PRERNA AVIATION

DGCA CPL Practice Paper 13

Meteorology - Atmospheric Processes

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

01. The standard atmosphere assumes a sea-level temperature of:

Answer: A. 15 degrees C

The ISA reference temperature at mean sea level is 15 degrees C. Actual conditions may differ, so ISA is a comparison model rather than a weather report.

Topic: ISA reference | Study reference: MET

02. Using an ISA lapse rate of 2 degrees C per 1,000 ft, temperature at 10,000 ft is approximately:

Answer: B. Minus 5 degrees C

From 15 degrees C at sea level, subtract 10 × 2 = 20 degrees C. The result is -5 degrees C. The stated rounded lapse rate is used.

Topic: ISA calculation | Study reference: MET

03. Environmental lapse rate describes the temperature change with height in:

Answer: A. The surrounding atmosphere

Environmental lapse rate is the observed or specified temperature gradient of the atmosphere. It is compared with parcel lapse rates to assess stability.

Topic: Lapse-rate distinction | Study reference: MET

04. If environmental cooling with height exceeds the dry adiabatic lapse rate, an unsaturated displaced parcel is generally:

Answer: D. Unstable

The rising parcel cools more slowly than its environment and becomes relatively warm and buoyant. This favours continued upward displacement.

Topic: Absolute instability | Study reference: MET

05. Conditional instability exists when the environmental lapse rate is:

Answer: C. Between the saturated and dry adiabatic lapse rates

An unsaturated parcel can be stable while a saturated parcel is unstable, because saturated ascent cools more slowly as latent heat is released. Thus instability depends on saturation.

Topic: Conditional instability | Study reference: MET

06. An isothermal layer has:

Answer: D. Constant temperature with increasing height

Isothermal means equal temperature through the layer. It is not the same as an inversion, in which temperature increases with height.

Topic: Isothermal layer | Study reference: MET

07. Water evaporating into unsaturated air tends to cool that air because evaporation:

Answer: A. Absorbs latent heat

Liquid-to-vapour phase change requires energy. Evaporation takes latent heat from the surroundings and can cool the air or surface supplying that energy.

Topic: Latent heat | Study reference: MET

08. A wet-bulb thermometer normally reads below the dry-bulb temperature in unsaturated air because of:

Answer: C. Evaporative cooling

Water evaporating from the wetted covering absorbs heat. In saturated air there is little net evaporation, and the two readings approach each other.

Topic: Wet-bulb temperature | Study reference: MET

09. When dry-bulb and wet-bulb temperatures are equal under proper measurement conditions, relative humidity is approximately:

Answer: C. 100%

Equal readings imply little or no evaporative cooling, consistent with saturated air and relative humidity near 100%.

Topic: Humidity measurement | Study reference: MET

10. Mixing ratio is commonly expressed as the mass of water vapour per unit mass of:

Answer: C. Dry air

Mixing ratio compares water-vapour mass with dry-air mass, often in grams per kilogram. Relative humidity instead compares actual vapour content with saturation at the temperature concerned.

Topic: Moisture quantities | Study reference: MET

11. The tropopause is generally higher over:

Answer: D. The tropics than the poles

The warmer, deeper tropical troposphere usually has a higher tropopause than polar regions. Tropopause height varies with latitude, season and weather systems.

Topic: Tropopause | Study reference: MET

12. Most atmospheric water vapour is concentrated in the:

Answer: B. Lower troposphere

Moisture originates largely from evaporation at the surface, and colder upper levels hold less vapour. Thus most atmospheric water vapour is found in the lower troposphere.

Topic: Moisture distribution | Study reference: MET

13. At the same temperature, raising atmospheric pressure generally causes air density to:

Answer: B. Increase

For a fixed gas composition, density is proportional to pressure divided by absolute temperature. Holding temperature constant while raising pressure increases density.

Topic: Density and pressure | Study reference: MET

14. Pressure gradient force acts approximately:

Answer: B. From higher towards lower pressure

Pressure differences produce a force directed from high to low pressure, approximately perpendicular to isobars on a horizontal pressure chart.

Topic: Pressure gradient force | Study reference: MET

15. In the Southern Hemisphere, Coriolis deflection is towards the:

Answer: D. Left of the motion

Earth's rotation produces Coriolis deflection to the left in the Southern Hemisphere and to the right in the Northern Hemisphere. The direction is relative to the motion.

Topic: Coriolis effect | Study reference: MET

16. Coriolis effect on horizontal motion is weakest at the:

Answer: C. Equator

The horizontal Coriolis parameter varies with the sine of latitude and is zero at the equator. It increases in magnitude towards the poles.

Topic: Latitude and wind | Study reference: MET

17. A land breeze near the coast is most likely to blow:

Answer: D. From land towards sea at night

Land often cools faster than water at night, creating a relatively higher near-surface pressure over land and a breeze towards the sea. Larger-scale winds can modify this circulation.

Topic: Land breeze | Study reference: MET

18. An anabatic wind is typically:

Answer: D. An upslope wind driven by daytime heating

Sun-heated slopes warm adjacent air, encouraging buoyant upslope motion. Anabatic flow contrasts with katabatic cold-air drainage.

Topic: Slope winds | Study reference: MET

19. A coastal air mass is carried uphill and cools to saturation. The resulting cloud formation is primarily due to:

Answer: B. Orographic lifting

Terrain forces air to rise, expand and cool. If saturation is reached, cloud can form on the windward side, depending on moisture and stability.

Topic: Orographic cloud | Study reference: MET

20. Air descending on the lee side of a mountain often becomes warmer and drier because of:

Answer: B. Adiabatic compression and a rise in saturation capacity

Descending air is compressed and warmed. Relative humidity generally falls if moisture content does not rise sufficiently, producing a warm, dry lee-side effect.

Topic: Lee-side weather | Study reference: MET

21. The freezing level is the altitude at which the atmospheric temperature is:

Answer: B. 0 degrees C

The freezing level marks the zero-degree-Celsius isotherm in a vertical profile. More than one crossing can occur in a complex temperature structure.

Topic: Freezing level | Study reference: MET

22. Which cloud is normally composed predominantly of ice crystals at high altitude?

Answer: A. Cirrus

Cirrus forms in cold upper-level air and is composed mainly of ice crystals. Lower clouds may consist mainly of water droplets, depending on temperature.

Topic: Cloud composition | Study reference: MET

23. Nimbostratus is most associated with:

Answer: A. Widespread, relatively continuous precipitation

Nimbostratus is a thick layered precipitation cloud. Its precipitation is generally more continuous and widespread than the showery precipitation of cumuliform clouds.

Topic: Precipitation clouds | Study reference: MET

24. Virga is precipitation that:

Answer: A. Evaporates or sublimates before reaching the ground

Virga is visible precipitation that does not reach the surface because it evaporates or sublimates in the air below the cloud. Cooling from evaporation can contribute to downdraughts.

Topic: Virga | Study reference: MET

25. A halo around the sun seen through a thin high cloud layer is often associated with:

Answer: C. Ice crystals in cirrostratus

Refraction through ice crystals in high cloud can form halos. This observation suggests ice-crystal cloud but does not by itself guarantee a particular immediate weather event.

Topic: Cloud identification | Study reference: MET

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.

MET — FAA PHAK, Chapter 12: Weather Theory

https://www.faa.gov/sites/faa.gov/files/14_phak_ch12.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.