



# Headquarters Air Cadets Examination

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Staff Cadet  
33/4 Airframes  
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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 In a transport aircraft, to what approximate altitude is the fuselage pressurised:

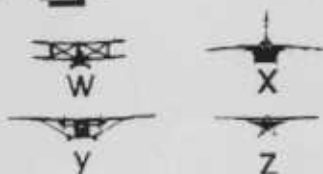
- a ☐ 2400m (8000ft)
- b ☐ 240m (800ft)
- c ☐ 24m (80ft)
- d ☐ 4200m (13,500ft)

2 The undercarriage serves two main purposes, one is to absorb landing shocks, the other is:

- a ☐ To support the aircraft on the ground
- b ☐ To exercise hydraulic systems
- c ☐ To provide more lift on final approach
- d ☐ To provide aerodynamic braking

3 Which of these aircraft has a wing construction known as cantilever:

- a ☐ W
- b ☐ X
- c ☐ Y
- d ☐ Z



4 The main construction components of an airframe are ties, struts, beams and webs. A web is a member which is subject purely to:

- a ☐ Loads at an angle
- b ☐ Tension (pulling)
- c ☐ Loads in shear
- d ☐ Compression

5 When considering an aircraft's wing, the square of its span, divided by its area is known as its:

- a ☐ WING LOADING
- b ☐ MEAN CHORD VALUE
- c ☐ ASPECT RATIO
- d ☐ ASPIC RATIO

6 If a metal chosen for airframe construction has the same properties throughout it is said to be:

- a ☐ HOMOGENOUS
- b ☐ HOMOGENIOUS
- c ☐ AN ALLOY
- d ☐ AL-CLAD

7 Pure aluminium is often plated onto its alloys to form a protective layer because aluminium:

- a ☐ Has a very high SWR
- b ☐ Can be super-plastically formed
- c ☐ Is prone to attack by sea-water
- d ☐ Is very resistant to corrosion

8 Steels can be produced with a wide range of properties, ranging from very hard to very ductile. However, they are all very:

- a ☐ Brittle
- b ☐ Expensive
- c ☐ Heavy
- d ☐ Corrosive

9 Titanium has only recently become widely available in airframe construction, so it is quite:

- a ☐ Heavy
- b ☐ Rare
- c ☐ Expensive
- d ☐ Malleable

10 Aircraft wing ribs often have large lightening holes in them. What is a possible use for these holes:

- a ☐ To prevent condensation
- b ☐ To allow fuel to flow along the wing
- c ☐ To allow the wing to flex more
- d ☐ To prevent corrosion

11 Most modern aircraft have 2 main spars in their wing construction, with stressed skin between them. This type of construction is known as:

- a ☐ TENSION BOX
- b ☐ TORSION BOX
- c ☐ TORQUE BLOCKS
- d ☐ TENSION BLOCKS

12 Why are aircraft engines placed as close as possible to the aircraft's centreline:

- a ☐ To prevent pitch when an engine fails
- b ☐ To prevent yaw when an engine fails
- c ☐ To prevent roll when an engine fails
- d ☐ To reduce fuel weight in the outboard wing sections

13 Where are the engines mounted on a Jetstream aircraft:

- a ☐ In the fuselage
- b ☐ On the wings
- c ☐ At the rear of the fuselage
- d ☐ In pods under the wings

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

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

15 Where are an aircraft's main wheels often stowed during flight:

- a ☐ In the oleos
- b ☐ In the tail
- c ☐ In the ailerons
- d ☐ In the wings

16 What piece of equipment ensures that an undercarriage cannot be retracted accidentally on the ground:

- a ☐ Ground lock
- b ☐ A sequencer valve
- c ☐ Chock
- d ☐ Down lock

17 Which plane of movement is controlled by ailerons:

- a ☐ YAW
- b ☐ CLIMB
- c ☐ PITCH
- d ☐ ROLL

18 The big advantage of fly-by-wire systems is that they eliminate the need for:

- a ☐ Cables and linkages
- b ☐ Control surfaces
- c ☐ Wire connections
- d ☐ Computers

19 If a control back-up system is manually operated, failure of the primary hydraulic system will cause an immediate:

- a ☐ Decrease in stick forces
- b ☐ Increase in stick forces
- c ☐ Increase in altitude
- d ☐ Decrease in speed

20 Control surfaces which combine the functions of elevators and ailerons are called:

- a ☐ RUDDERATORS
- b ☐ AILERONS
- c ☐ ELEFLAPS
- d ☐ ELEVONS

21 Routine flying for long periods on one heading can easily be performed by a mechanical or electronic system called:

- a ☐ An autodirector
- b ☐ An autonav
- c ☐ An autoguide
- d ☐ An autopilot

22 For an autopilot to control an aircraft in pitch, roll and yaw axes it requires how many CHANNELS:

- a ☐ 1
- b ☐ 2
- c ☐ 3
- d ☐ 4

23 In an auto-pilot the speed at which disturbance correcting servo-motors travel is:

- a ☐ The same as the size of the signal they receive
- b ☐ Inversely proportional to the size of the signal they receive
- c ☐ Proportional to the size of the signal they receive
- d ☐ Less than the size of the signal they receive

24 A major disadvantage of pneumatic systems over hydraulic systems is that air is

- a ☐ COMPRESSIBLE
- b ☐ INVISIBLE
- c ☐ REVERSIBLE
- d ☐ CONDENSABLE

25 To avoid boiling at high altitude fuel in aircraft tanks is:

- a ☐ CIRCULATED
- b ☐ PRESSURISED
- c ☐ COOLED
- d ☐ VENTED