



Headquarters Air Cadets Examination

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Senior Cadet
32/3 Air Navigation
Generated 17-Jul-00
Serial: 256

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 _____

One degree of latitude is equal to:

- a ☐ 1/10,000 part of the distance from the North Pole to the Equator
- b ☐ 360nms
- c ☐ 60nms
- d ☐ 60km

2. In Germany, Kiel is due north of Warzburg. If Kiel's latitude is 54 20N and Warzburg's is 49 48N, how far are they apart:

- a ☐ 272nm
- b ☐ 2720nm
- c ☐ 27.2nm
- d ☐ 227nm

3. Rectified Air Speed (RAS) is:

- a ☐ Pilot pressure minus static pressure
- b ☐ IAS after correction for pressure error and instrument error
- c ☐ Always less than IAS
- d ☐ Always the same as IAS

4. How fast must an aircraft fly to cover 1200nm in 3 hours:

- a ☐ 400mph
- b ☐ 800kts
- c ☐ 400kts
- d ☐ 3600kts

5. What time is used as standard in military and commercial aviation:

- a ☐ Greenwich mean time (Universal time)
- b ☐ European daylight saving time
- c ☐ The time of the country over which the aircraft is flying
- d ☐ British summer time

6. A vector is a line, drawn to represent a velocity. This is achieved by:

- a ☐ The bearing represents knots at all times
- b ☐ The bearing represents speed and the length represents direction
- c ☐ The length represents mph at all times
- d ☐ The bearing of the line represents the direction and the length of the line representing the speed

7. In the Air Triangle, the heading vector includes 2 components. They are:-

- a ☐ Heading and wind velocity
- b ☐ Heading and Groundspeed
- c ☐ Heading and drift
- d ☐ Heading and true air speed

8. You are flying at 120knots groundspeed. How long will it take to fly 20nms:

- a ☐ 60 minutes
- b ☐ 10 minutes
- c ☐ 2 minutes
- d ☐ 6 minutes

9. An aircraft departs from base, but does not arrive at the destination, on its Estimated Time of Arrival. What action will Air Traffic Control take:

- a ☐ Initiate overdue action
- b ☐ No immediate action is required
- c ☐ Close down
- d ☐ Contact the departure base

10. An aircraft is flying from Point A to Point B. A pinpoint fix shows it to be off track. A line from the pinpoint fix, to point B would be known as:

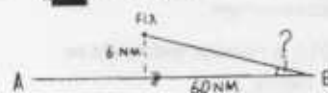
- a ☐ Track made good
- b ☐ Heading required
- c ☐ Revised track
- d ☐ Track required

11. An aircraft flies a track made good, 3 degrees in error from the required track. Using the 1 in 60 rule, how many miles will the aircraft be off track after 60 miles of flying:

- a ☐ 3nms
- b ☐ 6nms
- c ☐ 2nms
- d ☐ 1nm

12. An aircraft flying from A to B finds itself 6nms off track. It has a further 60nms to travel. What is the required closing angle:

- a ☐ 2 degrees
- b ☐ 3 degrees
- c ☐ 6 degrees
- d ☐ 10 degrees



- 13 An aircraft when flying from A to B is found to be off track at the pinpoint shown in the diagram. The pilot calculates the track error as 12 degrees and the closing angle of 8 degrees. By how much does the pilot need to turn to reach point B:

- a ☐ 12 degrees to the right
- b ☐ 8 degrees to the right
- c ☐ 20 degrees to the right
- d ☐ 4 degrees to the right



- 14 An aircraft flying from A to B finds that after 40nms it is 6nms right of track. If it has a further 30nms to travel, by how much does the pilot need to turn, to regain the intended track at B:

- a ☐ 12 degrees left
- b ☐ 21 degrees left
- c ☐ 18 degrees left
- d ☐ 24 degrees right

- 15 All RAF aircraft are equipped with a Direct Indicating Compass (DIC). Why is this:

- a ☐ The DIC gives a reading of true heading
- b ☐ The DIC is the most accurate compass system available
- c ☐ The DIC is not affected by turns and accelerations
- d ☐ The DIC is reliable and needs no power supply

- 16 Which of the following statements, about the gyro-magnetic compass is true:

- a ☐ When the aircraft climbs or descends, the flux valve takes over from the gyroscope
- b ☐ The gyroscope takes over from the flux valve, whenever the aircraft turns
- c ☐ The gyro-magnetic compass is less accurate than the Direct Indicating Compass
- d ☐ The flux-valve controls the speed of the gyroscope

- 17 A gyroscope cannot be perfect, and so over a period of time it becomes inaccurate, this is called:

- a ☐ Gyro rigidity
- b ☐ Turn/acceleration error
- c ☐ Variation
- d ☐ Gyro wander

- 18 As a compass nears the Magnetic North Pole, the compass detector will try to point at the magnetic material inside the Earth. This tilting is called:

- a ☐ Wander
- b ☐ Dip
- c ☐ Drop
- d ☐ Variation

- 19 What principle does an Inertial Navigation System use, to calculate the position of the aircraft:

- a ☐ A gyroscope feeds position to the computer
- b ☐ The navigator must update the Inertial Navigation system all the time
- c ☐ It uses compass heading and doppler values to compute aircraft position
- d ☐ It is set accurately on the ground, and then measures the accelerations in the fore, aft and lateral

- 20 In order to fly in a Visual Circuit, a trainee pilot requires:

- a ☐ No wind
- b ☐ Good visibility, and no cloud in the sky
- c ☐ Good visibility and no wind
- d ☐ Visibility and cloudbase conditions to meet the aerodrome controller's requirements

- 21 The wind is blowing directly down the length of a runway. What is the crosswind component:

- a ☐ Zero crosswind component
- b ☐ Equal to half the winds speed
- c ☐ Equal to 3/4 of wind speed
- d ☐ Equal to the winds speed

- 22 The airfield has a covering of shallow fog. A pilot circling directly overhead, sees the runway lights clearly. However, on the approach to land, he may have great difficulty in seeing some lights. Why is this:

- a ☐ Fog is more dense, closer to the ground
- b ☐ Fog will appear thicker when on the glide path, because the pilot is looking at a shallower angle
- c ☐ Runway lights are designed to be seen from high level only
- d ☐ The thickest fog always settles at the end of the runway

- 23 What problems can be caused by precipitation at freezing temperatures:

- a ☐ Icing
- b ☐ Crosswinds
- c ☐ Fog
- d ☐ Thunderstorms

- 24 What can be the effects of heavy icing, on an aircraft's performance:

- a ☐ Loss of aerodynamics and reduced engine performance
- b ☐ Loss of aerodynamics only
- c ☐ It will fly much slower
- d ☐ There is no adverse effect on the aircraft's performance

- 25 One minute of latitude on the Earth's surface is equal to:

- a ☐ 1 knot
- b ☐ 1km
- c ☐ 1 nautical mile
- d ☐ 60 nautical miles