



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 Initials _____

Date of Exam _____

Date of Birth _____

Squadron/Unit _____

Wing _____

- 1 To fly, an aircraft must generate lift to oppose its:

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

- 4 What is the force called that resists the forward motion of an aircraft?

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

- 9 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

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



- 5 To accelerate an aircraft from straight and level flight which of the following statements is true?

a ☐ Thrust must exceed total drag
b ☐ Thrust must equal total drag
c ☐ Thrust must be less than drag
d ☐ Drag must be greater than thrust



- 6 Which axis runs from nose to tail in an aircraft?

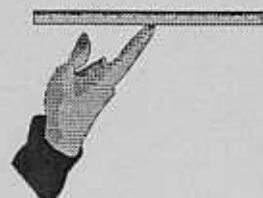
a ☐ Normal
b ☐ Longitudinal
c ☐ Bilateral
d ☐ Lateral

- 10 What sort of movement is shown in the diagram?

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

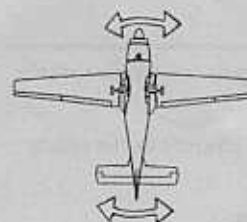
- 3 In the diagram all the small forces of gravity acting on the ruler balance about a point called?

a ☐ The dynamic centre
b ☐ The centre of pressure
c ☐ Static centre
d ☐ The centre of gravity



- 7 The movement of an aircraft about its longitudinal axis is called?

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



- 8 Which of these gives an aircraft high directional stability?

a ☐ Small fin area
b ☐ Large fin area
c ☐ Rearward centre of gravity
d ☐ Low centre of gravity

- 11 What sort of movement is shown in the diagram?

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



12 What device is used to cancel out the unwanted forces on a pilot's controls?

- a ☐ Trimming tabs
 - b ☐ Slats
 - c ☐ Spoilers
 - d ☐ Flaps
-

13 To obtain the maximum drag from an aircraft's flaps, they should be set to?

- a ☐ 40degrees
 - b ☐ 10degrees
 - c ☐ 30degrees
 - d ☐ 90degrees
-

14 When slats are open on a wing, what effect will this have on the drag?

- a ☐ Reduce it to zero
 - b ☐ No effect
 - c ☐ Increase it
 - d ☐ Decrease it
-

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

16 What is the purpose of a helicopter's tail rotor?

- a ☐ Control the aircraft in the rolling plane
 - b ☐ Reduce drag
 - c ☐ Provide thrust
 - d ☐ Counter torque reaction
-

17 How is horizontal flight achieved in a helicopter?

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

18 Which of the following is true? A particular wing will stall:

- a ☐ Always at the same angle of attack
 - b ☐ Only below a particular airspeed
 - c ☐ Only when its nose is well above the horizon
 - d ☐ Always at the same airspeed
-

19 On a general purpose wing, at which angle of attack is the greatest lift produced?

- a ☐ About 10degrees
 - b ☐ About 15degrees
 - c ☐ About 5degrees
 - d ☐ About 20degrees
-

20 Only one of these statements is true for an aircraft in straight and level flight. Which one?

- a ☐ Lift exactly equals weight
 - b ☐ Lift is considerably greater than weight
 - c ☐ Lift is slightly more than weight
 - d ☐ Lift is slightly less than weight
-

21 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 ☐ Balance tabs
 - b ☐ Elevators
 - c ☐ Trimming tabs
 - d ☐ Flaps
-

22 When would a glider pilot use airbrakes?

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

23 A helicopter pilot uses the yaw pedals to control:

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

24 If the balance of an aircraft shifts in flight (eg due to the consumption of fuel) the pilot may have to apply constant pressure on the controls to maintain straight and level flight. What device would enable the pilot to remove such control loads?

- a ☐ Fixed tabs
 - b ☐ Spring tabs
 - c ☐ Trimming tabs
 - d ☐ Balance tabs
-

25 When a glider pilot operates the airbrakes what is the effect?

- a ☐ Lift is reduced and drag is increased
 - b ☐ Lift is increased and drag is reduced
 - c ☐ Lift is increased and drag is increased
 - d ☐ Lift is reduced and drag is reduced
-