 250 kts TAS.
c) M1.3.

597. Engine life of a turbojet aircraft is reduced by:

a) Extremes of temperature and pressure between ground level and the high altitudes at which these aircraft operate.
b) Corrosion of the compressor blades by the fuel
c) Rubbing of the turbine blades against the shroud.

598. The function of a Mach trim device is:

a) To produce nose-up trim at high Mach numbers.
b) To produce nose-down trim at high Mach numbers.
c) To trim the aircraft for minimum shock drag.

599. The pressure rise per compressor stage is higher in a:

a) Centrifugal compressor.
b) Axial compressor.
c) Mechanical compressor.

600. The thrust produced by the fan of a turbofan engine, expressed as a percentage of the total thrust is:

a) 75%.
b) 50%.
c) 25%.

601. The speed of the airflow behind a normal shock wave will:

a) Increase.
b) Decrease.
c) Remain unaltered.

602. Transonic speed is when:

a) Part of the airflow over the aircraft is supersonic and part is subsonic.
b) When the aircraft is accelerating through Mach 1.
c) When the flow at the critical point reaches the critical Mach number.

603. Nozzle guide vanes affect the airflow through the engine:

a) By increasing dynamic pressure.
b) By decreasing dynamic pressure.
c) By decreasing dynamic pressure and increasing the through flow pressure

604. The compressor stall occurs when:

a) The compressor stops turning.
b) There is no airflow through the engine.
c) Turbulent airflow in the inlet stalls the compressor flow over the blades.

605. The preferred engine intake for a jet-engine subsonic aircraft is:

a) Convergent.
b) Divergent.
c) A straight tube.

606. The exhaust nozzle is shaped to:

a) Increase the heat of the exhaust gases by compression and increase mass flow.
b) Increase the velocity of the exhaust gases and increase mass flow.
c) Slow the velocity of the exhaust gases to subsonic speed.

607. A by-product of the exhaust is a swirl. The swirl will:

a) Increase the thrust.
b) Decrease the thrust.
c) Not change the thrust value.

608. In a axial type compressor, the compression ratio is determined by:

a) The size of the compressor blades.
b) The RPM of the compressor stages.
c) The number of stages.

609. The factor most affecting the maximum speed of a turbojet aircraft is:

a) Environmental concerns.
b) The sharp increase in drag above Mcrit.
c) The limited thrust available.

610. At Mcrit the coefficient of drag:

a) Decreases constantly.
b) Increase rapidly.
c) Remains constant.

611. After separation the boundary layer thickness:

a) Increases more rapidly.
b) Decreases.
c) Remains at a constant thickness.

612. The indications of a hung start are:

a) Normal TIT.
b) Low RPM not increasing or increasing very slowly.
c) High TIT, RPM high and rising, black smoke.

613. In a steady, level turn with an angle of bank of 50°, the load factor and stall speed will be:

a) 1.96 and 1.4 times that in level flight respectively.
b) 1.55 and 1.24 times that in level flight respectively.
c) 1.24 and 1.55 times that in level flight respectively.

614. In order to achieve maximum endurance in a piston engine aircraft, the aircraft must be flown at:

a) The speed for best lift to drag ratio at the full throttle height.
b) The speed for minimum power consumption at the full throttle height.
c) The speed for minimum power consumption at the lowest safe altitude.

615. Most techniques of providing lateral stability rely on:

a) Dihedral.
b) Sideslip.
c) Weathercocking.

616. The service ceiling of an aircraft is the altitude at which the rate of climb reduces to:

a) Zero.
b) 50 feet per minute.
c) 100 feet per minute.

617. In comparing the glide performance of differently loaded but identical types of aircraft:

a) The heavier aircraft will dissipate its energy faster and thus reach the ground in a shorter distance.
b) Will dissipate its energy faster but glide the same distance if flown at a lower speed.
c) Sink faster but if flown at the speed for the best lift to drag ratio, glide the same distance.

618. An aircraft turns when banked because the:

a) Horizontal component of lift exceeds the vertical component of lift.
b) Horizontal component of lift forces the aircraft to turn.
c) Resultant lift acts outward and upward from the centre of the turn.

619. When the load factor is kept constant during a level co-ordinated turn, it is true to say that:

a) An increase in airspeed would result in the same turn radius.
b) An increase in airspeed results in a decrease in turn radius.
c) An increase in airspeed results in an increase in turn radius.

620. As airspeed increases in level flight, total drag of an aircraft becomes greater than the total drag produced at the maximum L/D speed because of the:

a) Increase in induced drag. (LDD).
b) Increase in profile drag. (ZLD).
c) Decrease in profile drag. (ZLD).

621. As airspeed decreases in level flight, total drag of an aircraft becomes greater than the total drag produced at the maximum L/D speed because of the:

a) Increase in induced drag.
b) Increase in parasite drag.
c) Decrease in induced drag.

622. In comparison with a low aspect ratio wing, a high aspect ratio wing in a constant airflow velocity will have:

a) Decreased drag, especially at high angles of attack.
b) Increased drag, especially at high angles of attack.
c) Increased drag, especially at low angles of attack.

623. In comparison with a high aspect ratio wing, a low aspect ratio wing in a constant airflow velocity will have:

a) Decreased drag, especially at low angles of attack.
b) Decreased drag, especially at high angles of attack.
c) Increased drag, especially at high angles of attack.

624. A rectangular wing (compared to other wing planforms) has a tendency to stall first at the:

a) Wing root providing adequate stall warning.
b) Wingtip providing adequate stall warning.
c) Wing root providing inadequate stall warning.

625. Aircraft designed for less lateral manoeuvrability have:

a) Greater wing dihedral, but less sweepback.
b) Less wing dihedral, but greater sweepback.
c) Greater wing dihedral and sweepback.

626. The primary purpose of wing spoilers is to:

a) Change the camber or curvature of the wing.
b) Decrease landing speed.
c) Decrease the lift of the wing.

627. Changing the angle of attack of a wing, enables control of the:

a) Lift, gross weight and drag.
b) Lift, airspeed and drag.
c) Airspeed, weight and drag.

628. Changes in the centre of pressure of a wing affect the:

a) Aerodynamic balance and controllability.
b) CG location.
c) Lift/drag ratio.

629. To descend at the same airspeed as used in straight-and-level flight, power must be reduced or drag increased because the:

a) Component of weight acting forward along the flightpath increases as the descent angle increases.
b) Lifting action of the wing decreases as the angle of attack decreases.
c) Component of weight acting forward along the flightpath decreases as the rate of descent increases.

630. To generate the same amount of lift as altitude is increased, an aircraft must be flown at:

a) A lower true airspeed for any given angle of attack.
b) A lower true airspeed and a greater angle at attack.
c) A higher true airspeed for any given angle of attack.

631. Dynamic longitudinal instability in an aircraft can be identified by:

a) The need to apply continuous forward pressure on the elevators.
b) The need to apply continuous back pressure on the elevators.
c) Pitch oscillations becoming progressively steeper.

632. If the aircraft nose initially tends to return to the original position after the elevator is pressed forward and released, the aircraft displays:

a) Negative stability.
b) Positive static stability.
c) Negative dynamic stability.

633. In co-ordinated flight for any specific bank, the faster the speed the:

a) Greater the radius and the faster the rate of turn.
b) Smaller the radius and the faster the rate of turn.
c) Greater the radius and the slower the rate of turn.

634. To increase the rate of turn and at the same time decrease the radius:

a) Steepen the bank and increase airspeed.
b) Shallow the bank and increase airspeed.
c) Steepen the bank and decreases airspeed.

635. It is necessary to increase back elevator pressure to maintain altitude during a medium to steep banking turn:

a) Because the rudder function has been transferred to the elevator as the bank angle approaches 45°.
b) To compensate for the loss of vertical lift and increased centrifugal force.
c) To compensate for the effect of drag caused by deflection of the ailerons.

636. To maintain altitude during a turn, the angle at attack must be increased to compensate for the increase in the:

a) Wing loading.
b) Horizontal component of lift.
c) Vertical component of lift.

637. The maximum allowable airspeed with flaps extended (Vfe) is lower than cruising airspeed because:

a) The additional lift and drag created would overload the wing structure at higher speeds.
b) The flaps will retract automatically at higher speeds.
c) Too much drag is induced.

638. The ratio between the total airload imposed on the wing and the gross weight of an aircraft in flight is known as:

a) Load factor.
b) Power loading.
c) Aspect ratio.

639. Load factor is the actual load supported by the wings of an aircraft at any given moment:

a) Divided by the total weight of the aircraft.
b) Multiplied by the total weight of the aircraft.
c) Subtracted from the total weight of the aircraft.

640. If a load factor of 3 is placed on an aircraft with a gross weight of 3 000 lbs, the total load on the aircraft structure would be:

a) 3 000 lbs.
b) 6 000 lbs.
c) 9 000 lbs.

641. For a given angle of bank, the load factor imposed on both the aircraft and pilot in a co-ordinated constant altitude turn:

a) Is constant.
b) Is directly related to the gross aircraft weight.
c) Increase very slowly beyond 45° of bank.

642. Regarding the stalling speed, it is true to say that:

a) A low speed is necessary to produce a stall.
b) The stall speed of a given aircraft in not a fixed value.
c) The stall speed of a given aircraft is the same regardless of the flight manoeuvre.

643. The angle of attack at which a wing stalls remains constant regardless of:

a) Weight, dynamic pressure, bank angle, or pitch attitude.
b) Dynamic pressure, but varies with weight, bank angle, and pitch attitude.
c) Weight and pitch attitude, but varies with dynamic pressure and bank angle.

644. With comparable conditions relative to temperature, wind and aircraft weight, the groundspeed at touchdown at high elevation airports will be:

a) Higher than at sea level.
b) Lower than at sea level.
c) The same as at sea level.

645. An aircraft leaving ground effect will:

a) Require a lower angle of attack to maintain the same lift coefficient.
b) Experience an increase in induced drag and require more thrust.
c) Display more stability and a nose-down change in moment.

646. An aircraft leaving ground effect:

a) Require a greater angle of attack to maintain the same coefficient of lift.
b) Produce less induced drag and require less thrust.
c) Produce more static source pressure and higher indicated airspeed.

647. To produce the same lift while in ground effect as when out of ground effect requires:

a) Greater thrust and the same angle of attack.
b) A greater angle of attack.
c) A lower angle of attack.

648. One of the main functions of flaps during the approach and landing is to:

a) Permit a touchdown at a higher indicted airspeed.
b) Increase the angle of descent without increasing airspeed.
c) Decrease lift, thus enabling a steeper-than-normal approach to be made.

649. It is true to say concerning use of flaps during approach and landing that:

a) Flaps decrease lift, which increases the stall speed.
b) Flaps provide an increased in lift.
c) A steeper-than-normal approach is necessary due to increase in stall speed.

650. If the outside air temperature at a given altitude is warmer than standard, the density altitude is:

a) Lower than pressure altitude, but approximately equal to the true altitude.
b) Higher than true altitude, but lower than pressure altitude.
c) Higher than the pressure altitude.

651. Comparing an aircraft generator with an alternator:

a) An alternator provides more power at lower engine RPM than a generator.
b) A generator charges the battery during low engine RPM, therefore, the battery has less chance to discharge than with an alternator.
c) A generator always provides more current than an alternator.

652. As well as the additional safety factor, dual ignition systems also provides:

a) Improved engine performance.
b) Better heat control of the engine.
c) Easier starting.

653. The amount of water absorbed in aviation fuels will:

a) Remain the same regardless of temperature changes.
b) Decrease as the temperature of the fuel increases.
c) Increase as the temperature of the fuel increase.

654. Fuel tank vents must be open:

a) To allow proper air pressure in the tanks to maintain a steady fuel flow.
b) To allow fuel fumes to escape, eliminating the chance of the tank exploding.
c) To allow excess fuel to drain overboard when heat expands the fuel.

655. Completely filling the fuel tanks after the last flight of the day prevents fuel contamination by eliminating the airspace so that:

a) Rust or corrosive scale cannot form in the tanks.
b) Condensation of moist air cannot occur within the tanks.
c) Development of micro-organisms in the fuel is prevented.

656. One advantage of fuel injection systems over carburettor systems is:

a) Better fuel distribution to the cylinders.
b) Easier hot-engine starting.
c) Easier in-flight restarting.

657. One advantage of fuel ignition systems over carburettor systems is:

a) Elimination of vapour locks during ground operations.
b) A reduction in the probability of evaporative icing.
c) Easier starting of a hot engine.

658. One disadvantage of fuel ignition systems compared with carburettor systems is:

a) Difficulty in starting a hot engine.
b) Uneven fuel distribution to the cylinders.
c) Poor control of the fuel/air mixture.

659. Spark plugs in an aircraft engine are fouled:

a) When excessive heat in the combustion chamber of a cylinder causes oil to form on the centre electrodes of a spark plug fouling the plug.
b) When operating with an excessively rich mixture.
c) Primarily by operating at excessively high cylinder head temperatures.

660. An abnormally high engine oil temperature indication may be caused by:

a) The oil level being too low.
b) The oil level being too high.
c) Operating with an excessively rich mixture.

661. With regard to detonation, it is true to say that:

a) Detonation may be caused by opening the throttle abruptly when the engine is running at slow speeds.
b) Detonation is most likely to occur immediately after starting a cold engine.
c) Detonation can easily be detected by a pinging sound.

662. When the throttle is advanced during cruise on aircraft equipped with a constant-speed propeller the propeller pitch angle automatically:

a) Increase and engine RPM remains the same.
b) Increases and engine RPM also increases.
c) Decreases and engine RPM remains the same.

663. When the throttle setting is decreased during cruise on aircraft equipped with a constant-speed propeller, the propeller pitch automatically:

a) Increases and RPM increases.
b) Decreases and RPM remain the same.
c) Increases and RPM remain the same.

664. In aircraft equipped with constant speed propellers undue stress on engine components is best avoided by:

a) (When power is increased or decreased) adjusting RPM before the manifold pressure.
b) (When power is decreased) reducing RPM before reducing manifold pressure.
c) (When power is increased) increasing RPM before increasing manifold pressure.

665. With regard to propeller efficiency it is correct to say that:

a) Propeller efficiency is the ratio of thrust to brake horsepower.
b) Propeller efficiency is the theoretical distance a propeller should advance during one revolution.
c) Propeller efficiency is the actual distance a propeller advanced during one revolution.

666. If the aircraft is in an unusual flight attitude and the attitude indicator has exceeded limits, the instruments to rely on first to determine pitch attitude before starting recovery are:

a) Turn indicator and VSI.
b) ASI and altimeter.
c) Turn indicator and ASI.

667. Prior to staring the engine the manifold pressure gauge usually indicates ± 29" Hg. This is because the:

a) Throttle is in the fully open position.
b) Throttle is closed, trapping high air pressure in the manifold.
c) Pressure within the manifold is the same as atmospheric pressure.

668. Cylinder head and oil temperature readings are likely to exceed the normal operating ranges when:

a) Using fuel with a lower-than-specified octane rating for the engine.
b) Using fuel with a higher-than-specified octane rating for the engine.
c) Operating with the mixture control set too rich.

669. The gaseous mixture expands within the cylinder during the:

a) Compression stroke.
b) Power stroke.
c) Exhaust stroke.

670. When operating a typical unsupercharged aircraft engine it is true to say that:

a) Operating with an excessively lean mixture for an extended period of time usually results in fouled spark plugs.
b) Detonation often cannot be recognized from the cockpit through sound or engine roughness.
c) Generally speaking, rich mixture must be used with caution when operating at high-power settings.

671. If fuel/air mixture adjustments are not made during high altitude operation, engine performance will be affected because of a:

    a) Decrease in the volume of air while there is an increase in the amount of fuel entering the carburettor.
    b) Decrease in weight of the air while the same amount of fuel enters the carburettor.
    c) Decrease in weight of the air and amount of fuel entering the carburettor.

672. During run-up at a high-elevation airport it is noted that a slight engine roughness is not affected by the magneto check, but grows worse during the carburettor heat check. Under these circumstances, the most logical initial action is to:

    a) Check the results obtained with a leaner setting of the mixture control.
    b) Taxi back for a maintenance check.
    c) Check to see that the mixture is in the fully rich position.

673. Compared with fuel injection systems, float-type carburettor systems are generally considered to be:

    a) Equally susceptible to icing.
    b) Susceptible to icing only when visible moisture is present.
    c) More susceptible to icing.

674. When operating a supercharged engine, the use of carburettor heat should be regulated by reference to the:

    a) Carburettor air or mixture temperature gauge.
    b) Cylinder air temperature gauge.
    c) Manifold pressure or RPM indicator.

675. In an aircraft equipped with a float-type carburettor and a constant-speed propeller, carburettor icing would probably first be detected by:

    a) A drop in engine RPM.
    b) A drop in manifold pressure and engine RPM.
    c) A drop in manifold pressure.

676. Regarding aircraft engine operation during cold weather:

    a) Prolonged idling makes the spark electrodes saturated with congealed oil and results in shorting out the plugs.
    b) Overpriming could result in poor compression and hard starting.
    c) Engine parts expand, making if difficult to crank the engine.

677. While taxiing a light, high-wing aircraft during strong quartering tailwinds the aileron control (wheel or stick) should be positioned:

a) Towards the direction from which the wind is blowing.
b) Neutral at all times.
c) Opposite the direction from which the wind is blowing.

678. The aileron positions which should be generally used when taxiing in strong quartering headwinds are:

a) Aileron up on the side from which the wind is blowing.
b) Aileron down on the side from which the wind is blowing.
c) Aileron parallel to the ground on the side from which the wind is blowing.

679. The technique required for a crosswind correction on take-off is:

a) Aileron pressure into wind and initiate lift-off at a normal airspeed in both tailwheel and nosewheel-type aircraft.
b) Rudder as required to keep directional control, aileron pressure into wind, and higher than normal lift-off airspeed in both conventional and nosewheel aircraft.
c) Right rudder pressure, aileron pressure into wind, and higher than normal lift-off airspeed in both tricycle and conventional gear aircraft.

680. The maximum speed at which an aircraft can be stalled without imposing structural damage is:

a) The design manoeuvring speed.
b) Never-exceed speed.
c) Maximum structural cruising speed.

681. Operations approaching maximum speeds (such as Vne) should be avoided because:

a) Excessive induced drag will cause structural failures.
b) The stalling speed is increased to the point where manoeuvres will result in a stall.
c) Of the possibility of inducing flutter or exceeding design load factors.

682. The most immediate and vital concern in the event of complete power failure after becoming airborne on take-off is:

a) Gaining altitude quickly.
b) Landing directly into the wind.
c) Maintaining safe airspeed.

683. The approach and landing recommend during gusty wind conditions is:

a) A power-off approach at the normal speed and a power-off landing.
b) A power-on approach at the recommended speed and power-on landing.
c) A power-on approach and power-off landing at a lower speed.

684. Under normal conditions, a proper crosswind landing on a runway requires that at the moment of touchdown, the:

a) Direction of motion of the aircraft and the lateral axis is perpendicular to the runway.
b) Direction of motion of the aircraft and the longitudinal axis is parallel to the runway.
c) Upwind wheel should be braked lightly to control the shifting CG.

685. For take-off, the blade angle of a controllable-pitch propeller should be set at an angle which produces:

a) Equal pressure on each side of each blade.
b) A small angle of attack.
c) A large angle of attack.

686. To avoid the wing tip vortices of a departing jet during take-off:

a) Establish a flightpath downwind of the vortices.
b) Lift off at a point well past the jet aircraft flightpath.
c) Climb above and stay upwind of the jet aircraft flightpath.

687. Wingtip vortices created by large aircraft tend to:

a) Sink below the aircraft generating turbulence.
b) Rise into the take-off or landing path of a crosswind runway.
c) Accumulate at the beginning of the take-off roll.

688. When turbulence is encountered during the approach to land, the best action is to:

a) Increase airspeed slightly above normal approach speed to attain more positive control.
b) Increase airspeed slightly above normal approach speed to penetrate the turbulence as quickly as possible.
c) Decrease airspeed slightly below normal approach speed to prevent overshooting the landing area.

689. Vortex turbulence which might be encountered behind large aircraft is created only when that aircraft is:

a) Developing lift.
b) Heavily loaded.
c) Operating at high airspeeds.

690. The best technique for minimising the wing load factor when flying in severe turbulence is to:

a) Control altitude with power, airspeed with elevator and accept variations of bank.
b) Control airspeed with power, maintain wings level and accept variations of altitude.
c) Set power and trim to obtain an airspeed at or below manoeuvring speed, maintain wings level and accept variations of airspeed and altitude.

691. When entering an area where significant clear air turbulence has been reported the appropriate action on encountering the first ripple is to:

a) Extend flaps to decrease wing loading.
b) Extend gear to provide more drag and increase stability.
c) Adjust airspeed to that recommended for rough air.

692. The recommended procedure in the event of unintentional thunderstorm penetration is to:

a) Reduce airspeed to manoeuvring speed and maintain a constant altitude.
b) Set power for recommended turbulence penetration airspeed and attempt to maintain level attitude.
c) Reduce airspeed to manoeuvring speed and then maintain constant airspeed.

693. The correct sequence for recovery from a spiralling nose-low, increasing airspeed, unusual flight attitude is to:

a) Increase pitch attitude, reduce power, and level wings.
b) Reduce power, correct the bank attitude, and raise the nose to a level attitude.
c) Reduce power, raise the nose to level attitude, and correct the bank attitude.

694. The principle advantage of using propeller reduction gears is:

a) To enable propeller RPM to be increased without an accompanying increase in engine RPM.
b) That the diameter and blade area of the propeller can be increased.
c) To enable engine RPM to be increased with an accompanying increase in power and to allow the propeller to remain to a lower more efficient RPM.

695. The horsepower developed in the cylinders of a reciprocating engine is known as the:

a) Shaft horsepower.
b) Indicated horsepower.
c) Thrust horsepower.

696. The inside of some cylinder barrels is hardened by:

a) Nitriding.
b) Nickel plating.
c) Cadmium plating.

697. Top overhaul of a piston engine means:

a) Complete reconditioning of engine and accessories.
b) Ignition tuning and adjustment of valve clearance.
c) Reconditioning the cylinders, pistons and valve operating mechanism.

698. Engines operate more smoothly when the number of cylinders is increased because:

a) The power impulses are spaced closer together.
b) The heat formed is dissipated more evenly.
c) The engine has larger counter balance weights.

699. The volume of a cylinder equals 70 cubic inches when the piston is at bottom centre. When the piston is at the top of the cylinder the volume equals 10 cubic inches. The compression ratio is:

a) 1:7.
b) 7:10.
c) 7:1.

700. The purpose of a power check on a reciprocating engine is:

a) To check magneto drop.
b) To determine satisfactory performance.
c) To determine that the fuel/air mixture is adequate.

701. The probable cause of oil being thrown out of the breather on wet-sump reciprocating engine is:

a) Broken scavenger pump.
b) Worn piston rings.
c) Excessive oil.

702. An engine is shut down because of high operating temperature, loss of power, loss of oil through the engine breather and complete loss of oil pressure. The most likely cause is:

a) An inoperative engine oil pump.
b) An inoperative scavenge pump.
c) A raptured supercharger shaft oil seal

703. If the oil pressure gauge fluctuates over a wide range from zero normal operating pressure the most likely cause is:

a) Low oil supply.
b) Broken or weak pressure relief valve spring.
c) Air lock in the scavenge pump intake.

704. The indicated oil pressure of a particular dry-sump aircraft engine is higher at cruise RPM than at idle RPM. This indicates:

a) Defective piston-oil control rings.
b) Insufficient oil supply.
c) Normal operation.

705. Before attempting to start a radial engine which has been shut down for more than 30 minutes:

a) Place the fuel selector valve in the OFF position.
b) Pull the propeller through by hand in the opposite direction to normal rotation to check for liquid lock.
c) Turn the propeller three to four revolutions in the normal direction of rotation to check for liquid lock.

706. If the oil pressure of a cold engine is higher than at normal operating temperatures, the:

a) Oil system relief valve should be readjusted.
b) Lubrication system is probably operating normally.
c) Engine should be shut down immediately.

707. The best indication of worn valve guides is:

a) High oil consumption.
b) Low oil pressure.
c) High oil pressure.

708. Increased water vapour (higher relative humidity) in the incoming air to a reciprocating engine will normally result in:

a) Decreased engine power at a constant RPM and manifold pressure.
b) Increased power output due to increased volumetric efficiency.
c) Reduced fuel flow requirements at high-power settings due to reduced detonation tendencies.

709. Detonation differs from pre-ignition in that:

a) Detonation cannot be detected in an engine as easily as pre-ignition.
b) Pre-ignition will cause a loss of power, but will not damage an engine.
d) Detonation usually occurs in only a few cylinders at one time.

710. In a gas turbine engine, combustion occurs at a constant:

a) Volume.
b) Pressure.
c) Velocity.

711. When starting a turbo-jet engine:

a) A hot start is indicated if the exhaust gas temperature exceeds specified limits.
b) An excessively lean mixture is likely to cause a hot start.
c) The engine should start between 60 to 80 seconds after the fuel shutoff lever is opened.

712. Newton's First Law of motion, generally termed the Law of Inertia, states:

a) To every action there is an equal opposite reaction.
b) Force is proportional to the product of mass and acceleration.
c) Every body persists in a state of rest, or of motion in a straight line, unless acted upon by an external unbalanced force.

713. A manifold pressure gauge is designed to:

a) Indicate differential pressure between the intake manifold and atmospheric pressure.
b) Indicate variations of atmospheric pressure at different altitudes.
c) Indicate pressure in the manifold throat.

714. An example of a primary engine instrument would be:

a) Tachometer.
b) Fuel flowmeter.
c) Airspeed indicator.

715. Engine oil temperature gauge indicates the temperature of oil:

a) Entering the oil cooler.
b) Entering the engine.
c) In the oil storage tank.

716. Engine pressure ratio is determined by:

a) Multiplying engine inlet total pressure by turbine outlet total pressure.
b) Multiplying turbine outlet total pressure by engine inlet total pressure.
c) Dividing turbine outlet total pressure by engine inlet total pressure.

717. The most satisfactory extinguisher agent for an electrical fire is:

a) Water.
b) Carbon tetrachloride.
c) Carbon dioxide.

718. Alternators are often driven by a constant-speed drive mechanism to permit a nearly constant:

a) Voltage output.
b) Amperage output.
c) Frequency.

719. The viscosity of a liquid is a measure of the:

a) Resistance to flow.
b) Ability to transmit force.
c) Rate of change of internal friction with change in temperature.

720. Specific gravity is a comparison of the weight of a substance and the weight of an equal volume of:

a) Oil at a specific temperature.
b) Mercury at a specific temperature.
c) Distilled water at a specific temperature.

721. The viscosity of lubricating oil is greatly affected by:

a) Temperature.
b) Pressure.
c) Volatility.

722. The functions of lubricating oil in an aircraft engine are to:

a) Lubricate, cool, clean, and prevent fatigue of parts.
b) Lubricate, cool, seal, and prevent internal pressure build-up.
c) Lubricate, seal, cool and clean.

723. If a high powered engine has been ground operated at high RPM for long enough to reach high operating temperature, care should be taken not to decelerate the engine too quickly to avoid the possibility of:

a) Carbonising oil trapped in the ring grooves.
b) Rupturing the diaphragm control valve in the automatic oil temperature control unit.
c) Completely scavenging all power section oil.

724. The primary purpose of changing aircraft engine lubricating oils at predetermined periods is because:

a) Exposure to heat and oxygen causes the oil to lose the ability to maintain a film under load.
b) The oil becomes contaminated with finely divided particles in suspension.
c) The oil eventually wears out.

725. All oil tanks are equipped with vent lines:

a) To prevent pressure build up in the engine.
b) To eliminate foaming in the tank.
c) To prevent pressure build up in the tank.

726. A combination of atmospheric conditions which will reduce performance is:

a) Low temperature, low relative humidity, and low density altitude.
b) High temperature, low relative humidity, and low density.
c) High temperature, high relative humidity, and high density altitude.

727. One purpose of the dual ignition system is to provide for:

a) Uniform heat distribution.
b) Balanced cylinder-head pressure.
c) Easier starting.

728. The basic flight manoeuvre which increases the load factor on an aircraft as compared to straight-and-level flight is:

a) Climbing.
b) Turning.
c) Stalling.

729. In order to spin, an aircraft must be:

a) Partially stalled with one wing low and the throttle closed.
b) Placed in a steep diving spiral and throttle closed.
c) Placed in a steep nose-high pitch attitude with throttle closed.

730. The phenomenon of ground effect is most likely to result in:

a) Settling back to the surface abruptly immediately after becoming airborne.
b) Becoming airborne before reaching recommended take-off speed.
c) An inability to get airborne even though airspeed in normal.

731. The Principles on which the production of lift are based on:

a) Boyle's Law.
b) Bernoulli's Theorem.
c) Charles law.

732. When considering aerodynamic forces, the effect of size is related to:

a) Joules law.
b) Bernoulli's theorem.
c) Reynolds number.

733. The ratio Span² ÷ Area gives:

a) Aspect ratio.
b) Lift/Drag ratio.
c) Fineness ratio.

734. The dividing line between Laminar flow and Turbulent flow is:

a) Separation point.
b) Transition point.
c) Line of Mean Camber.

735. The drag obtained in truly vertical flight is called:

a) Interference drag.
b) Form drag.
c) Zero lift drag.

736. The ideal wing platform in regard to efficiency aerodynamically is:

a) Rectangular.
b) Elliptical.
c) Delta.

737. The best warning of an impending stall is:

a) Buffet of the tail surface.
b) The attitude of the aircraft.
c) A sharp dropping of the nose.

738. Factors, which can affect the indicated stalling speed, are:

a) Wind velocity, weight and density.
b) Weight, load factor and power.
c) Aspect ratio, down wash and sweep back.

739. The possibility of a spin developing into a flat spin is greatest with:

a) A forward centre of gravity.
b) A small inertia moment.
c) An aft centre of pressure.

740. The take-off chart in the manufacturer's handbook gives take-off distance:

a) For the worst possible conditions.
b) For a hard dry runway.
c) For a soft wet runway.

741. With a light wind on a runway with an appreciable gradient it is advisable to take-off:

a) Uphill.
b) Downhill.
c) Either uphill or downhill.

742. If flaps are used for take-off they are retracted:

a) A soon as possible after take-off.
b) Fully, in one movement.
c) In stages.

743. A pilot accepting an ATC clearance to follow another aircraft to a landing is responsible for maintaining:

a) A minimum of 2 minutes separation.
b) Wake turbulence separation.
c) A minimum of 2 minutes before landing behind another aircraft.

744. The wake turbulence vector circulates around each wing tip:

a) Clockwise as viewed from behind.
b) Inward, upward and around each wing tip.
c) Outward, upward and towards the fuselage.

745. Bernoulli's theorem states that the following factors added together make a constant:

a) Pressure energy, Kinetic energy and potential energy.
b) Density, velocity and temperature.
c) Pressure, Newtons and Joules.

746. The difference between Rectified Airspeed and Equivalent Airspeed is:

a) Position error.
b) Compressibility.
c) Density error.

747. The effect on the stalling attitude when using flaps or slats is:

a) That both flaps and slats increase the stalling attitude.
b) That slats increase the stalling attitude and flaps reduce it.
c) That flaps increase the stalling attitude and slates reduce it.

748. Total drag is the sum of:

a) Form drag and skin friction.
b) Interference drag, form drag and skin friction.
c) Profile drag and induced drag.

749. A unit driven by the engine to produce AC electrical power is called:

a) A transformer rectifier.
b) An inverter.
c) An alternator.

750. To change AC power to DC power requires:

a) A transformer rectifier.
b) A reverse current relay.
c) An inverter.

751. If the ammeter is indicating a negative charge rate it could indicate:

a) An unserviceable generator.
b) An overload.
c) Either (a) or (b).

752. A constant speed drive is used with:

a) A transformer rectifier.
b) An alternator.
c) A generator.

753. An unusually heavy load on the ammeter could be diagnosed by:

a) Splitting the load on the busses.
b) Closing the BTB's.
c) Switching off the generators.

754. Cabin altitude in a pressurised cabin is controlled by:

a) Controlling the amount of inflowing air.
b) Controlling both the inflow and outflow of air to the cabin.
c) Controlling the amount of outflowing air.

755. In a pressurisation system the cooling effect of air entering the cabin is allowed for by:

a) A water separator.
b) An outflow valve.
c) A park valve.

756. If the maximum differential was reached during the climb in a pressurised aircraft, it could be corrected by:

a) Increasing the aircraft altitude.
b) Increasing the cabin altitude.
c) Closing the outflow valve.

757. To be able to accept both tension and compression forces requires:

a) A strut or tube.
b) A wire.
c) A hinge.

758. The indicated speed at which an aircraft will stall varies in proportion to:

a) The weight of the aircraft.
b) The square root of the product of weight and load factor.
c) The density altitude.

759. On a turbocharged aircraft, the altitude to which the turbocharger can maintain rated engine power is called:

a) The cut-off altitude.
b) The maximum cruising level.
c) The critical altitude.

760. Centre of pressure is defined as:

a) The point about which the wing rotates.
b) The point through which the resulting aerodynamic force acting on the wing can be considered to pass.
c) A point on the chord of the wing about which the moments remain at a constant value.

761. If the airspeed of an aircraft is doubled then the power required to overcome parasite and profile drag will:

a) Be 4 times greater.
b) Remain unchanged.
c) Decrease to one half of the original value.

762. The stalling angle is:

a) Independent of airspeed and load-factor.
b) Reached when the angle of incidence becomes so high that separation occurs over a large portion of the upper surface of the aerofoil.
c) Independent of configuration airspeed and bank angle.

763. Which is the odd one out?

a) Split flap.
b) Plain flap.
c) Fowler flap.

764. Stalling angle decreases when:

a) Leading edge slots are used.
b) Aspect ratio is increased.
c) Wing surfaces are dirty.

765. The stall speed, in level flight of an aircraft is 61 knots. If the aircraft's gross weight is 3 600 lbs what would be the effect of a 12% overload?

a) Stall speed increases to 68.3 knots.
b) Stall speed increases to 64.6 knots.
c) Stall speed increases to 76.5 knots.

766. An increase of aircraft weight will:

a) Glide further in a headwind.
b) Glide further in a tailwind.
c) Glide the same distance irrespective of head or tailwind because the glide angle is dependant only on lift to drag ratio.

767. Lateral balance can:

a) Be a limiting factor.
b) Can affect aircraft performance.
c) Both (a) or (b).

768. The aircraft nose initially tends to return to the original position after the elevator is pushed forward and released, the aircraft displays:

a) Negative stability,
b) Positive static stability
c) Negative dynamic stability.

769. The firing sequence of a typical six cylinder horizontally opposed piston engine is:

a) 1-4-5-6-3-2.
b) 1-4-5-2-3-6.
c) 1-6-3-2-4-5.

770. At the absolute ceiling:

a) The aircraft will be on the verge of stalling.
b) There will only be one possible cruise speed equal to the maximum rate of climb speed and maximum angle of climb speed.
c) The maximum climb rate will be reduced to 100 ft per minute or less

771. The use of counter-rotating propellers has the effect of:

a) Increasing the nett torque and gyroscopic moment.
b) Decreasing the nett torque and increasing the nett gyroscopic moment.
c) Eliminating the torque and gyroscopic moment.

772. To gain all the advantages associated with counter rotating engines, the engines on a twin engine aircraft should rotate as follows:

a) Left engine clockwise and right engine anti-clockwise.
b) Right engine clockwise and left engine anti-clockwise.
c) It makes no differences so long as the engine rotates in opposite directions.

773. With the engine off, the manifold pressure gauge will read:

a) 0.
b) Ambient atmospheric pressure.
c) 29.9” Hg.

774. Imagine you are in an aircraft a FL250 with the pressurisation at maximum differential giving a cabin altitude of 7 000 ft. To avoid bad weather, you climb to FL300. The cabin altitude will then increase to:

a) An altitude of 12 000 ft.
b) An altitude just over 12 000 ft.
c) An altitude under 12 000 ft.

775. In a piston engine the spark would occur:

a) At the beginning of the power stroke.
b) When the piston is at TDC.
c) Towards the end of the compression stroke.

776. An aircraft in a level turn has a stalling speed of 107 kts at 1.8g. The stalling speed in straight and level flight will be:

a) 143 kts.
b) 59 kts.
c) 80 kts.

777. Why must the angle of attack be increased during a turn to maintain altitude?

a) Compensate for loss of vertical component of lift.
b) Increase the horizontal component of lift equal to the vertical component.
c) Compensate for increase in drag.

778. If kinetic energy is increased in a Venturi tube, there will be a decrease in:

a) Potential energy.
b) Energy due to position.
c) Pressure energy.

779. Assume an aircraft is certified with a maximum gross weight of 2 500 lbs and a load factor of 3.8. If this aircraft were loaded to a gross weight of 2 650 lbs and flown in turbulence creating a 3.8 load factor, what air load would be imposed upon its structure?

a) 2 650 lbs and this aircraft should not be flown with this gross weight.
b) 570 lbs above maximum possible, this aircraft should not be flown at this gross weight.
c) 150 lbs above maximum possible and this aircraft should not be flown at this gross weight.

780. If, during a level turn, the rate of turn is kept constant, an increase in airspeed will result in:

a) A constant load factor regardless of changes in angle of bank.
b) A need to decrease the angle of bank to maintain the same rate of turn.
c) A need to increase the angle of bank to maintain the small rate of turn.

781. If, while holding the angle of bank constant, the rate of turn is increased, the load factor would:

a) Remain the same.
b) Vary depending on speed.
c) Vary depending on weight.

782. Frost on the surface of the wing means that:

a) Lift is decreased and drag is decreased.
b) Lift is increased and drag is decreased.
c) Lift is decreased and drag is increased.

783. When an aircraft is flying at zero angle of attack, the pressure over the wing top surface would be:

a) Above atmospheric pressure.
b) Below atmospheric pressure.
c) The same as atmospheric pressure.

784. An aircraft climbs as a result of:

a) Total reaction and lift.
b) Excess thrust.
c) Excess lift.

785. When an aircraft climbs at a constant airspeed and constant power:

a) Thrust is greater than drag and lift is greater than weight.
b) Thrust is greater than drag and lift is equal to weight.
c) Thrust is greater than drag and lift is less than weight.

786. The maximum load factor for an aircraft is +4.4G units. The maximum bank angle which could be made during a level turn without exceeding this load factor is approximately:

a) 67°
b) 77°
c) 87°

787. In a co-ordinated turn at a constant altitude, it is true to say that:

a) For any specific bank angle and airspeed, the lighter the aircraft is, the faster the rate and the smaller the radius of the turn.
b) For a specific bank angle and airspeed, the rate and radius of the turn will not vary.
c) The faster the TAS, the faster the rate and the larger the radius of turn, regardless of the bank angle.

788. The reason for the variation in geometric pitch (twisting) along a propeller blade is that it:

a) Permits a relatively constant angle of incidence along its length when in cruise.
b) Prevents the portion of the blade near the hub from stalling during cruise.
c) Permits a relatively constant angle of attack along its length when in cruise.

789. Propeller thrust is the result of the:

a) Angle of incidence of the blade.
b) Shape and angle of attack of the blade.
c) Decreased pressure on the flat side of the blade and increased pressure on the curved side.

790. When exhaust odours are detected in the cockpit, the pilot should:

a) Shut down the engines and land immediately.
b) Shut off the cabin heater and close all engine compartment openings.
c) Open all cabin vents including passages to the engine compartment.

791. At sea level full power of a supercharged engine produces a manifold pressure of approximately 30” Hg. At 10 000 ft, without a change in the position of the engine controls, the manifold pressure gauge will indicate approximately:

a) 15” Hg.
b) 20” Hg.
c) 30” Hg.

792. At sea level, an unsupercharged engine fitted with a constant-speed propeller develops 260 HP at 2625 RPM and 29” Hg. The expected full power manifold pressure reading at an airport 5 000 ft AMSL would be:

a) Less than 2 625 RPM and 29” Hg.
b) 2 625 RPM and less than 29” Hg.
c) Higher than 2 625 RPM and more than 29” Hg.

793. Reciprocating engines, for cooling, depend mainly on:

a) A properly functioning thermostat.
b) The circulation of lubricating oil.
c) A lean air/fuel mixture.

794. If the fuel/air is not adjusted while climbing, the engine performance will be affected because of:

a) A decrease in air mass with approximately the same fuel amount entering the carburettor.
b) A decrease in the amount of fuel and a decrease in the volume of air entering the carburettor.
c) A constant volume of air and an increase in fuel.

795. In the glide, the use of flaps will:

a) Extend the glide and more ground distance will be covered.
b) Lower the lift/drag ratio and steepen the glide.
c) Increase the lift/drag ratio and flatten the glide.

ANSWERS

1	**A**	48	**B**	95	**B**
2	**B**	49	**A**	96	**C**
3	**B**	50	**B**	97	**B**
4	**A**	51	**A**	98	**A**
5	**C**	52	**B**	99	**C**
6	**A**	53	**C**	100	**C**
7	**A**	54	**B**	101	**C**
8	**C**	55	**A**	102	**C**
9	**A**	56	**B**	103	**A**
10	**C**	57	**C**	104	**B**
11	**A**	58	**C**	105	**B**
12	**C**	59	**B**	106	**C**
13	**C**	60	**C**	107	**B**
14	**C**	61	**A**	108	**B**
15	**B**	62	**C**	109	**A**
16	**A**	63	**B**	110	**C**
17	**C**	64	**B**	111	**C**
18	**C**	65	**A**	112	**A**
19	**A**	66	**B**	113	**B**
20	**B**	67	**C**	114	**A**
21	**B**	68	**A**	115	**A**
22	**A**	69	**A**	116	**B**
23	**A**	70	**C**	117	**A**
24	**A**	71	**B**	118	**B**
25	**C**	72	**C**	119	**A**
26	**A**	73	**C**	120	**C**
27	**C**	74	**A**	121	**B**
28	**B**	75	**B**	122	**C**
29	**B**	76	**B**	123	**A**
30	**C**	77	**C**	124	**A**
31	**A**	78	**A**	125	**C**
32	**B**	79	**C**	126	**A**
33	**A**	80	**A**	127	**C**
34	**B**	81	**A**	128	**C**
35	**A**	82	**B**	129	**B**
36	**B**	83	**A**	130	**B**
37	**B**	84	**C**	131	**C**
38	**C**	85	**B**	132	**C**
39	**B**	86	**B**	133	**A**
40	**A**	87	**C**	134	**A**
41	**C**	88	**A**	135	**A**
42	**B**	89	**B**	136	**C**
43	**C**	90	**C**	137	**A**
44	**C**	91	**B**	138	**C**
45	**B**	92	**A**	139	**C**
46	**C**	93	**A**	140	**C**
47	**C**	94	**C**	141	**B**

142	**B**	190	**C**	238	**A**
143	**C**	191	**C**	239	**C**
144	**B**	192	**A**	240	**C**
145	**A**	193	**C**	241	**B**
146	**C**	194	**B**	242	**B**
147	**B**	195	**B**	243	**B**
148	**B**	196	**A**	244	**B**
149	**A**	197	**C**	245	**C**
150	**C**	198	**A**	246	**C**
151	**A**	199	**A**	247	**C**
152	**B**	200	**C**	248	**C**
153	**C**	201	**C**	249	**C**
154	**B**	202	**C**	250	**A**
155	**B**	203	**C**	251	**A**
156	**A**	204	**B**	252	**C**
157	**A**	205	**A**	253	**A**
158	**C**	206	**C**	254	**C**
159	**A**	207	**A**	255	**B**
160	**C**	208	**B**	256	**B**
161	**A**	209	**A**	257	**A**
162	**A**	210	**A**	258	**C**
163	**B**	211	**B**	259	**B**
164	**C**	212	**B**	260	**C**
165	**B**	213	**A**	261	**A**
166	**C**	214	**B**	262	**B**
167	**B**	215	**B**	263	**B**
168	**B**	216	**B**	264	**B**
169	**C**	217	**A**	265	**C**
170	**C**	218	**B**	266	**B**
171	**C**	219	**B**	267	**B**
172	**A**	220	**A**	268	**B**
173	**B**	221	**C**	269	**B**
174	**C**	222	**A**	270	**B**
175	**B**	223	**B**	271	**C**
176	**A**	224	**C**	272	**B**
177	**C**	225	**C**	273	**C**
178	**C**	226	**C**	274	**A**
179	**C**	227	**A**	275	**A**
180	**B**	228	**A**	276	**C**
181	**B**	229	**A**	277	**C**
182	**A**	230	**A**	278	**A**
183	**A**	231	**C**	279	**A**
184	**B**	232	**C**	280	**C**
185	**A**	233	**C**	281	**A**
186	**C**	234	**B**	282	**B**
187	**B**	235	**A**	283	**A**
188	**A**	236	**C**	284	**B**
189	**A**	237	**C**	285	**C**

286	**B**	334	**A**	382	**C**
287	**C**	335	**A**	383	**B**
288	**A**	336	**B**	384	**C**
289	**B**	337	**C**	385	**C**
290	**B**	338	**C**	386	**C**
291	**C**	339	**B**	387	**A**
292	**B**	340	**B**	388	**A**
293	**A**	341	**C**	389	**B**
294	**C**	342	**C**	390	**C**
295	**B**	343	**A**	391	**A**
296	**B**	344	**A**	392	**B**
297	**B**	345	**C**	393	**A**
298	**C**	346	**A**	394	**A**
299	**B**	347	**C**	395	**C**
300	**C**	348	**C**	396	**A**
301	**B**	349	**B**	397	**B**
302	**B**	350	**C**	398	**C**
303	**A**	351	**A**	399	**C**
304	**B**	352	**A**	400	**A**
305	**B**	353	**A**	401	**C**
306	**B**	354	**B**	402	**C**
307	**C**	355	**C**	403	**B**
308	**A**	356	**C**	404	**A**
309	**A**	357	**A**	405	**A**
310	**C**	358	**A**	406	**B**
311	**B**	359	**C**	407	**B**
312	**B**	360	**A**	408	**B**
313	**B**	361	**C**	409	**C**
314	**A**	362	**A**	410	**A**
315	**B**	363	**B**	411	**C**
316	**C**	364	**A**	412	**A**
317	**A**	365	**B**	413	**A**
318	**A**	366	**C**	414	**A**
319	**C**	367	**B**	415	**A**
320	**B**	368	**B**	416	**C**
321	**A**	369	**C**	417	**C**
322	**A**	370	**A**	418	**B**
323	**C**	371	**C**	419	**C**
324	**C**	372	**B**	420	**A**
325	**B**	373	**A**	421	**B**
326	**C**	374	**C**	422	**B**
327	**A**	375	**A**	423	**B**
328	**A**	376	**B**	424	**C**
329	**B**	377	**A**	425	**C**
330	**A**	378	**A**	426	**C**
331	**B**	379	**B**	427	**B**
332	**B**	380	**A**	428	**A**
333	**A**	381	**C**	429	**A**

430	**B**	478	**C**	526	**C**
431	**B**	479	**C**	527	**A**
432	**C**	480	**A**	528	**A**
433	**C**	481	**B**	529	**A**
434	**C**	482	**C**	530	**B**
435	**C**	483	**B**	531	**B**
436	**A**	484	**A**	532	**B**
437	**A**	485	**C**	533	**A**
438	**B**	486	**B**	534	**A**
439	**B**	487	**C**	535	**A**
440	**B**	488	**A**	536	**C**
441	**C**	489	**A**	537	**A**
442	**B**	490	**C**	538	**B**
443	**B**	491	**C**	539	**A**
444	**B**	492	**A**	540	**B**
445	**B**	493	**C**	541	**B**
446	**A**	494	**A**	542	**B**
447	**A**	495	**B**	543	**C**
448	**A**	496	**C**	544	**A**
449	**A**	497	**B**	545	**B**
450	**B**	498	**C**	546	**B**
451	**C**	499	**A**	547	**C**
452	**B**	500	**C**	548	**A**
453	**B**	501	**A**	549	**A**
454	**C**	502	**A**	550	**B**
455	**B**	503	**C**	551	**C**
456	**B**	504	**C**	552	**B**
457	**A**	505	**B**	553	**C**
458	**B**	506	**B**	554	**B**
459	**C**	507	**B**	555	**B**
460	**C**	508	**C**	556	**A**
461	**A**	509	**C**	557	**A**
462	**C**	510	**C**	558	**A**
463	**C**	511	**C**	559	**A**
464	**B**	512	**A**	560	**A**
465	**C**	513	**C**	561	**C**
466	**C**	514	**C**	562	**C**
467	**C**	515	**C**	563	**B**
468	**C**	516	**B**	564	**C**
469	**B**	517	**A**	565	**A**
470	**C**	518	**B**	566	**C**
471	**C**	519	**B**	567	**A**
472	**B**	520	**C**	568	**A**
473	**A**	521	**C**	569	**A**
474	**B**	522	**C**	570	**B**
475	**A**	523	**A**	571	**B**
476	**C**	524	**C**	572	**A**
477	**A**	525	**C**	573	**B**

574	**C**	622	**A**	670	**B**
575	**C**	623	**C**	671	**B**
576	**A**	624	**A**	672	**A**
577	**B**	625	**C**	673	**C**
578	**C**	626	**C**	674	**A**
579	**C**	627	**B**	675	**C**
580	**A**	628	**A**	676	**B**
581	**C**	629	**A**	677	**C**
582	**A**	630	**C**	678	**A**
583	**B**	631	**C**	679	**B**
584	**B**	632	**B**	680	**A**
585	**C**	633	**C**	681	**C**
586	**B**	634	**C**	682	**C**
587	**C**	635	**B**	683	**B**
588	**C**	636	**B**	684	**B**
589	**A**	637	**A**	685	**B**
590	**C**	638	**A**	686	**C**
591	**A**	639	**A**	687	**A**
592	**C**	640	**C**	688	**A**
593	**B**	641	**A**	689	**A**
594	**C**	642	**B**	690	**C**
595	**C**	643	**A**	691	**C**
596	**A**	644	**A**	692	**B**
597	**C**	645	**B**	693	**B**
598	**A**	646	**A**	694	**C**
599	**A**	647	**C**	695	**B**
600	**A**	648	**B**	696	**A**
601	**B**	649	**B**	697	**C**
602	**A**	650	**C**	698	**A**
603	**A**	651	**A**	699	**C**
604	**C**	652	**A**	700	**B**
605	**A**	653	**C**	701	**B**
606	**B**	654	**A**	702	**B**
607	**B**	655	**B**	703	**A**
608	**C**	656	**A**	704	**C**
609	**B**	657	**B**	705	**C**
610	**B**	658	**A**	706	**B**
611	**A**	659	**B**	707	**A**
612	**B**	660	**A**	708	**A**
613	**B**	661	**A**	709	**A**
614	**B**	662	**A**	710	**B**
615	**A**	663	**B**	711	**A**
616	**C**	664	**C**	712	**C**
617	**A**	665	**A**	713	**C**
618	**B**	666	**B**	714	**A**
619	**C**	667	**C**	715	**B**
620	**B**	668	**A**	716	**C**
621	**A**	669	**B**	717	**C**

718	**C**	744	**C**	770	**A**
719	**A**	745	**A**	771	**C**
720	**C**	746	**B**	772	**C**
721	**A**	747	**B**	773	**B**
722	**C**	748	**C**	774	**C**
723	**A**	749	**C**	775	**C**
724	**B**	750	**A**	776	**C**
725	**C**	751	**C**	777	**A**
726	**C**	752	**B**	778	**C**
727	**A**	753	**A**	779	**B**
728	**B**	754	**C**	780	**C**
729	**A**	755	**A**	781	**A**
730	**B**	756	**B**	782	**C**
731	**B**	757	**A**	783	**B**
732	**C**	758	**B**	784	**B**
733	**A**	759	**C**	785	**C**
734	**B**	760	**B**	786	**B**
735	**C**	761	**A**	787	**B**
736	**B**	762	**A**	788	**C**
737	**A**	763	**B**	789	**B**
738	**B**	764	**B**	790	**B**
739	**C**	765	**B**	791	**B**
740	**B**	766	**B**	792	**B**
741	**B**	767	**C**	793	**B**
742	**C**	768	**B**	794	**A**
743	**B**	769	**B**	795	**B**