PRERNA AVIATION

DGCA CPL Practice Paper 03

Aviation Meteorology — Set A

ANSWER KEY & EXPLAINED SOLUTIONS

Original educational practice set. Not an official DGCA paper or a full-length examination simulation.

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

01. Which gas forms the largest fraction of dry air near sea level?

Answer: D. Nitrogen

Dry air contains roughly 78% nitrogen and 21% oxygen by volume. Water vapour is variable and is not included in the dry-air description.

Topic: Atmospheric composition | Study reference: MET

02. Most ordinary weather affecting low-level flight occurs in which atmospheric layer?

Answer: B. Troposphere

The troposphere contains most atmospheric water vapour and vigorous vertical mixing, so most clouds and weather occur there.

Topic: Atmospheric layers | Study reference: MET

03. Using ISA sea-level temperature 15 C and a lapse rate of 2 C per 1,000 ft, what temperature is expected at 8,000 ft?

Answer: A. Minus 1 C

Temperature decrease = 8 x 2 = 16 C. Subtract from 15 C to obtain -1 C. The stated lapse rate is an approximation.

Topic: ISA temperature | Study reference: MET

04. At 5,000 ft, ISA temperature is taken as 5 C. If actual temperature is 20 C, what is the ISA deviation?

Answer: D. ISA +15 C

ISA deviation = actual minus standard = 20 - 5 = +15 C. A positive deviation means warmer than the standard atmosphere.

Topic: ISA deviation | Study reference: MET

05. At the same atmospheric pressure, warming dry air causes its density to:

Answer: C. Decrease

For a gas of fixed composition, density is proportional to pressure divided by absolute temperature. At fixed pressure, a temperature rise lowers density.

Topic: Air density | Study reference: MET

06. At the same temperature and total pressure, replacing some dry air with water vapour generally makes the air:

Answer: D. Less dense

Water molecules have lower molecular mass than the average molecules of dry air. More water vapour therefore lowers density at equal pressure and temperature.

Topic: Humidity and density | Study reference: MET

07. Which combination generally produces the highest density altitude at a given aerodrome?

Answer: D. Low pressure and high temperature

Low pressure and high temperature reduce density. Density altitude is the altitude in the standard atmosphere corresponding to that lower density.

Topic: Density altitude | Study reference: MET

08. What is an atmospheric temperature inversion?

Answer: B. Temperature increases with height through a layer

An inversion reverses the usual tropospheric temperature decrease with altitude. It commonly resists vertical mixing.

Topic: Inversion | Study reference: MET

09. After a small upward displacement, an unsaturated air parcel is colder than its surroundings. What is its tendency?

Answer: B. Sink back toward its original level

A colder parcel is denser than surrounding air at similar pressure and tends to sink. This indicates stability for that displacement.

Topic: Stability | Study reference: MET

10. An unsaturated parcel is warmer than its surroundings after being lifted. This indicates a tendency toward:

Answer: B. Instability

The warmer parcel is less dense and tends to keep rising. Instability favours vertical motion if lifting is initiated.

Topic: Instability | Study reference: MET

11. A saturated rising parcel usually cools more slowly than a dry rising parcel because:

Answer: A. Condensation releases latent heat

Expansion cools both parcels, but condensation in saturated air releases heat and offsets some of that cooling.

Topic: Saturated ascent | Study reference: MET

12. Dew point is best defined as the temperature to which air must be cooled, at approximately constant pressure and water-vapour content, to:

Answer: A. Become saturated

Cooling reduces the saturation vapour pressure. At the dew point the existing vapour content is sufficient for saturation.

Topic: Dew point | Study reference: MET

13. If air temperature falls toward an unchanged dew point, relative humidity generally:

Answer: A. Increases

The same water-vapour content represents a larger fraction of saturation as temperature falls. Relative humidity approaches 100% near the dew point.

Topic: Relative humidity | Study reference: MET

14. For a convective-cloud estimate, use cloud-base height AGL = 400 x (temperature minus dew point) in feet. If temperature is 27 C and dew point 17 C, estimate cloud base.

Answer: C. 4,000 ft AGL

Spread = 27 - 17 = 10 C. Estimated base = 400 x 10 = 4,000 ft AGL. This simplified estimate is not a substitute for observed cloud information.

Topic: Cloud-base estimate | Study reference: MET

15. Which conditions most favour radiation fog over land?

Answer: D. Clear night, moist air and light wind

Clear skies allow strong surface radiational cooling. Moisture and light wind favour cooling near the surface to the dew point without excessive mixing.

Topic: Radiation fog | Study reference: MET

16. Advection fog is most closely associated with:

Answer: B. Moist air moving over a colder surface

Warm moist air can be cooled to saturation as it travels over a colder surface. Air movement is essential to this process.

Topic: Advection fog | Study reference: MET

17. A daytime sea breeze near a coastline usually blows at the surface:

Answer: B. From sea toward warmer land

Land commonly warms faster than water during the day. The resulting pressure circulation draws cooler marine air inland near the surface.

Topic: Sea breeze | Study reference: MET

18. A katabatic wind is characteristically:

Answer: C. A downslope flow of relatively cold dense air

Cooling can produce dense air that drains downhill under gravity. Daytime upslope thermal flow is anabatic, not katabatic.

Topic: Local winds | Study reference: MET

19. In the Northern Hemisphere, the Coriolis effect deflects moving air to the:

Answer: C. Right of its motion

Coriolis deflection is to the right in the Northern Hemisphere and to the left in the Southern Hemisphere. It depends on the direction of motion.

Topic: Wind forces | Study reference: MET

20. Widely spaced isobars, compared with closely spaced isobars at the same map scale, usually indicate:

Answer: A. A weaker pressure-gradient force

Closer isobars show a larger pressure change over a given distance. Wider spacing therefore usually means a weaker pressure-gradient force.

Topic: Pressure gradient | Study reference: MET

21. Above the friction layer, geostrophic wind is an ideal balance between:

Answer: A. Pressure-gradient and Coriolis forces

In the geostrophic approximation, straight flow results from balance between the pressure-gradient force and Coriolis effect, giving flow parallel to straight isobars.

Topic: Geostrophic wind | Study reference: MET

22. Compared with wind above the friction layer, surface friction generally causes wind to:

Answer: D. Slow and cross isobars toward lower pressure

Friction slows the wind and weakens Coriolis deflection. The unbalanced pressure-gradient component turns the flow toward lower pressure.

Topic: Surface wind | Study reference: MET

23. Which cloud is most associated with strong vertical development and thunderstorms?

Answer: C. Cumulonimbus

Cumulonimbus is a deep convective cloud capable of strong updrafts, downdrafts, heavy precipitation, lightning and severe turbulence.

Topic: Cloud type | Study reference: MET

24. Broad, relatively uniform layered cloud is more commonly associated with:

Answer: C. Stable air and gentle widespread lifting

Stable air tends to resist deep convection. Gentle large-scale ascent can instead produce extensive stratiform cloud layers.

Topic: Cloud formation | Study reference: MET

25. Atmospheric pressure normally decreases with altitude because:

Answer: D. There is less air above the higher level

Pressure reflects the weight of the overlying air column. A higher level has a smaller column above it and therefore lower pressure.

Topic: Pressure with height | 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.

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