



# Headquarters Air Cadets Examination

Leading Cadet  
33/2 Principles of Flight  
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Serial: 272

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 Newton's 3rd law states that:

- a ☐ Every object has weight.
- b ☐ Weight equals lift during flight.
- c ☐ Every force causes an object to move.
- d ☐ Every action has an equal and opposite reaction.

2 Where is the air pressure lowest in this diagram of an aerofoil in an airflow?

- a ☐ O
- b ☐ L
- c ☐ V
- d ☐ E



3 Where is the greatest amount of lift normally generated on an aerofoil?

- a ☐ Top surface
- b ☐ Bottom surface
- c ☐ Trailing edge
- d ☐ Leading edge

4 If the air density in an airflow is reduced and all other factors are unchanged, what happens to the lift generated by a wing in the airflow?

- a ☐ It is reduced
- b ☐ It is increased
- c ☐ It is unchanged
- d ☐ It becomes unpredictable

5 The resistance to the forward movement of an aircraft is called?

- a ☐ Drag
- b ☐ Resistance
- c ☐ Turbulence
- d ☐ Thrust

6 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 ☐ 3600 N
- c ☐ 400 N
- d ☐ 800 N

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

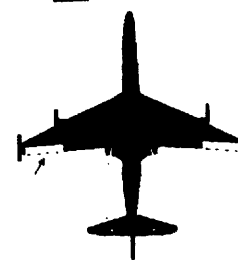
- a ☐ Cockpit
- b ☐ Centre of gravity
- c ☐ Wings
- d ☐ Engine bearings

8 Which of these gives an aircraft stability in the yawing plane?

- a ☐ High centre of gravity
- b ☐ Anhedral
- c ☐ Dihedral
- d ☐ Sufficient fin area

9 On this diagram what does the arrow point to?

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



10 What is the purpose of the trimming tabs on flying controls?

- a ☐ To increase the approach angle during landing
- b ☐ To improve the manoeuvrability of the aircraft
- c ☐ To cancel out the unwanted forces on the pilots controls
- d ☐ To reduce the take off run of an overloaded aircraft

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

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

12 Name the three forces acting on a glider in a steady flight?

- a ☐ Drag, thrust and lift
- b ☐ Drag, weight and lift
- c ☐ Drag, weight and thrust
- d ☐ Thrust, weight and lift

13 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 ☐ 10 kms
- c ☐ 20 kms
- d ☐ 8.75 kms

14 A Viking glider with a gliding angle of 1 in 35 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 ☐ 35 kms
- b ☐ 70 kms
- c ☐ 8.75 kms
- d ☐ 17.5 kms

15 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 ☐ Cyclic pitch
- b ☐ Collective pitch
- c ☐ Torque reaction
- d ☐ Pitching

16 Tilting the rotor disc of a helicopter forward will make the helicopter:

- a ☐ Travel forwards
- b ☐ Hover
- c ☐ Travel backwards
- d ☐ Climb

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

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

18 The pitch angle of a helicopters rotor blades can be altered individually, as each one traverses the plane of rotation. This is called?

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





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

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

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

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

21 Which of the following is a split flap?

- a ☐ W
  - b ☐ Z
  - c ☐ X
  - d ☐ Y
- W 
- X 
- Y 
- Z 

22 In what direction relative to the direction of the oncoming air, or path of the aircraft, do the lift forces act?

- a ☐ At about 4 degrees
- b ☐ The opposite direction
- c ☐ At 90 degrees
- d ☐ The same direction

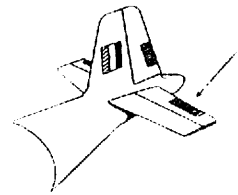
23 Which of these wing sections are for high speed?

- a ☐ Z and W
- b ☐ W and Y
- c ☐ Y and Z
- d ☐ X and Z



24 In this diagram what is the arrow pointing to?

- a ☐ A rudder trimming tab
- b ☐ An elevator trimming tab
- c ☐ A fin
- d ☐ A fuselage



25 Which of the following is a Fowler flap?

- a ☐ W
- b ☐ Z
- c ☐ X
- d ☐ Y

