Headquarters Air Cadets
Examination

Leading Cadet
33/2 Principles of Flight
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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 _____

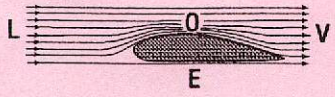
Date of Birth _____ Squadron/Unit _____ Wing _____

1 In the diagram, air is flowing past a constriction. What has happened to the air pressure at point B?

a ☐ It is greater than at point C
b ☐ It is lower than at point C
c ☐ It is greater than at point A
d ☐ It is the same as at point C

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

a ☐ L
b ☐ V
c ☐ O
d ☐ E

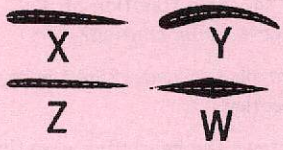


3 The centre of pressure on an aerofoil is?

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

4 Which of these wing sections are for high lift?

a ☐ X
b ☐ W
c ☐ Y
d ☐ Z



5 At the stall of a particular wing which one of these factors is NOT variable?

a ☐ The amount of lift being produced by the wing at the stall
b ☐ The amount of weight supported by the wing
c ☐ The angle of attack at which it stalls
d ☐ The air speed at which it stalls

6 The angle of attack at which a wing stalls is known as?

a ☐ Crucial angle
b ☐ Stopped angle
c ☐ Stilled angle
d ☐ Critical angle

7 Each of the three axes of an aircraft pass through the aircraft's:

a ☐ Centre of gravity
b ☐ Engine bearings
c ☐ Cockpit
d ☐ Wings

8 The movement of an aircraft about its lateral axis is called:

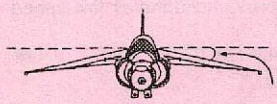
a ☐ Pitching
b ☐ Yawing
c ☐ Rolling
d ☐ Slewing

9 Which of the following will give an aircraft stability in the rolling plane?

a ☐ A small fin area
b ☐ Dihedral
c ☐ A large fin area
d ☐ Anhedral

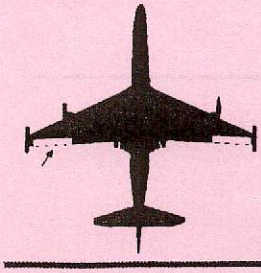
10 This aircraft is flying towards you. What angle is the arrow pointing to ?

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



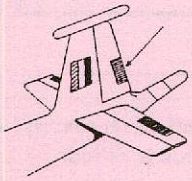
11 On this diagram what does the arrow point to ?

a ☐ Fuselage
b ☐ Aileron
c ☐ Rudder
d ☐ Fin



12 On this diagram, what does the arrow point to ?

a ☐ Elevator trimming tab
b ☐ Fin
c ☐ Rudder trimming tab
d ☐ Elevator



13 Which of these is used by the pilot to make the aircraft yaw?

a ☐ Fin
b ☐ Rudder
c ☐ Aileron
d ☐ Elevator

14 Which of these flap settings would a pilot most probably select, for a shorter take-off?

a ☐ 90degrees
b ☐ 120degrees
c ☐ 60degrees
d ☐ 15degrees

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

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

16 A glider with a gliding angle of 1 in 30 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 ☐ 30 kms
b ☐ 25 kms
c ☐ 60 kms
d ☐ 15 kms

17 A glider with a flying speed of 35 kts flies into a head wind of 35 kts. To an observer on the ground the glider will appear to?

a ☐ Climb steadily
b ☐ Cover the ground at 70 kts
c ☐ Cover the ground at 35 kts
d ☐ Lose height slowly over one spot

18 When a helicopter rotor is driven in a circular motion there is an opposing force. What is this force called?

a ☐ Torque reaction
b ☐ Lift
c ☐ Lift reaction
d ☐ Drag

19 What is the main function of a helicopter's cyclic control?

a ☐ Controls horizontal flight in any direction
b ☐ Controls the helicopter's vertical movement
c ☐ Acts as a rudder
d ☐ Controls the engine speed

20 Lift is obtained from almost all parts of the wing but not equally from every part. About how much is obtained from the top surface of an aircraft wing such as a Chipmunk:

a ☐ Up to 33%
b ☐ Up to 80%
c ☐ Up to 25%
d ☐ Up to 50%

21 On an aircraft, if the airspeed over a wing is trebled,and all other factors affecting lift are unchanged, the lift is:

a ☐ Unchanged
b ☐ Multiplied by about 3
c ☐ Divided by about 3
d ☐ Multiplied by about 9

22 Which of these statements, about the airflow over the wing of an aircraft just beyond the point of stall is true?

a ☐ It speeds up tremendously
b ☐ It becomes turbulent
c ☐ It stops completely
d ☐ It becomes very smooth

23 A helicopter pilot uses the yaw pedals to control:

a ☐ Vertical flight
b ☐ The pitch angle of the main rotor blades
c ☐ Forward speed
d ☐ The tail rotor

24 If an aircraft's speed through the air is increased from 250 knots to 500 knots, what happens to the amount of lift produced?

a ☐ It is increased by four times
b ☐ It is doubled
c ☐ It is reduced to a quarter
d ☐ It remains the same

25 Which of these is used by the pilot to make the aircraft roll?

a ☐ Rudder
b ☐ Fin
c ☐ Aileron
d ☐ Elevator