



Headquarters Air Cadets Examination

Senior Cadet
Air Navigation
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1. Use black or dark blue pen, NOT pencil.
2. Write only on the answer sheet. Add your personal details.

- 1 Distance on the Earth's surface is measured in Nautical Miles (nm). Which of the following is true:
- a One nm is equal to one minute of longitude
 - b One nm is equal to one minute of latitude
 - c One nm is equal to 5280 feet
 - d One nm equals 1/10,000 of the distance from the North Pole to the Equator

- 2 Your destination airfield is situated due south of your departure airfield. If the two latitudes are 63°25'N and 57°58'N, how far are they apart:

- a 327nms
- b 323nms
- c 333nms
- d 317nms

- 3 Rectified Air Speed (RAS) is:

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

- 4 A Tornado flies from its base to a target in 30 minutes. If the distance is 250nms, what speed is it flying at:

- a 125kts
- b 500kts
- c 800kts
- d 750kts

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

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

- 6 A Vector is a representation, on paper of:

- a Speed
- b Direction
- c Direction and speed
- d Time

- 7 In the Air Triangle shown here, name the components of the 3rd side, represented by a dotted line:

- a Drift and groundspeed
- b Wind direction and speed
- c Heading and true airspeed
- d Drift



- 8 You are flying in a Tornado at 420kts groundspeed. How many nms do you travel each minute:

- a 6nms
- b 42nms
- c 7nms
- d 8nms

- 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 Close down
- c Contact the departure base
- d No immediate action is required

- 10 The track drawn on a map, between the departure airfield and the destination is known as:

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

- 11 Using the 1 in 60 rule, calculate how many miles off track an aircraft will be, if it flies 60nms with a track error of 2 degrees:

- a 4nms
- b 6nms
- c 2nms
- d 60nms

- 12 An aircraft flying from A to B. After flying 30nms, a fix shows the aircraft to have a track error of 10 degrees. How far is the aircraft off track at the time of the fix:

- a 6nms
- b 3nms
- c 5nms
- d 2nms



- 3 An aircraft flying from A to B finds that after 30nms, it is 4nms off track. It has a further 60nms to travel. What is the required closing angle:

- a 3 degrees
- b 6 degrees
- c 2 degrees
- d 4 degrees



- 4 An aircraft when flying from A to B is found to be off track at the pinpoint shown below. 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 20 degrees to the right
- c 4 degrees to the right
- d 8 degrees to the right



- 15 20nm after take-off for a pre-planned destination, a pilot finds that he is 3nm off track. By how much does the pilot need to turn to regain the intended track after flying a further 20nm:

- a 3 degrees
- b 9 degrees
- c 6 degrees
- d 18 degrees

- 16 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 21 degrees left
- b 18 degrees left
- c 24 degrees right
- d 12 degrees left

- 17 Which of the following statements is true, concerning the Direct Indicating Compass:

- a The DIC only reads magnetic headings
- b The DIC needs only a small power supply
- c The DIC is not affected by turns and accelerations
- d The DIC gives a reading of aircraft true heading

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

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

- 19 Why is a gyroscope used, in a gyro-magnetic compass system:

- a A gyro is always accurate, without error
- b A gyro requires no power supply
- c A gyro does not suffer from 'wander'
- d A gyroscope is extremely accurate for short periods of time

- 20 Where are variation values at their greatest:

- a At the equator
- b In the Northern hemisphere
- c In the Southern hemisphere
- d In polar regions

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

- a It is set accurately on the ground, and then measures the accelerations in the fore, aft and lateral
- 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 A gyroscope feeds position to the computer

- 22 In order to fly in instrument met conditions, which of the following are required:

- a No cloud in the local area
- b An instrument rating only
- c The correct instrumentation, and a suitable pilot instrument rating
- d A clear windscreen canopy

- 23 A wind is blowing at 90 degrees angle off the runway direction. If the wind speed is 20 kts. What is the crosswind component:

- a 10kts
- b 2 kts
- c 12 kts
- d 20 kts

- 24 What effect can icing have on the aerodynamics of an aircraft:

- a Ice forming on the leading edge of the wing, will increase lift
- b Lift will decrease and weight will increase
- c There will be no adverse effect upon the aerodynamics
- d The windscreen may freeze over

- 25 Which way does the Earth revolve on its axis:

- a South to North
- b East to West
- c North to South
- d West to East