CIVIL AVIATION DIRECTORATE
OF THE REPUBLIC OF SERBIA

Exam questions for obtaining aircraft licenses and ratings

Subject:

PPL (A) – Principle of flight

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NOTE:
The correct answer under a. During the exam the order of answers will be different.

Review questions:

1. Density:-
   a. Reduces with altitude increase.
   b. Is unaffected by temperature change.
   c. Increases with altitude increase.
   d. Reduces with temperature reduction.

2. The air pressure that acts on anything immersed in it:-
   a. Is also known as Static Pressure.
   b. Is also known as Dynamic Pressure.
   c. Is greater at altitude than at sea level.
   d. Is also known as Total Pressure.

3. If, on a given day, the actual outside air temperature at 4000 ft is 23°C, what is the approximate difference between the actual and ISA temperature?
   a. 16°C.
   b. 7°C.
   c. 15°C.
   d. 8°C.

4. The presence of water vapour:-
   a. In air will reduce its density.
   b. In air will increase its density.
   c. In the atmosphere will increase the power output of a piston engine.
   d. In the atmosphere will increase the amount of lift generated by an aircraft.

5. When considering the changes in density of the air with altitude, which of the following four options is correct?
   a. The reduction in pressure with increasing altitude causes density to reduce.
   b. The temperature increase with increasing altitude causes density to increase.
   c. The temperature reduction with increasing altitude causes density to increase.
   d. The increase in pressure with increasing altitude causes density to reduce.

6. The respective percentages of the four most abundant gases that make up the atmosphere are?
   a. Nitrogen 78% Oxygen 21% Argon 0.95% Carbon Dioxide 0.05%
   b. Oxygen 78% Nitrogen 21% Argon 0.95% Carbon Dioxide 0.05%
   c. Nitrogen 78% Oxygen 21% Argon 0.95% Carbon Monoxide 0.05%
   d. Oxygen 78% Nitrogen 21% Argon 0.95% Carbon Monoxide 0.05%

7. The properties of the Earth s atmosphere which influence the performance of aircraft are:
    a. Its water vapour content, temperature, pressure and density.
    b. Its temperature, pressure and humidity.
    c. Its oxygen content pressure, and water vapour content
    d. Its nitrogen content, oxygen content, temperature and pressure.

8. Assuming that the pressure at sea level is ISA, but the temperature is 10°C higher than ISA, the density will be:
    a. Less than ISA.
    b. As per ISA.
    c. Greater than ISA.
    d. Unaffected.

9. Air pressure:-
    a. Acts in all directions.
    b. Acts only vertically downwards.
    c. Is measured in Pascals per square inch.
    d. Increases with altitude.

10. A piston engine aircraft fiies in that layer of the atmosphere called:
    a. The Troposphere.
    b. The Stratosphere.
    c. The Mesosphere.
    d. The Tropopause.

11. In straight and level powered flight the following principal forces act on an aircraft:
    a. Thrust lift. drag, weight
    b. Thrust lift, weight
    c. Thrust lift, drag.
    d. Lift, drag, weight.

12. The unit of force is the:
    a. Newton.
    b. Newton-metre.
    c. Joule.
    d. Mass-kilogram.

13. The dynamic pressure exerted on an aircraft's frontal surface is equal to:
    a. Half the density times the true airspeed squared.
    b. Density time’s speed squared.
    c. Half the true airspeed times the density squared.
    d. Half the density times the indicated airspeed squared.

14. Relative airflow is ___and_____the movement of the aircraft.
    a. Parallel to / Opposite to.
    b. Perpendicular to / Opposite to.
    c. Perpendicular to / in the same direction as.
    d. Parallel to / in the same direction as.

15. The symbol for dynamic pressure is:
    a. Q
    b. P
    c. R
    d. D

16. The air flow over the wing's upper surface in straight and level flight, when compared with the airflow that is unaffected by the wing, will have:
    a. A higher velocity.
    b. A higher density.
    c. A reduced velocity.
    d. The same velocity.

17. Which of the four answer options most correctly completes the sentence? Increasing speed also increases lift because:
    a. The increased speed of the air passing over an aerofoil's upper surface decreases the static pressure above the wing, thus creating a greater pressure differential across the upper and lower surface.
    b. Lift is directly proportional to velocity.
    c. The increased velocity of the relative wind overcomes the increased drag.
    d. Increasing speed decreases drag.

18. An aircraft has a nose down pitching moment due to the lift/weight couple and a nose up pitching moment due to the thrust/drag couple. When power is increased:
    a. It will pitch nose up.
    b. It will pitch nose down.
    c. The couples both increase in magnitude but remain balanced.
    d. The couples both decrease in magnitude but remain balanced.

19. Considering the forces acting upon an aeroplane, at constant airspeed, which statement is correct?
    a. Weight always acts vertically downwards towards the centre of the Earth.
    b. Lift acts perpendicular to the chord line and must always be greater than weight
    c. Thrust acts parallel to the relative airflow and is greater than drag.
    d. The lift force generated by the wings always acts in the opposite direction to the aircraft's weight.

20. In straight and level flight, the free stream airflow pressure, compared to that flowing under the wing, is:
    a. Lower.
    b. Equal.
    c. Higher.
    d. Equal pressure but travelling faster.

21. If the cross sectional area of an airflow is mechanically reduced:
    a. The mass flow remains constant and the velocity of the airflow increases.
    b. The velocity of the airflow remains constant and the mass flow increases.
    c. The mass flow remains constant and the static pressure increases.
    d. The velocity of the airflow remains constant and the kinetic energy increases.

22. Dynamic pressure is:
    a. The amount by which the pressure rises at a point where a moving airflow is brought completely to rest.
    b. The total pressure at a point where a moving airflow is brought completely to rest.
    c. The pressure due to the mass of air pressing down on the air beneath.
    d. The pressure change caused by heating when a moving airflow is brought completely to rest.

23. When considering air:
    1 - Air has mass
    2 - Air is not compressible
    3 - Air is able to flow or change its shape when subject to even small pressures
    4 - The viscosity of air is very high
    5 - Moving air has kinetic energy
    The correct combination of all true statements is:
    a. 1, 3, and 5.
    b. 1, 2. 3 and 5.
    c. 2, 3 and 4.
    d. 1 and 4.

24. An aircraft rotates about:
    a. Its centre of gravity.
    b. Its wings.
    c. Its main undercarriage.
    d. Its rudder.

25. An aircraft's mass is a resuit of:
    a. How much matter it contains.
    b. Its weight
    c. How big it is.
    d. Its volume.

26. Dynamic pressure equals:
    a. Total pressure minus static pressure.
    b. Total pressure plus static pressure.
    c. Static pressure minus total pressure.
    d. Total pressure divided by static pressure.

27. If the velocity of an air mass is increased:
    a. The kinetic energy will increase, the dynamic pressure will increase and the static pressure will decrease.
    b. The dynamic pressure will decrease and the static pressure will increase.
    c. The static pressure will remain constant and the kinetic energy will increase.
    d. The mass flow will stay constant, the dynamic pressure will decrease and the static pressure will increase.

28. The boundary layer consists of:
    a. Laminar and Turbulent flow.
    b. Laminar flow.
    c. Turbulent flow.
    d. Turbulent flow at low speeds only.

29. What must be the relationship between the forces acting on an aircraft in flight, for that aircraft to be in a state of equilibrium?
    a. Lift must equal weight, and thrust must equal drag.
    b. Lift must equal drag, and thrust must equal weight
    c. Lift must equal thrust plus drag.
    d. Lift must equal thrust, and weight must equal drag.

30. The smooth flow of air, where each molecule follows the path of the preceding molecule, is a definition of:
    a. Laminar flow.
    b. Turbulent flow.
    c. Free stream flow.
    d. Wind.

31. In sub-sonic airflow, as air passes through a venturi, the mass flow_____, the velocity _____and the static pressure_____.
    a. Remains constant / increases then decreases / decreases then increases.
    b. a) Decreases then increases / remains constant / increases then decreases.
    c. Remains constant / increases then decreases / increases then decreases.
    d. Decreases then increases / increases then decreases / increases then decreases.

32. A moving mass of air possesses kinetic energy. An object placed in the path of such a moving mass of air will be subject to:
    a. Static pressure and dynamic pressure.
    b. Static Pressure.
    c. Dynamic pressure.
    d. Dynamic pressure minus static pressure.

33. Dynamic Pressure may be expressed by the formula:
    a. $Q=1/2pV^2$
    b. $Q=1/3_PV^2$
    c. $Q =_PV$
    d. $Q = 2_PV$

34. As airspeed increases, induced drag:
    a. Decreases.
    b. Increases.
    c. Is dependant on the weight of the aircraft?
    d. Remains unchanged.

35. As Indicated Air Speed (IAS) is reduced, in order to maintain altitude, the pilot must:
    a. Increase the angle of attack to maintain the correct lift force.
    b. Decrease the angle of attack to reduce the drag.
    c. Deploy the speed brakes to increase drag.
    d. Reduce the thrust.

36. That portion of the aircraft's total drag created by the production of lift is called:
    a. Induced drag, which is greatly affected by changes in airspeed.
    b. Parasite drag, which is greatly affected by changes in airspeed.
    c. Induced drag, which is not affected by changes in airspeed.
    d. Parasite drag, which is inversely proportional to the square of the airspeed.

37. By changing the Angle of Attack of a wing, the pilot can control the aeroplane's:
    a. Lift, airspeed, and drag.
    b. Lift and airspeed, but not drag.
    c. Lift, gross weight, and drag.
    d. Lift and drag, but not airspeed.

38. Resistance, or skin friction, due to the viscosity of the air as it passes along the surface of a wing, is a type of:
    a. Parasite drag.
    b. Induced drag.
    c. Form drag.
    d. Interference drag.

39. If the Indicated Air Speed of an aircraft is increased from 50 kts to 100 kts, parasite drag will be:
    a. Four times greater.
    b. Six times greater.
    c. Two times greater.
    d. One quarter as much.

40. An imaginary straight line running from the midpoint of the leading edge of an aerofoil to its trailing edge, is called the:
    a. Chord.
    b. Mean camber.
    c. Aerofoil thickness.
    d. Maximum camber.

41. A positively cambered aerofoil starts to produce lift at an angle of attack of approximately:
    a. Minus 4 degrees.
    b. 0 degrees.
    c. 4 to 6 degrees.
    d. 16 degrees.

42. On an aerofoil section, the force of lift acts perpendicular to, and the force of drag acts parallel to, the:
    a. Flightpath.
    b. Longitudinal axis.
    c. Chord line.
    d. Aerofoil section upper surface.

43. As airspeed increases induced drag_____, parasite drag_____and total drag
    a. Decreases / Increases / Decreases then increases.
    b. Increases / Increases / Increases
    c. Increases / Decreases / Increases then decreases.
    d. Decreases / Decreases / Decreases

44. If in level flight the airspeed decreases below that for maximum Lift/Drag, the effect will be that:
    a. Drag increases because of increased induced drag.
    b. Drag decreases because of lower induced drag.
    c. Drag increases because of increased parasite drag.
    d. Drag decreases because of lower parasite drag.

45. The angle of attack is the angle between the:
    a. Chord line and the relative airflow.
    b. Camber line and free stream flow.
    c. Chord line and the longitudinal axis of the aeroplane.
    d. Chord line and the horizontal plane.

46. The maximum value of the coefficient of lift is found at an angle of attack of approximately:
    a. 16 degrees.
    b. Minus 4 degrees.
    c. 0 degrees.
    d. 4 to 6 degrees.

47. At a constant angle of attack, a decrease in the airspeed of an aircraft will result in:
    a. A decrease in lift and drag.
    b. An increase in lift and a decrease in drag.
    c. An increase in drag and a decrease in lift.
    d. Possible increases or decreases in lift or drag, depending on the actual speed.

48. If the Angle of Attack and other factors remain constant, and the airspeed is doubled, lift will be:
    a. Quadrupled.
    b. Doubled.
    c. One quarter of what it was.
    d. The same.

49. The definition of lift is:
    a. The aerodynamic force which acts at 90° to the relative airflow.
    b. The aerodynamic force which acts perpendicular to the chord line of the aerofoil.
    c. The aerodynamic force that results from the pressure differentials about an aerofoil.
    d. The aerodynamic force which acts perpendicular to the upper surface of the aerofoil.

50. Which of the answer options most correctly completes the sentence? The amount of lift a wing produces is directly proportional to:-
    a. The air density.
    b. The dynamic pressure minus the static pressure.
    c. The square root of the velocity of the air flowing over it.
    d. The air temperature.

51. The maximum value of the Coefficient of Lift is found:
    a. At the stalling angle of attack.
    b. At negative angles of attack.
    c. When lift equals drag.
    d. During steep turns.

52. At a given Indicated Air Speed, what effect will an increase in air density have on lift and drag?
    a. Lift and drag will remain the same.
    b. Lift will increase but drag will decrease.
    c. Lift and drag will increase.
    d. Lift and drag will decrease.

53. An aerofoil section is designed to produce lift resulting from a difference in the:
    a. Higher air pressure below the surface and lower air pressure above the surface.
    b. Negative air pressure below and a vacuum above the surface.
    c. Vacuum below the surface and greater air pressure above the surface.
    d. Higher air pressure at the leading edge than at the trailing edge.

54. Full flaps should be selected when:
    a. Committed to land.
    b. Commencing final approach.
    c. On go-around.
    d. Landing into a strong headwind.

55. A wing which is inclined downwards from root to tip is said to have:
    a. Anhedral.
    b. Washout.
    c. Taper.
    d. Sweep.

56. When the C of G is close to the forward limit:
    a. Very high stick forces are required to pitch because the aircraft is very stable.
    b. Very small forces are required on the control column to produce pitch.
    c. Longitudinal stability is reduced.
    d. Stick forces are the same as for an aft C of G.

57. Following a lateral disturbance, an aircraft with Dutch roll instability will:
    a. Develop simultaneous oscillations in roll and yaw.
    b. Go into a spiral dive.
    c. Develop oscillations in pitch.
    d. Develop an unchecked roll.

58. An aeroplane which is inherently stable will:
    a. Have a built-in tendency to return to its original state following the removal of any disturbing force.
    b. Require less effort to control.
    c. Be difficult to stall.
    d. Not spin.

59. After a disturbance in pitch, an aircraft oscillates in pitch with increasing amplitude. It is:
    a. Statically stable but dynamically unstable.
    b. Statically and dynamically unstable.
    c. Statically unstable but dynamically stable.
    d. Statically and dynamically stable.

60. If a disturbing force causes an aircraft to roll:
    a. Wing dihedral will cause a rolling moment which tends to correct the sideslip.
    b. The fin will cause a yawing moment which reduces the sideslip.
    c. Wing dihedral will cause a yawing moment which tends to correct the sideslip.
    d. Wing dihedral will cause a nose up pitching moment

61. If the wing Aerodynamic Centre is forward of the C of G:
    a. Changes in lift produce a wing pitching moment which acts to increase the change of lift.
    b. Changes in lift produce a wing pitching moment which acts to reduce the change of lift.
    c. Changes in lift give no change in wing pitching moment.
    d. When the aircraft sideslips, the CofG causes the nose to turn into the sideslip thus applying a restoring moment.

62. By design, the Centre of Pressure on a particular aircraft remains behind the aircraft's C of G. If the aircraft is longitudinally stable and is displaced in pitch, nose down, by turbulence:
    a. The tailplane will generate a downward force.
    b. The tailplane will generate an upward force.
    c. Neither an upward nor a downward force will be generated by the tailplane, as the aircraft will already be in equilibrium.
    d. The aircraft will maintain its nose-down attitude.

63. Wing dihedral produces a stabilising rolling moment by causing an increase in lift:
    a. On the lower wing when the aircraft is sideslipping.
    b. On the up-going wing when the aircraft rolls.
    c. On the up-going wing when the aircraft is sideslipping.
    d. On the lower wing whenever the aircraft is in a banked attitude.

64. When an aircraft is disturbed from its established flight path by, for example, turbulence, it is said to have positive stability if it subsequently:
    a. Re-establishes its original flight path without any input from the pilot.
    b. Remains on the new flight path.
    c. Becomes further displaced from its original flight path.
    d. Continues to pitch in the disturbed direction until the displacement is resisted by opposing control forces.

65. Loading an aircraft so that the C of G exceeds the aft limits could result in:
    a. Loss of longitudinal stability and the nose pitching up at slow speeds.
    b. Excessive upward force on the tail, and the nose pitching down.
    c. Excessive load factor in turns.
    d. High stick forces.

66. Which of the following four options describes the consequence of taking off with the manufacturer's recommended take-off flap setting selected?
    a. A decrease in the length of the take-off run compared to a non-flap take-off.
    b. An increase in the length of the take-off run compared to a non-flap take-off.
    c. A greater angle of climb.
    d. Easier avoidance of obstacles at the end of a runway.

67. With the flaps lowered, the stalling speed will:
    a. Decrease.
    b. Increase.
    c. Increase, but occur at a higher angle of attack.
    d. Remain the same.

68. When an aircraft is disturbed from its trimmed attitude by, for example, turbulence, it is said to have neutral stability if it subsequently:
    a. Remains in the new attitude.
    b. Oscillates about its original attitude before settling back to that original attitude.
    c. Immediately re-establishes its original attitude.
    d. Continues to move in the disturbed direction until the displacement is resisted by opposing control forces.

69. If the Centre of Gravity (C of G) of an aircraft is found to be within limits for take-off:
    a. The CofG limits for landing must be checked, allowing for planned fuel consumption.
    b. The CofG will always be within limits for landing.
    c. The CofG will not change during the flight.
    d. The flight crew will always be certain of being able to adjust the C of G during flight in order to keep it within acceptable limits for landing.

70. With a forward Centre of Gravity, an aircraft will have:
    a. Decreased elevator effectiveness when flaring.
    b. Reduced longitudinal stability.
    c. Lighter forces for control movements.
    d. Shorter take off distances.

71. Longitudinal stability is given
    a. The horizontal tailplane.
    b. The fin.
    c. The wing dihedral.
    d. The ailerons.

72. An aft Centre of Gravity will give:
    a. Increased elevator effectiveness when flaring.
    b. Increased longitudinal stability.
    c. Heavy forces for control movements.
    d. Longer take-off distances.

73. The tendency of an aircraft to develop forces which restore it to its original flight situation, when disturbed from a condition of steady flight, is known as:
    a. Stability.
    b. Manoeuvrability.
    c. Controllability.
    d. Instability.

74. Stability around the normal axis:
    a. Is increased if the keel surface behind the CofG is increased.
    b. Is given by the lateral dihedral.
    c. Depends on the longitudinal dihedral.
    d. Is greater if the wing has no sweepback.

75. The maximum gliding distance from 6000 feet, for an aircraft in clean configuration, with a lift/drag ratio of 8:1, is approximately 8 nautical miles. If flaps are deployed:
    a. The maximum gliding distance will be less.
    b. The maximum gliding distance will increase.
    c. Lift/Drag ratio will be unaffected but will be achieved at a lower airspeed.
    d. The maximum gliding distance will be unaffected.

76. A pilot lowers the flaps while keeping the airspeed constant. In order to maintain level flight, the angle of attack:
    a. Must be reduced.
    b. Must be increased.
    c. Must be kept constant but power must be increased.
    d. Must be kept constant and power required will be constant.

77. Movement of the aircraft about its normal (vertical) axis is known as:-
    a. Yawing.
    b. Rolling.
    c. Pitching.
    d. Side slipping.

78. An aircraft wing is constructed with positive dihedral in order to give:
    a. Lateral stability about the longitudinal axis.
    b. Longitudinal stability about the lateral axis.
    c. Lateral stability about the normal axis.
    d. Directional stability about the normal axis.

79. An aircraft is disturbed from its path by a gust of wind. Neutral stability is when, without pilot intervention, it:
    a. Maintains the new path.
    b. Returns to its original path without overshooting.
    c. Returns to its original path after overshooting.
    d. Continues to move away from the original path.

80. When flaps are lowered the stalling angle of attack of the wing:
    a. Decreases, but C_{LMAX} increases.
    b. Remains the same, but C_{LMAX} increases.
    c. Increases and C_{LMAX} increases.
    d. Decreases, but C_{LMAX} remains the same.

81. A high wing configuration with no dihedral, compared to a low wing configuration with no dihedral, will provide:
    a. Greater lateral stability.
    b. Greater longitudinal stability.
    c. The same degree of longitudinal stability as any other configuration because dihedral gives longitudinal stability.
    d. Less lateral stability.

82. An aircraft is disturbed from its flight path by a gust of wind. If it tends to return to its original flight path without pilot intervention, the aircraft is said to possess:
    a. Positive Dynamic Stability.
    b. Instability.
    c. Negative Dynamic Stability.
    d. Neutral Dynamic Stability.

83. Wing leading-edge devices such as slots, designed to allow flight at higher angles of attack, do so by:
    a. Re-energising the airflow over the top of the wing, delaying separation.
    b. Providing an extra lifting surface and hence increase the lift available.
    c. Changing the shape and hence the lift characteristics of the wing.
    d. Decreasing lift and hence induced drag.

84. The surface that gives an aircraft directional stability is:
    a. The fin.
    b. The rudder.
    c. The horizontal tailplane.
    d. The rudder trim tab.

85. If a landing is to be made without flaps the landing speed must be:
    a. Increased.
    b. Reduced.
    c. The same as for a landing with flaps.
    d. The same as for a landing with flaps but with a steeper approach.

86. The maximum speed at which the aircraft can be flown with flaps extended is called:
    a. V_{FE}.
    b. V_{YSE}.
    c. V_{NE}.
    d. V_{NO}.

87. Yawing is movement around the_____axis.
    a. Normal.
    b. Longitudinal.
    c. Lateral.
    d. Horizontal.

88. The lateral axis of an aircraft is a line which:
    a. Passes through the Centre of Gravity, parallel to a line through the wing tips.
    b. Passes through the wing tips.
    c. Passes through the Centre of Pressure, at right angles to the direction of the airflow.
    d. Passes through the quarter-chord point of the wing root at right angles to the longitudinal axis.

89. Lowering the fiaps during a landing approach:
    a. Increases the angle of descent without increasing the airspeed.
    b. Permits approaches at a higher indicated airspeed.
    c. Decreases the angle of descent without increasing power.
    d. Eliminates floating.

90. During a manoeuvre, the ailerons are deflected and returned to neutral when the aircraft has attained a small angle of bank. If the aircraft then returns to a wings-level attitude without further control movement, it is:
    a. Statically and dynamically stable.
    b. Neutrally stable.
    c. Statically stable but dynamically neutral.
    d. Statically stable.

91. The purpose of an anti-balance tab is to:
    a. Ensure that the pilot's physical control load increases with increase of control surface deflection.
    b. Trim the aircraft.
    c. Reduce the load required to move the controls at all speeds.
    d. Reduce the load required to move the controls at high speeds only.

92. The phenomenon of flutter is described as:
    a. Oscillatory motion of part or parts of the aircraft relative to the remainder of the structure.
    b. Rapid oscillatory motion involving only rotation of the control surfaces, associated with the shock waves produced around the control surfaces.
    c. Rapid movement of the airframe caused by vibration from the engines.
    d. Reversal of the ailerons caused by wing torsional flexibility.

93. An aileron could be balanced aerodynamical I y by:
    a. Having the control hinge set back behind the control surface leading edge.
    b. Making the up aileron move through a larger angle than the down aileron.
    c. Attaching a weight to the control surface forward of the hinge.
    d. Having springs in the control circuit to assist movement

94. When the control column is pushed forward, a balance tab on the elevator:
    a. Will move up relative to the control surface.
    b. Will move down relative to the control surface.
    c. Will only move if the trim wheel is operated.
    d. Moves to the neutral position.

95. The purpose of a differential ailerons is to:
    a. Reduce the opposite yawing moment when making a turn.
    b. Increase the yawing moment which opposes a turn.
    c. Induce a pitching moment to prevent the nose from dropping in the turn.
    d. Improve the rate of roll.

96. The respective primary and secondary effects of the rudder control are:
    a. Yaw and roll.
    b. Yaw and pitch.
    c. Pitch and yaw
    d. Roll and yaw.

97. On an aircraft with a simple trim tab incorporated into a control surface, when the surface is moved, the tab remains in the same position relative to the:
    a. Control surface.
    b. Relative airflow.
    c. Boundary layer airflow.
    d. Aircraft horizontal plane.

98. Which flying control surface(s) give(s) control about the aircraft's normal axis?
    a. The rudder.
    b. The ailerons.
    c. The elevator.
    d. The flaps.

99. The primary and secondary effects of applying the left rudder alone are:
    a. Left yaw and left roll.
    b. Left yaw and right roll.
    c. Right yaw and left roll.
    d. Right yaw and right roll.

100. When displacing the ailerons from the neutral position:
   a. The down-going aileron causes an increase in induced drag.
   b. The up-going aileron causes an increase in induced drag.
   c. Induced drag remains the same; the up-going aileron causes a smaller increase in profile drag than the down-going aileron.
   d. Both cause an increase in induced drag.

101. An aircraft's rudder is fitted with a balance tab. Movement of the rudder bar to the right, to yaw the aircraft to the right, will move the balance tab to the:
   a. Left and the rudder to the right.
   b. Right and the rudder to the left.
   c. Right and the rudder to the right.
   d. Left and the rudder to the left.

102. An aircraft has a tendency to fly right wing low with hands off. It is trimmed with a tab the left aileron. The trim tab will:
   a. Move down causing the left aileron to move up, and right aileron to move down.
   b. Move up, causing the left aileron to move up and right aileron to move down.
   c. Move down, causing the left aileron to move up, right aileron remains neutral.
   d. Move up causing the left wing to move down, ailerons remain neutral.

103. Ailerons give:
   a. Lateral control about the longitudinal axis.
   b. Lateral control about the lateral axis.
   c. Longitudinal control about the lateral axis.
   d. Directional control about the normal axis.

104. Following re-trimming for straight and level flight, in an aircraft with a C of G near its forward limit, and an elevator fitted with a conventional trim-tab:
   a. Nose-up pitch authority will be reduced.
   b. Nose-down pitch authority will be reduced.
   c. Longitudinal stability will be reduced.
   d. Tailplane down-load will be reduced.

105. Controls are mass balanced in order to:
   a. Eliminate control flutter.
   b. Aerodynamical l y assist the pilot in moving the controls.
   c. Provide equal control forces on all three controls.
   d. Return the control surface to neutral when the controls are released.

106. The primary and secondary effects of the aileron control are:
   a. Roll and yaw.
   b. Roll and pitch.
   c. Pitch and yaw
   d. Yaw and roll.

107. The purpose of a spring-bias trim system is:
a. To reduce to zero the effort required by the pilot to counter stick force, after making a control movement.
b. To maintain a constant tension in the trim tab system.
c. To increase the feel in the control system.
d. To compensate for temperature changes in cable tension.

108. A control surface may have a mass balance fitted to it, in order to:
a. Help prevent a rapid and uncontrolled oscillation which is called "flutter".
b. Keep the control surface level.
c. Lighten the forces needed to control the surface.
d. Provide the pilot with "feel".

109. A control surface may be mass balanced by:
a. Attaching a weight acting forward of the hinge line.
b. Fitting a balance tab.
c. Fitting an anti-balance tab.
d. Attaching weight acting aft of the hinge line.

110. Fixed trim tabs on ailerons:
a. Can be adjusted on the ground after a test flight to make wings-level flight easier.
b. Can be adjusted during flight.
c. Should never be adjusted.
d. Can be adjusted on the ground after a test flight to make turning easier.

111. Which flying control surface(s) give(s) longitudinal control?
a. The elevator.
b. The rudder.
c. The ailerons.
d. The flaps.

112. The purpose of a trim tab is:
a. To zero the load on the pilots controls in the flight attitude required.
b. To assist the pilot in initiating movement of the controls.
c. To provide feel to the controls at high speed.
d. To increase the effectiveness of the controls.

113. Yawing is a rotation about:
a. The normal axis controlled by the rudder.
b. The lateral axis controlled by the rudder.
c. The longitudinal axis controlled by the ailerons.
d. The normal axis controlled by the elevator.

114. If the control column is moved forward and to the left:
a. The left aileron moves up, right aileron moves down, elevator moves down.
b. The left aileron moves up, right aileron moves down, elevator moves up.
c. The left aileron moves down, right aileron moves up, elevator moves down.
d. The left aileron moves down, right aileron moves up, elevator moves up.

115. If the control column is moved to the right, a balance tab on the left aileron should:
   a. Move up relative to the aileron.
   b. Move down relative to the aileron.
   c. Not move unless the aileron trim wheel is turned.
   d. Move to the neutral position.

116. 'Differential Ailerons'are a design feature that helps to counteract:
   a. Adverse yaw.
   b. Stability about the longitudinal axis.
   c. Positive aircraft stability.
   d. Adverse roll.

117. If the angle of attack is increased above the stalling angle:
   a. Lift will decrease and drag will increase.
   b. Lift and drag will both decrease.
   c. Lift will increase and drag will decrease.
   d. Lift and drag will both increase.

118. If the Angle of Attack is increased beyond the Critical Angle of Attack, the wing will no longer produce sufficient lift to support the weight of the aircraft:
   a. Regardless of airspeed or pitch attitude.
   b. Unless the airspeed is greater than the normal stall speed.
   c. Unless the pitch attitude is on or below the natural horizon.
   d. In which case, the control column should be pulled-back immediately.

119. An aeroplane wing stalls when:
   a. The critical angle of attack is exceeded.
   b. The indicated airspeed is too low.
   c. The laminar airflow becomes turbulent.
   d. It is subjected to unusually high 'G'forces.

120. The stalling speed of an aircraft in straight and level flight is 60 kt, IAS. What is its stalling speed in a level 60° banked turn?
   a. 85 kt
   b. 60 kt
   c. 43 kt
   d. 120 kt

121. When an aircraft is in a steady climb, the aerodynamic lift is_____the weight.
   a. Less than.
   b. Balanced by.
   c. Equal to.
   d. Greater than.

122. A typical stalling angle of attack for an aircraft wing is:
   a. 16°
   b. 4°
   c. 30°
   d. 45°

123. The maximum angle of climb of an aeroplane is determined by:
   a. Excess engine thrust.
   b. The aircraft weight.
   c. Wind speed.
   d. Excess airspeed.

124. The angle of attack at which an aeroplane stalls:
   a. Will remain constant, regardless of gross weight.
   b. Will be smaller flying downwind than when flying upwind.
   c. Is dependent upon the speed of the airflow over the wing.
   d. Is a function of speed and density altitude.

125. When the aircraft is in a spin, the direction of spin is most reliably found by reference to which of the following indications?
   a. Turn needle.
   b. Artificial horizon.
   c. Slip indicator.
   d. Direction indicator.

126. The reason for washout being designed into an aircraft wing is to:-
   a. Cause the inboard section of the wing to stall first.
   b. Increase the effectiveness of the flaps.
   c. Cause the outboard section of the wing to stall first.
   d. Decrease the effectiveness of the ailerons.

127. The maximum allowable airspeed with flaps extended (V_{FE}) is lower than cruising speed because:
   a. At speeds higher than V_{FE} the aerodynamic forces would overload the flap and wing structures.
   b. Flaps are used only when preparing to land.
   c. Too much drag is induced.
   d. Flaps will stall if they are deployed at too high an airspeed.

128. The basic staiiing speed of an aeroplane is 80 knots. In a level turn with 45° angle bank, the stalling speed is:
   a. 95 knots.
   b. 33 knots.
   c. 86 knots.
   d. 113 knots.

129. At the stall, the Centre of Pressure moving backwards will cause the nose to_____, and the decreased lift will cause the aircraft to_____.
   a. Drop / lose height.
   b. Yaw / reduce speed.
   c. Rise / sink.
   d. Drop / reduce speed.

130. V_{NE} is:
   a. The maximum airspeed at which the aircraft may be flown.
   b. The airspeed which must not be exceeded except in a dive.
   c. The maximum airspeed at which manoeuvres approaching the stall may be carried out.
   d. The maximum speed, above which flaps should not be extended.

131. In a climb at a steady speed, the thrust is:
   a. Greater than the aerodynamic drag.
   b. Equal to the aerodynamic drag.
   c. Less than the aerodynamic drag.
   d. Equal to the weight component along the flight path.

132. What is the significance of the speed known as V_{NO}?
   a. It signifies the upper limit of the normal operating speed range.
   b. It is the maximum speed at which abrupt movements of the controls will result in a stall, before the aircraft's positive load limit is exceeded.
   c. It is the speed beyond which structural failure of the airframe will occur.
   d. It signifies the airspeed which must never be exceeded.

133. The stalling speed of an aircraft, assuming weight to be constant, is a function of the:
   a. Square root of the Load Factor
   b. Inverse of the Load Factor.
   c. Indicated airspeed.
   d. Square of the weight.

134. The angle of climb is proportional to:
   a. The amount by which the thrust exceeds the drag.
   b. The amount by which the lift exceeds the weight.
   c. The amount by which the thrust exceeds the weight.
   d. The angle of attack of the wing.

135. If an aircraft is flown at its design manoeuvring speed V_A:
   a. It is not possible to exceed the limit load.
   b. It is possible to subject the aircraft to a load greater than its limit load during high 'g' manoeuvres.
   c. It is only possible to subject the aircraft to a load greater than its limit load during violent increases in incidence, i.e. when using excessive stick force to pull-out of a dive.
   d. It must be immediately slowed down if turbulence is encountered.

136. If the aircraft weight is increased, without change of C of G position, the stalling angle attack will:
   a. Remain the same.
   b. Decrease.
   c. Increase.
   d. Remain the same. The position of the C of G does not affect the stall speed.

137. At which angle of attack should we normally expect beginning of a stall?
   a. 10° - 18°.
   b. 3° - 5°.
   c. 5° - 10°.
   d. grater than 25°.

138. The best angle of attack on the wing polar diagram is marked as: (See Fig. PPL PoF-2)
   a. 4.
   b. 2.
   c. 5.
   d. 6.

139. The critical angle of attack on the wing polar diagram is marked as: (See Fig. PPL PoF-2)
   a. 6.
   b. 1.
   c. 4.
   d. 5.

140. The angle of attack for a minimum drag on the wing polar diagram is marked as: (See Fig. PPL PoF-2)
   a. 3.
   b. 4.
   c. 5.
   d. 7.

141. Which wing shape has the greatest induction drag?
   a. Rectangular.
   b. Taper.
   c. Elliptical.
   d. Double taper.

142. If the velocity of an airstream is doubled the drag coefficient will
   a. increase 4-times.
   b. double.
   c. not change.
   d. increase 6-times.

143. Approximately for what percent will the stall speed increase if wing loading increases by 15%?
   a. 7%.
   b. 0%.
   c. 15%.

d. 20%.

144. What is the approximate percentage increase of a minimum speed if an aircraft mass is increased for 20%?
   a. 10%.
   b. 0%.
   c. 120%.
   d. 20%.

145. If an airplane weights 3,000 pounds, what approximate weight would the airplane structure be required to support during a 20° banked turn while maintaining altitude? (See Fig. PPL PoF-1)
   a. 3,180 lbs
   b. 4,000 lbs
   c. 3,350 lbs
   d. 3,000 lbs

146. If an airplane weights 4,600 pounds, what approximate weight would the airplane structure be required to support during a 50° banked turn while maintaining altitude? (See Fig. PPL PoF-1)
   a. 7,160 lbs.
   b. 5,400 lbs.
   c. 9,200 lbs.
   d. 8,180 lbs.

147. What is the maximum allowed bank angle when flying an aircraft with limiting load factor of +2,5 G? (See Fig. PPL PoF-1)
   a. 66°.
   b. 55°.
   c. 60°.
   d. 50°.

148. What is the maximum allowed bank angle when flying an aircraft with limiting load factor of +3,8 G? (See Fig. PPL PoF-1)
   a. 75°.
   b. 70°.
   c. 67°.
   d. 53°.

149. What is the load factor in a 60° banked level turn? (See Fig. PPL PoF-1)
   a. 2.0 G
   b. 1.5 G
   c. 0.5 G
   d. 1 G

150. The airspeed at which a pilot will not yet overstress the airframe of an aicraft by momentarily up-deflecting the elevator is
   a. V_A.
   b. V_B.
   c. V_{FE}.
   d. V_S.

APPENDIX:

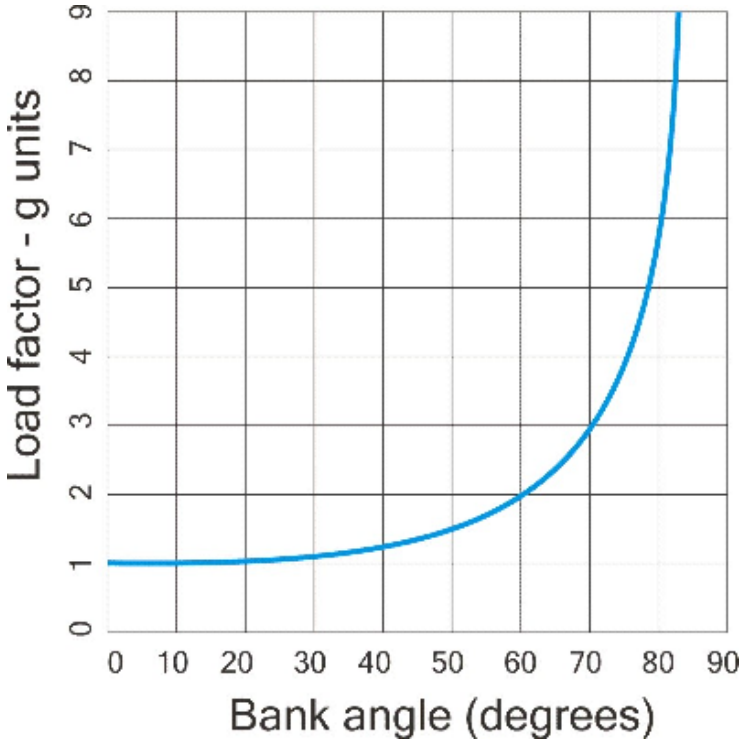

Fig. PPL PoF-1.

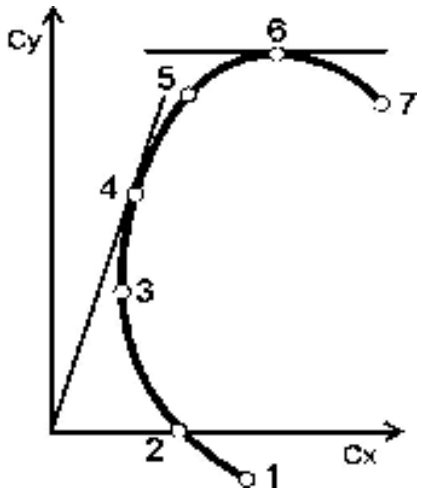

Fig. PPL PoF-2.