



# Headquarters Air Cadets Examination

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 The main structural link between an aircraft's wings and tail unit is called:

- a ☐ The control link
- b ☐ The fuselage
- c ☐ The ailerons
- d ☐ The undercarriage

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:

- a ☐ Weight spiral effect
- b ☐ Weight increase system
- c ☐ Weight spiral deflect
- d ☐ Weight spinning effect

3 Loads on an airframe increase as the square of the airspeed. Increasing speed from 100 kts to 500 kts increases the air loads by the following amount:

- a ☐ Fifty times
- b ☐ Twenty five times
- c ☐ Five times
- d ☐ Five hundred times

4 An aircraft's wing loading is found by:

- a ☐ Dividing its wing area by its weight
- b ☐ Multiplying its wing area by its weight
- c ☐ Dividing its weight by the wing area
- d ☐ Multiplying its wing area by its aspect ratio

5 Many light aircraft have diagonal ties between the wing and fuselage - this type of construction is called:

- a ☐ TIED BIPLANES
- b ☐ DIAGONAL MONOPLANES
- c ☐ BRACED MONOPLANES
- d ☐ BRACED BIPLANES

6 A structure which is strong enough to take the loads applied to it both in compression and tension, despite being supported at one end only, is called:

- a ☐ Uniliever structure
- b ☐ Ortholever structure
- c ☐ Cantilever structure
- d ☐ Monolever structure

7 At speeds near to the speed of sound the pressure waves generated in front of an aircraft cannot move forwards fast enough to warn the oncoming air an aircraft is approaching and they become:

- a ☐ SHOCK PRESSURES
- b ☐ SHOCK WEAVES
- c ☐ SHOCK WAVES
- d ☐ PRESSURE WAVES

8 Which of these is the aspect ratio of a wing:

- a ☐ Span divided by area
- b ☐ Span(squared) divided by area
- c ☐ Area divided by span
- d ☐ Area(squared) divided by span

9 Why are magnesium alloys rarely used in carrier-based aircraft construction:

- a ☐ It is difficult to AL-CLAD them
- b ☐ They do not float in sea-water
- c ☐ They have a low SWR
- d ☐ They are prone to attack by sea-water

10 Steel is an alloy of:

- a ☐ TITANIUM
- b ☐ ALUMINIUM
- c ☐ MAGNESIUM
- d ☐ IRON

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

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

12 Fibres of materials such as glass, carbon or kevlar inside a thermosetting resin such as epoxy are known as:

- a ☐ COMPOSITIONS
- b ☐ COMPOSTS
- c ☐ CAMPSITES
- d ☐ COMPOSITES

13 The ideal shape of a window in an aircraft fuselage is:

- a ☐ Rectangular with rounded corners
- b ☐ Round
- c ☐ Elliptical
- d ☐ Square

- 14 If only one piston engine/propellor combination or turbo prop engine is fitted to an aircraft it will normally be fitted:
- a ☐ In the nose
  - b ☐ On the starboard wing
  - c ☐ In the fuselage, rear the centre of gravity
  - d ☐ In the tail

- 15 What is used to counter the yaw which results from engine failure on a large four-engined aircraft:
- a ☐ A large rudder
  - b ☐ Canards
  - c ☐ A large fin
  - d ☐ Assymetric power

- 16 An undercarriage should be as light as possible because:
- a ☐ It is dead weight when airborne
  - b ☐ Heavy undercarriages damage runways
  - c ☐ It places high loads on the wing mountings
  - d ☐ It is difficult to retract

- 17 Which part of an undercarriage system normally has to be disconnected before towing:
- a ☐ The nose-wheel brakes
  - b ☐ The uni-directional torsion link
  - c ☐ The oleo nitrogen reservoir
  - d ☐ The nose-wheel steering

- 18 Roll is controlled by:
- a ☐ AIRBRAKES
  - b ☐ AILERONS
  - c ☐ RUDDER
  - d ☐ ELEVATORS OR CANARDS

- 19 The control column or stick operates elevators and:
- a ☐ RUDDER
  - b ☐ AILERONS
  - c ☐ UNDERCARRIAGE
  - d ☐ FIN

- 20 The system where an unstable aircraft can be flown by computer without control cables or linkages is known as:
- a ☐ Fly-by-night
  - b ☐ Fly-by-stability
  - c ☐ Fly-by-wire
  - d ☐ Fly-by-height

- 21 Where a hydraulic actuator is used to move a jack to a specific position, rather than to the end of its travel, we use:
- a ☐ A servo actuator
  - b ☐ A servo accumulator
  - c ☐ Several accumulators
  - d ☐ Several actuators

- 22 Control surfaces which combine the functions of elevators and ailerons are called:
- a ☐ ELEVONS
  - b ☐ ELEFLAPS
  - c ☐ AILERONS
  - d ☐ RUDDERATORS

- 23 What is the meaning of ILS:
- a ☐ Immediate Landing System
  - b ☐ Interim Lighting System
  - c ☐ Interim Landing System
  - d ☐ Instrument Landing System

- 24 What is the meaning of APU:
- a ☐ Auxilliary Power Unit
  - b ☐ Auxilliary Pump Unit
  - c ☐ Aircraft Power Unit
  - d ☐ Active Pressurisation Unit

- 25 What instrument is represented in this diagram

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

