PRERNA AVIATION

DGCA CPL Practice Paper 12

Radio Navigation & Instruments

ANSWER KEY & EXPLAINED SOLUTIONS

2026-reviewed sectional practice. Not an official DGCA paper or a verified full-length latest-pattern mock.

01 A	02 B	03 B	04 A	05 D
06 D	07 A	08 C	09 D	10 A
11 C	12 D	13 A	14 C	15 B
16 C	17 B	18 B	19 C	20 A
21 C	22 B	23 D	24 A	25 D

01. A VOR receiver shows radial 270 degrees. Where is the aircraft relative to the station?

Answer: A. West of the station

A radial is a magnetic bearing FROM the station. Radial 270 places the aircraft west of the station; heading is a separate quantity.

Topic: VOR position | Study reference: NAV

02. An aircraft on the 030-degree VOR radial wants to track directly away from the station. The required magnetic track is:

Answer: B. 030 degrees

Outbound tracking follows the radial itself. The reciprocal, 210 degrees, would be the inbound track to the station, before applying a wind-correction heading.

Topic: VOR outbound | Study reference: NAV

03. An aircraft on the 240-degree radial selects course 060 degrees on a conventional VOR indicator. With the CDI centred, the expected flag is:

Answer: B. TO

The reciprocal of radial 240 is inbound course 060. Selecting that course with a centred CDI should produce TO when the signal is valid and the aircraft is outside ambiguity regions.

Topic: VOR indication | Study reference: NAV

04. A conventional VOR CDI has a nominal full-scale deflection of 10 degrees. A two-degree error corresponds to approximately:

Answer: A. One-fifth of full-scale deflection

The fraction is angular error divided by full-scale angle: 2/10 = 0.2. This applies to the stated conventional VOR scale, not to an ILS localizer scale.

Topic: CDI sensitivity | Study reference: NAV

05. At 60 NM from a VOR, a one-degree angular error gives an approximate lateral displacement of:

Answer: D. 1 NM

Using 1-in-60, displacement = distance × angle/60 = 60 × 1/60 = 1 NM. The same angular error produces greater lateral displacement farther from the station.

Topic: Angular error | Study reference: NAV

06. An ADF displays relative bearing 250 degrees while magnetic heading is 140 degrees. Magnetic bearing TO the station is:

Answer: D. 030 degrees

Bearing to station = heading + relative bearing = 140 + 250 = 390 degrees. Subtract 360 to normalise: 030 degrees.

Topic: ADF bearing | Study reference: NAV

07. A station bears 320 degrees magnetic and the aircraft heading is 050 degrees magnetic. Relative bearing is:

Answer: A. 270 degrees

Relative bearing = magnetic bearing - magnetic heading = 320 - 50 = 270 degrees. The station is directly left of the aircraft.

Topic: Relative bearing | Study reference: NAV

08. An aircraft heads 090 degrees magnetic; the ADF needle points directly behind. Magnetic bearing TO the station is:

Answer: C. 270 degrees

Directly behind means relative bearing 180 degrees. Adding heading 090 gives magnetic bearing 270 degrees.

Topic: ADF geometry | Study reference: NAV

09. Why can NDB homing in a crosswind produce a curved ground track?

Answer: D. Keeping the nose pointed at the station does not compensate for drift

Homing keeps relative bearing near zero but allows wind to displace the aircraft. Tracking requires a wind-correction heading to maintain the desired ground track.

Topic: Homing versus tracking | Study reference: NAV

10. NDB bearing errors near thunderstorms may occur because:

Answer: A. The receiver can respond to electrical interference

Electrical discharges create radio noise that can disturb ADF indications. An uncertain bearing should be checked against other information.

Topic: ADF limitations | Study reference: NAV

11. An aircraft is 3 NM horizontally from a DME station and 4 NM above its antenna. Ideal DME indication is:

Answer: C. 5 NM

DME measures slant range. Pythagoras gives square root of (3 squared + 4 squared) = 5 NM. Horizontal and vertical distances must use the same units.

Topic: DME geometry | Study reference: NAV

12. A DME-derived ground-speed display is most representative of actual ground speed when the aircraft is:

Answer: D. Tracking directly towards or away from the station at nearly constant altitude

DME computes rate of change of slant range. It approximates ground speed on a direct radial track with little altitude change and small slant-range effects; it is not a general ground-speed sensor.

Topic: DME speed | Study reference: NAV

13. A radio altimeter principally measures height above:

Answer: A. The terrain or surface directly below

A radio altimeter uses reflected radio energy to measure distance to the underlying surface. It is distinct from barometric altitude referenced to a pressure setting.

Topic: Radio altitude | Study reference: INST

14. With normal localizer sensing on an inbound ILS front course, the localizer needle is left of centre. The aircraft is:

Answer: C. Right of the localizer centreline

With correct front-course sensing, the needle shows the direction towards the centreline. A left needle indicates the aircraft is right of course. Wind correction and approved procedures determine control inputs.

Topic: ILS lateral indication | Study reference: NAV

15. On an established ILS approach, a normal glideslope pointer above centre indicates that the aircraft is:

Answer: B. Below the glide path

The glideslope pointer indicates where the desired glide path lies relative to the aircraft. If it is above centre, the aircraft is below the path, subject to valid signal and correct capture.

Topic: ILS vertical indication | Study reference: NAV

16. An ILS localizer signal is primarily carried in which band?

Answer: C. VHF

The localizer uses VHF frequencies, whereas the paired glide-slope signal uses UHF. Their functions are lateral and vertical guidance respectively.

Topic: ILS frequencies | Study reference: NAV

17. Primary surveillance radar detects aircraft principally by:

Answer: B. Receiving reflected radio energy

Primary radar transmits energy and receives echoes reflected by targets. Secondary radar instead depends on an airborne transponder responding to interrogation.

Topic: Radar principles | Study reference: NAV

18. Secondary surveillance radar differs from primary radar because it normally requires:

Answer: B. An operating aircraft transponder

SSR interrogates an airborne transponder and receives coded replies. Its operation differs from detecting passive reflected energy with primary radar.

Topic: SSR | Study reference: NAV

19. Mode C transponder information primarily adds:

Answer: C. Pressure altitude

Mode C reports pressure altitude referenced to the standard-pressure datum. It does not transmit the aircraft's indicated altitude with an arbitrary QNH setting.

Topic: Transponder altitude | Study reference: INST

20. ADS-B Out is described as dependent surveillance because its broadcast position depends on:

Answer: A. Onboard navigation-derived position information

ADS-B Out broadcasts data including an onboard-derived position, commonly from GNSS. Its dependence on that position source differs from independent primary radar measurement.

Topic: ADS-B principle | Study reference: NAV

21. RAIM in a GNSS receiver is primarily concerned with:

Answer: C. Monitoring the integrity of the navigation solution

Receiver Autonomous Integrity Monitoring checks consistency among available satellite measurements to detect certain faults. Availability and capability depend on receiver design and satellite geometry.

Topic: GNSS integrity | Study reference: NAV

22. Poor satellite geometry can degrade a GNSS solution even with usable signals because:

Answer: B. Measurement errors are amplified by the geometry

Dilution of precision describes how satellite geometry affects the position solution. Widely distributed satellites generally provide better geometry than clustered directions.

Topic: GNSS geometry | Study reference: NAV

23. An inertial navigation system can provide navigation without continuous external radio signals, but its errors generally:

Answer: D. Accumulate with time unless corrected or updated

Small sensor errors can integrate into velocity and position errors. External updates or appropriate alignment and aiding can limit drift, depending on the system.

Topic: Inertial navigation | Study reference: NAV

24. A conventional heading indicator must be periodically checked against a suitable magnetic reference because of:

Answer: A. Gyroscopic drift and other heading errors

Gyro heading indicators can drift. Proper comparison with a reliable magnetic reference under suitable conditions helps maintain accurate heading indications.

Topic: Gyro heading | Study reference: INST

25. A serviceable instrument display shows a navigation warning flag. The appropriate interpretation is:

Answer: D. Displayed guidance may be invalid and needs cross-checking

Warning flags indicate a loss of valid guidance or a system condition requiring attention. They should not be ignored merely because a needle still appears plausible.

Topic: Navigation validity | Study reference: INST

Study references & review notes

Use these sources to revise the concepts behind your answers. Questions and explanations are newly written; they are not reproduced from an official question bank.

INST — FAA PHAK, Chapter 8: Flight Instruments

https://www.faa.gov/sites/faa.gov/files/10_phak_ch8.pdf

NAV — FAA Pilot’s Handbook of Aeronautical Knowledge, Chapter 16: Navigation

https://www.faa.gov/sites/faa.gov/files/18_phak_ch16.pdf

Scope: foundation-to-intermediate CPL ground-subject practice. This set does not claim complete coverage of the latest DGCA syllabus. Consult the current DGCA CAR Section 7, Series B and Pariksha notices for the applicable syllabus and examination requirements. Aircraft-type-specific Technical Specific and a complete RTR(A) course are not included.

FAA references support general theory only, not Indian regulatory requirements. CAP 413 is used for standard phrase meanings, not UK-specific operating rules. Weather reports, fuel reserves and flight scenarios in questions are illustrative. For operational use, consult current approved publications and aircraft manuals.

Reviewed and prepared: 30 October 2026. Official session instructions and syllabus pointers were checked; exact current subject-wise question counts and durations were not independently verified.