



# Headquarters Air Cadets Examination

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Staff Cadet

Air Frames

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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 The undercarriage serves two main purposes, one is to support the aircraft on the ground, the other is:
- ☐ To provide aerodynamic braking
  - ☐ To exercise hydraulic systems
  - ☐ To absorb landing shocks
  - ☐ To improve lift on final approach
- 2 When designing an aircraft an increase in weight in one area which leads to other areas being strengthened, and therefore made more heavy, is called the:
- ☐ Weight spiral deflect
  - ☐ Weight increase system
  - ☐ Weight spiral effect
  - ☐ Weight spinning effect
- 3 The main construction components of an airframe are ties, struts, beams and webs. A strut is a member which is subject purely to:
- ☐ Tension (pulling)
  - ☐ Compression
  - ☐ Loads at an angle
  - ☐ Loads in shear
- 4 If an aircraft's fuselage is made up of a series of frames, or hoops, what is the name gives to the metal strips which run the length of the fuselage, joining the frames:
- ☐ STINGERS
  - ☐ SKINNERS
  - ☐ STRINGERS
  - ☐ STRIPPERS
- 5 The aerodynamic phenomenon known as FLUTTER is caused when the wings of a high-speed aircraft:
- ☐ Twist too much
  - ☐ Deflect too much
  - ☐ Are too swept-back
  - ☐ Are too rigid
- 6 A SHOCK WAVE is generated in front of an aircraft as its speed approaches:
- ☐ The speed of the surrounding air
  - ☐ The speed of sound
  - ☐ Stalling speed
  - ☐ The speed of light
- 7 Which of these is the aspect ratio of a wing:
- ☐ Area divided by span
  - ☐ Span divided by area
  - ☐ Span(squared) divided by area
  - ☐ Area(squared) divided by span
- 8 One important characteristic of an alloy used in airframe construction is that it should be HOMOGENOUS, which means:
- ☐ Having different properties throughout
  - ☐ Having the same properties throughout
  - ☐ Having a high SWR
  - ☐ Being man-made
- 9 Why are magnesium alloys rarely used in carrier-based aircraft construction:
- ☐ They do not float in sea-water
  - ☐ It is difficult to AL-CLAD them
  - ☐ They have a low SWR
  - ☐ They are prone to attack by sea-water
- 10 Fibres of materials such as glass, carbon or kevlar inside a thermosetting resin such as epoxy are known as:
- ☐ COMPOSITIONS
  - ☐ COMPOSTS
  - ☐ COMPOSITES
  - ☐ CAMPSITES
- 11 A material's tendency to break under a high number of relative stresses, such as take-offs and landings, is called:
- ☐ FATIGUE
  - ☐ FLEXING
  - ☐ FRACTURE
  - ☐ BENDING
- 12 Which of these is the best material for a radome:
- ☐ Fibre-glass
  - ☐ High tensile steel
  - ☐ Carbon steel
  - ☐ Magnesium alloy
- 13 One of the two main components of an aircraft wing is the internal structure, the other is:
- ☐ The ribs
  - ☐ The spars
  - ☐ The aileron
  - ☐ The skin
- 14 What type of wing skin construction is normally used for aircraft of medium-to-high speed:
- ☐ Stretched skin
  - ☐ Fabric skin
  - ☐ Composite skin
  - ☐ Stressed skin
- 15 A multi-spar wing layout is particularly useful in constructing wings for what type of aircraft:
- ☐ LOW LEVEL
  - ☐ LOW SPEED
  - ☐ TRAINERS
  - ☐ HIGH SPEED

16 In a high-flying, pressurised aircraft, the pressure difference between the inside and outside of the aircraft would be:

- a ☐ 5600kg per square metre
- b ☐ 56000kg per square metre
- c ☐ 56kg per square metre
- d ☐ 5.6kg per square metre

17 If a single jet engine is fitted to an aircraft it will normally be fitted:

- a ☐ In the fuselage, near the centre of gravity
- b ☐ In the nose
- c ☐ At the rear of the fuselage
- d ☐ In the tail

18 Which part of an undercarriage system normally has to be disconnected before towing:

- a ☐ The oleo nitrogen reservoir
- b ☐ The uni-directional torsion link
- c ☐ The nose-wheel brakes
- d ☐ The nose-wheel steering

19 To ensure that the aircraft tail does not hit the ground on take-off or landing, the main wheels must be:

- a ☐ Underneath the tail
- b ☐ Behind the centre of gravity
- c ☐ At the centre of gravity
- d ☐ In front of the centre of gravity

20 Differential braking allows the pilot to use the brakes to:

- a ☐ Accelerate
- b ☐ Steer
- c ☐ Use different brakes
- d ☐ Stop

21 Yaw is controlled by:

- a ☐ Ailerons
- b ☐ Elevators or foreplanes
- c ☐ Airbrakes
- d ☐ Rudder

22 The control column or stick operates elevators and

- a ☐ AILERONS
- b ☐ RUDDER
- c ☐ UNDERCARRIAGE
- d ☐ FIN

23 Radar which maps the ground in front of the aircraft is called:

- a ☐ Terrain-following radar
- b ☐ Ground-proximity radar
- c ☐ Terrain-guidance radar
- d ☐ Ground-following radar

24 At high altitudes fuel in aircraft tanks is pressurised to prevent:

- a ☐ BOILING
- b ☐ FREEZING
- c ☐ VENTING
- d ☐ EVAPORATION

25 What instrument is represented in this diagram

- a ☐ Radar Altimeter
- b ☐ VSI
- c ☐ Attitude Director
- d ☐ ASI

