



# Headquarters Air Cadets Examination

Leading Cadet  
33/2 Principles of Flight  
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Serial: 76

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 \_\_\_\_\_

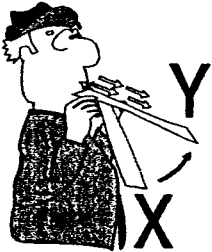
Wing \_\_\_\_\_

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

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

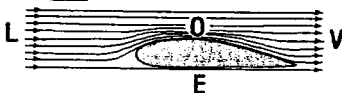
2 When this person blows along the top of the paper, the paper rises from position X to position Y because of:

- a  A rise in the air pressure along the top of the paper
- b  The vortices which form along the top of the paper
- c  The skin friction which develops along the top of the paper
- d  A reduction in the air pressure along the top of the paper



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

- a  E
- b  O
- c  L
- d  V



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

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

5 What is the chord line of a wing section?

- a  A line through the leading edge, parallel to the thrust line
- b  A curved line following the mean camber of the wing from the leading edge to the trailing edge
- c  The line at which the wing is set to the fuselage
- d  A straight line joining the leading edge to the trailing edge

6 Which one of these objects of equal width will produce the most drag in an airflow moving across the paper (parallel to the lines of writing):

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

7 If an aircraft in steady straight and level flight suffered a sudden reduction in weight (for example, by jettisoning fuel), and the pilot made no changes to the controls, the aircraft would begin to:

- a  Speed up
- b  Slow down
- c  Climb
- d  Descend

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

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

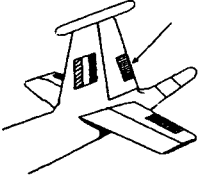
9 At the stall of a particular wing which one of these factors is NOT variable?

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

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

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

- 11 On this diagram, what does the arrow point to?
- a  Elevator
  - b  Elevator trimming tab
  - c  Rudder trimming tab
  - d  Fin



- 12 What is the purpose of the trimming tabs on flying controls?
- a  To cancel out the unwanted forces on the pilots controls
  - b  To increase the approach angle during landing
  - c  To reduce the take off run of an overloaded aircraft
  - d  To improve the manoeuvrability of the aircraft

- 13 To obtain the maximum drag from an aircraft's flaps, they should be set to?
- a  30degrees
  - b  90degrees
  - c  10degrees
  - d  40degrees

- 14 When slats are open on a wing what effect will this have on the stalling angle and stalling speed?
- a  Increase      Reduce
  - b  Reduce      Reduce
  - c  Increase      Increase
  - d  Reduce      Increase

- 15 When a helicopter rotor is driven in a circular motion there is an opposing force. What is this force called?
- a  Torque reaction
  - b  Drag
  - c  Lift reaction
  - d  Lift

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

- 17 Which part of an aircraft produces drag which resists forward motion?
- a  Only those parts which are producing lift
  - b  The fuselage but not the wings
  - c  Every part of the aircraft over which air flows
  - d  Only those parts of the aircraft that are not producing lift

- 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  Collective pitch
  - d  Cyclic pitch

- 19 The point on a wing at which all the lift is said to act is called:
- a  Pressure point
  - b  Dynamic centre
  - c  Centre of pressure
  - d  Static point

- 20 The movement of an aircraft about its normal axis is called:
- a  Yawing
  - b  Rolling
  - c  Damping
  - d  Pitching

- 21 The action of airbrakes on the wing of a glider is to:
- a  Reduce lift and reduce drag
  - b  Reduce lift and increase drag
  - c  Increase lift and reduce drag
  - d  Increase lift and increase drag

- 22 A helicopter pilot uses the yaw pedals to control:
- a  Vertical flight
  - b  Forward speed
  - c  The tail rotor
  - d  The pitch angle of the main rotor blades

- 23 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  Spring tabs
  - b  Trimming tabs
  - c  Fixed tabs
  - d  Balance tabs

- 24 Which of these is used by the pilot to make the aircraft roll?
- a  Elevator
  - b  Rudder
  - c  Aileron
  - d  Fin

- 25 When a glider pilot operates the airbrakes what is the effect?
- a  Lift is reduced and drag is reduced
  - b  Lift is increased and drag is increased
  - c  Lift is increased and drag is reduced
  - d  Lift is reduced and drag is increased