Headquarters Air Cadets
Examination

Leading Cadet
33/2 Principles of Fligh
Generated 20-Jul-04

Serial: 782

1. Use black or dark blue pen, NOT pencil.
2. Mark one answer per question with a cross.
3. If you wish to change an answer, cancel the original mark and mark another single answer.

☒ *A selected answer.*
☒ *A cancelled answer.*

Mark:

Name and Initals _____ Date of Exam _____

Date of Birth _____ Squadron/Unit _____ Wing _____

1 Which scientist formulated laws, one of which says that every action has an equal and opposite reaction?

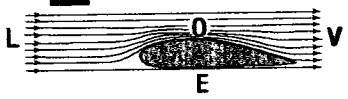
a ☐ Morgan
b ☐ Newton
c ☐ Einstein
d ☐ Riddely

2 The effect of gravity on an aircraft is called?

a ☐ Drag
b ☐ Lift
c ☐ Weight
d ☐ Thrust

3 Where is the airflow fastest in this diagram of an aerofoil in an airflow?

a ☐ O
b ☐ V
c ☐ E
d ☐ L



4 On a general purpose aerofoil, the greatest amount of lift occurs:

a ☐ Just forward of the trailing edge
b ☐ Where the top surface is not curved
c ☐ At the centre of the bottom surface
d ☐ Where the top surface is curved the most

5 The centre of pressure on an aerofoil is?

a ☐ The point at which all the weight is said to act
b ☐ The point at which all the lift is said to act
c ☐ Half way along the chord line
d ☐ Two thirds of the way along the chord line, measured from the leading edge

6 Which of these wing sections is for general purpose?

a ☐ W
b ☐ X
c ☐ Y
d ☐ Z

7 A stream line shape with an airspeed of 100 kts has a drag force of 200 N. If the airspeed is increased to 300 kts what will the drag be?

a ☐ 1800 N
b ☐ 800 N
c ☐ 400 N
d ☐ 3600 N

8 To slow an aircraft from straight and level flight which of the following statements is true?

a ☐ Thrust must equal drag
b ☐ Thrust must exceed drag
c ☐ Drag must exceed thrust
d ☐ Drag must be half thrust

9 The 3 axes about which an aircraft moves are?

a ☐ Longitudinal, lateral and normal
b ☐ Longitudinal, lateral and diagonal
c ☐ Lateral, bilateral and normal
d ☐ Lateral, normal and diagonal

10 A well designed aircraft that is disturbed from level flight (say, by bumpy air) will tend to go back to level flight of its own accord, without the pilot having to make adjustments. This property is called?

a ☐ Inertia
b ☐ Instability
c ☐ Damping
d ☐ Stability

11 This aircraft is flying towards you. What angle is the arrow pointing to ?

a ☐ Cohedral angle
b ☐ Lift angle
c ☐ Anhedral angle
d ☐ Dihedral angle

12 What sort of movement is shown in the diagram?

a ☐ Pitching
b ☐ Rolling
c ☐ Hovering
d ☐ Yawing

13 A pilot selects full flap when coming into land. This will?

a ☐ Increase the angle of approach and improve forward vision
b ☐ Decrease the angle of approach and reduce the landing run
c ☐ Increase the angle of approach and increase the landing run
d ☐ Reduce the angle of approach and improve the forward vision

14 What is the purpose of a slat on an aerofoil?

a ☐ To make the air turbulent at low speeds
b ☐ To reduce the drag at high speeds
c ☐ To improve handling at high speed
d ☐ To improve handling at low speed

15 A glider with a gliding angle of 1 in 20 is in still air and flying over level ground. What distance will the aircraft travel from a height of 1640 feet (0.5 kilometre) before reaching the ground.

a ☐ 10 kms
b ☐ 8.75 kms
c ☐ 20 kms
d ☐ 5 kms

16 The lift of a helicopter blade can be increased by?

a ☐ Decreasing the pitch angle
b ☐ Pointing the nose into wind
c ☐ Slowing the rotor head down
d ☐ Increasing the pitch angle

17 The pitch angle of all the main rotor blades of a helicopter can be altered by the same amount at the same time. This is called:

a ☐ Pitching
b ☐ Cyclic pitch
c ☐ Collective pitch
d ☐ Torque reaction

18 How is horizontal flight achieved in a helicopter?

a ☐ Tilting the rotor disc
b ☐ Increasing the rotor speed
c ☐ Increasing the speed of the tail rotor
d ☐ Decreasing the rotor speed

19 When the pilot of a helicopter makes a large upwards movement of the collective lever more power is required. How is this extra power obtained?

a ☐ An automatic cam arrangement opens the engine throttle and no further action is required
b ☐ The cyclic pitch is altered taking the load off the tail rotor
c ☐ The pilot turns the hand throttle to open it
d ☐ The yaw pedals are operated to increase the load on the engine

20 The point on a wing at which all the lift is said to act is called:

a ☐ Centre of pressure
b ☐ Static point
c ☐ Dynamic centre
d ☐ Pressure point

21 In order to control an aircraft in the rolling plane, a pilot of an aircraft fitted with conventional controls uses:

a ☐ The flaps
b ☐ The ailerons
c ☐ The rudder
d ☐ The elevators

22 A designer needs one shape of wing for the highest possible flying speed but another for the slowest possible landing speed. What does he provide to enable one wing to achieve both?

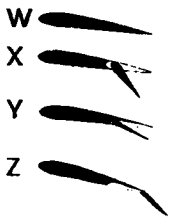
a ☐ Trimming tabs
b ☐ Flaps
c ☐ Balance tabs
d ☐ Elevators

23 When would a glider pilot use airbrakes?

a ☐ When wanting to climb
b ☐ When wanting to turn
c ☐ When being winch-launched
d ☐ When approaching to land

24 At position 1, the aircraft is climbing vertically. To make the aircraft move to position 2 and then to position 3, the pilot must move the control column:

a ☐ To the right
b ☐ To the left
c ☐ Forward
d ☐ Back

25 Which of the following is a Fowler flap?

a ☐ W
b ☐ Y
c ☐ Z
d ☐ X