CUET PG 2026 Atmospheric Science Question Paper with Solutions(Memory Based)

Time Allowed :1 Hours 30 min	Maximum Marks :300	Total Questions :75

General Instructions

1. The exam lasts 90 minutes (1 hour 30 minutes).
2. There are 75 Multiple Choice Questions (MCQs) to be answered.
3. +4 marks for every correct answer. -1 mark (negative marking) for every incorrect answer. 0 marks for unanswered or un-attempted questions.
4. For any discrepancy in questions, the English version is considered final (except for language-specific papers).
5. Click one of the four options to choose an answer.
6. You must click "Save & Next" to confirm your response. Only saved answers are considered for evaluation.
7. Use "Mark for Review & Next" to flag a question for later. You can unselect or change your answer using the "Clear Response" button.
8. All calculations must be done on the Rough Sheets provided at the centre. These must be returned to the invigilator after the exam.

1. What is the value of the Dry Adiabatic Lapse Rate (DALR) in the Earth's atmosphere?
(A) 6.5°C/km
(B) 9.8°C/km
(C) 12°C/km
(D) 4°C/km

Correct Answer: (2) 9.8°C/km

Solution:

Concept: The Dry Adiabatic Lapse Rate (DALR) refers to the rate at which the temperature of a rising or descending **dry air parcel** changes with altitude, without heat exchange with the surroundings.
Step 1: Understanding adiabatic process.
In an adiabatic process, no heat is exchanged. As dry air rises, it expands and cools due to decreasing pressure.
Step 2: Standard value of DALR.
The Dry Adiabatic Lapse Rate is approximately:

$$9.8^\circ\text{C per km}$$

Step 3: Eliminating incorrect options.

- 6.5°C/km is the Environmental Lapse Rate (average).
- 12°C/km and 4°C/km are not standard values.

Conclusion:
Thus, the correct value is $\boxed{9.8°C/km}$.

Quick Tip

DALR = 9.8°C/km (dry air).
Moist air has a lower lapse rate (4–7°C/km).

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2. Which atmospheric layer contains the maximum concentration of Ozone?
(A) Troposphere
(B) Stratosphere
(C) Mesosphere
(D) Thermosphere

Correct Answer: (2) Stratosphere

Solution:

Concept: The Earth's atmosphere is divided into different layers based on temperature and composition. Ozone (O_3) plays a crucial role in absorbing harmful ultraviolet (UV) radiation.
Step 1: Understanding ozone distribution.
Ozone is present in small amounts throughout the atmosphere but is highly concentrated in a specific layer forming the **ozone layer**.
Step 2: Identifying the correct layer.
The **Stratosphere**, located approximately 10–50 km above Earth's surface, contains the maximum concentration of ozone.
Step 3: Eliminating incorrect options.

- Troposphere contains weather phenomena but little ozone.
- Mesosphere has very low ozone concentration.
- Thermosphere is characterized by ionized gases, not ozone concentration.

Conclusion:
Thus, the correct answer is **Stratosphere**.

Quick Tip

Ozone layer = Stratosphere (10–50 km).
Protects Earth from harmful UV radiation.

3. The Coriolis force is zero at which location on Earth?
(A) Poles
(B) Equator
(C) Tropic of Cancer
(D) Arctic Circle

Correct Answer: (2) Equator

Solution:

Concept: The Coriolis force arises due to the rotation of the Earth and affects the motion of objects like winds and ocean currents.
Step 1: Understanding Coriolis force variation.
The magnitude of the Coriolis force depends on latitude:

$$F \propto \sin\phi$$

where ϕ is the latitude.
Step 2: Evaluating at Equator.
At the Equator:

$$\phi = 0^\circ \Rightarrow \sin 0^\circ = 0$$

Hence, Coriolis force is zero.
Conclusion:
Thus, the correct answer is **Equator**.

Quick Tip

Coriolis force: Zero at Equator, Maximum at Poles.

4. What is the primary greenhouse gas responsible for the natural greenhouse effect?
(A) Carbon dioxide
(B) Methane
(C) Water vapour
(D) Nitrous oxide

Correct Answer: (3) Water vapour

Solution:

Concept: Greenhouse gases trap heat in the Earth's atmosphere and maintain the planet's temperature. Different gases contribute differently to the natural greenhouse effect.

Step 1: Understanding greenhouse gases.
Major greenhouse gases include water vapour, carbon dioxide, methane, and nitrous oxide.
Step 2: Identifying the primary contributor.
Water vapour is the most abundant greenhouse gas and contributes the largest share to the natural greenhouse effect.
Step 3: Eliminating incorrect options.

- Carbon dioxide is important but not the largest contributor.
- Methane and nitrous oxide are present in smaller amounts.

Conclusion:
Thus, the correct answer is **Water vapour**.

Quick Tip

Natural greenhouse effect: Dominated by **water vapour**.
Human-induced warming: Mainly due to CO_2.

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5. Which instrument is used to measure atmospheric pressure?
(A) Thermometer
(B) Barometer
(C) Hygrometer
(D) Anemometer

Correct Answer: (2) Barometer

Solution:

Concept: Different meteorological instruments are used to measure various atmospheric parameters such as temperature, pressure, humidity, and wind speed.
Step 1: Understanding atmospheric pressure.
Atmospheric pressure is the force exerted by the weight of air above a given point.
Step 2: Identifying the correct instrument.
A **Barometer** is specifically designed to measure atmospheric pressure.
Step 3: Eliminating incorrect options.

- Thermometer measures temperature.
- Hygrometer measures humidity.
- Anemometer measures wind speed.

Conclusion:
Thus, the correct answer is **Barometer**.

Quick Tip

Barometer = Pressure.
Thermometer = Temperature, Hygrometer = Humidity, Anemometer = Wind speed.

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6. The Geostrophic wind represents a balance between the Coriolis force and which other force?
(A) Gravitational force
(B) Frictional force
(C) Pressure gradient force
(D) Centrifugal force

Correct Answer: (3) Pressure gradient force

Solution:

Concept: Geostrophic wind is an idealized wind that flows parallel to isobars in the upper atmosphere, where friction is negligible.
Step 1: Understanding forces acting on wind.
Air motion is influenced by several forces, mainly:

- Pressure gradient force (drives air from high to low pressure)
- Coriolis force (deflects motion due to Earth's rotation)

Step 2: Condition for geostrophic balance.
Geostrophic wind occurs when:

$$\text{Pressure gradient force} = \text{Coriolis force}$$

Step 3: Eliminating incorrect options.

- Gravitational force acts vertically, not in horizontal wind balance.
- Friction is negligible in geostrophic conditions.
- Centrifugal force is involved in gradient wind, not pure geostrophic wind.

Conclusion:
Thus, the correct answer is **Pressure gradient force**.

Quick Tip

Geostrophic wind = PGF balanced by Coriolis force.
Flows parallel to isobars.

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7. What is the standard unit used to measure Total Column Ozone?
(A) Pascal
(B) Dobson Unit
(C) Parts per million
(D) Millibar

Correct Answer: (2) Dobson Unit

Solution:

Concept: Total Column Ozone refers to the total amount of ozone present in a vertical column of the atmosphere above a given location.
Step 1: Understanding measurement of ozone.
Ozone concentration across the atmospheric column is measured in a specialized unit called the **Dobson Unit (DU)**.
Step 2: Definition of Dobson Unit.
1 Dobson Unit represents a layer of ozone that would be 0.01 mm thick under standard temperature and pressure.
Step 3: Eliminating incorrect options.

- Pascal and millibar measure pressure.
- Parts per million measures concentration, not total column ozone.

Conclusion:
Thus, the correct answer is **Dobson Unit**.

Quick Tip

Ozone layer thickness is measured in **Dobson Units (DU)**.

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8. In a tephigram, which parameters are plotted on the axes?
(A) Pressure and Temperature
(B) Temperature and Entropy
(C) Pressure and Entropy
(D) Temperature and Humidity

Correct Answer: (2) Temperature and Entropy

Solution:

Concept: A tephigram is a thermodynamic diagram used in meteorology to analyze atmospheric soundings and stability.
Step 1: Understanding the term "tephigram".
The name comes from:

- **T** = Temperature
- **Phi** = Entropy

Step 2: Identifying plotted variables.
A tephigram plots:

Temperature vs Entropy

Step 3: Eliminating incorrect options.

- Pressure is shown as lines, not axes.
- Humidity is represented by mixing ratio lines.

Conclusion:
Thus, the correct answer is **Temperature and Entropy**.

Quick Tip

Tephigram = Temperature vs Entropy.
Used for atmospheric stability analysis.

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9. Which type of radiation is primarily emitted by the Earth's surface?
(A) Ultraviolet radiation
(B) Shortwave radiation
(C) Longwave (infrared) radiation
(D) Gamma radiation

Correct Answer: (3) Longwave (infrared) radiation

Solution:

Concept: The Earth absorbs incoming solar radiation and re-emits energy back into the atmosphere based on its temperature.
Step 1: Understanding radiation types.
The Sun emits **shortwave radiation**, while the Earth, being cooler, emits **longwave radiation**.
Step 2: Identifying Earth's emission.
The Earth's surface primarily emits **infrared (longwave) radiation**.
Step 3: Eliminating incorrect options.

- Ultraviolet and shortwave radiation are mainly solar.
- Gamma radiation is not relevant in this context.

Conclusion:
Thus, the correct answer is **Longwave (infrared) radiation**.

Quick Tip

Sun = Shortwave, Earth = Longwave (Infrared).

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10. The Inter-Tropical Convergence Zone (ITCZ) is characterized by which type of surface winds?
(A) Westerlies
(B) Polar easterlies
(C) Trade winds convergence
(D) Jet streams

Correct Answer: (3) Trade winds convergence

Solution:

Concept: The ITCZ is a region near the Equator where atmospheric circulation plays a key role in global weather patterns.
Step 1: Understanding ITCZ.
The Inter-Tropical Convergence Zone is a low-pressure belt where air rises due to intense heating.
Step 2: Wind behavior at ITCZ.
It is characterized by the **convergence of trade winds** from the Northern and Southern Hemispheres.
Step 3: Eliminating incorrect options.

- Westerlies occur in mid-latitudes.
- Polar easterlies occur near the poles.
- Jet streams are upper-atmospheric winds.

Conclusion:
Thus, the correct answer is **Trade winds convergence**.

Quick Tip

ITCZ = Meeting point of trade winds + Rising air + Heavy rainfall.

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11. What is the approximate average Albedo of the Earth?
(A) 0.1
(B) 0.3

(C) 0.5
(D) 0.7

Correct Answer: (2) 0.3

Solution:

Concept: Albedo is the fraction of incoming solar radiation that is reflected back into space by the Earth's surface and atmosphere.
Step 1: Understanding albedo.
It ranges from 0 (no reflection) to 1 (total reflection).
Step 2: Average value of Earth's albedo.
The Earth reflects about **30%** of incoming solar radiation.

$$\text{Albedo} \approx 0.3$$

Step 3: Eliminating incorrect options.

- 0.1 is too low.
- 0.5 and 0.7 are unrealistically high for Earth.

Conclusion:
Thus, the correct answer is $\boxed{0.3}$.

Quick Tip

Earth's albedo 0.3 (30% reflected, 70% absorbed).

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12. Which law relates the wavelength of maximum emission to the temperature of a blackbody?
(A) Stefan-Boltzmann Law
(B) Wien's Displacement Law
(C) Planck's Law
(D) Kirchhoff's Law

Correct Answer: (2) Wien's Displacement Law

Solution:

Concept: Blackbody radiation laws describe how objects emit radiation based on their temperature.
Step 1: Understanding the relationship.
The law that connects the **wavelength of maximum emission** with temperature is:

$$\lambda_{\max} T = \text{constant}$$

Step 2: Identifying the law.
This relationship is given by **Wien's Displacement Law**.
Step 3: Eliminating incorrect options.

- Stefan-Boltzmann Law relates total energy to T^4.
- Planck's Law gives full radiation distribution.
- Kirchhoff's Law relates emission and absorption.

Conclusion:
Thus, the correct answer is **Wien's Displacement Law**.

Quick Tip

Wien's Law: Hotter body → shorter wavelength.
Sun (hot) → shortwave, Earth (cool) → longwave.

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13. What term describes a process where there is no heat exchange between a system and its surroundings?
(A) Isothermal process
(B) Adiabatic process
(C) Isobaric process
(D) Isochoric process

Correct Answer: (2) Adiabatic process

Solution:

Concept: Thermodynamic processes are classified based on how heat, pressure, volume, and temperature behave.
Step 1: Understanding the definition.
A process in which **no heat is exchanged** between the system and surroundings is called an **adiabatic process**.
Step 2: Key characteristic.

$$Q = 0$$

where Q is heat transfer.
Step 3: Eliminating incorrect options.

- Isothermal: temperature constant.
- Isobaric: pressure constant.

- Isochoric: volume constant.

Conclusion:
Thus, the correct answer is **Adiabatic process**.

Quick Tip

Adiabatic = No heat transfer (Q = 0).

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14. The ratio of the mass of water vapor to the mass of dry air is known as what?
(A) Relative Humidity
(B) Specific Humidity
(C) Mixing Ratio
(D) Dew Point

Correct Answer: (3) Mixing Ratio

Solution:

Concept: Humidity parameters describe the amount of water vapor present in the air using different definitions.
Step 1: Understanding the definition.
The ratio of the **mass of water vapor** to the **mass of dry air** is called the **mixing ratio**.
Step 2: Formula.

$$\text{Mixing Ratio} = \frac{\text{Mass of water vapor}}{\text{Mass of dry air}}$$

Step 3: Eliminating incorrect options.

- Relative humidity is a percentage of saturation.
- Specific humidity is ratio to total air mass.
- Dew point is the temperature at which condensation occurs.

Conclusion:
Thus, the correct answer is **Mixing Ratio**.

Quick Tip

Mixing ratio = Water vapor mass / Dry air mass.

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15. Which force is responsible for the deflection of winds to the right in the Northern Hemisphere?

(A) Pressure Gradient Force
(B) Gravitational Force
(C) Coriolis Force
(D) Frictional Force

Correct Answer: (3) Coriolis Force

Solution:

Concept: Wind movement on Earth is influenced by several forces, including pressure gradient, Coriolis, and frictional forces.
Step 1: Understanding wind deflection.
Due to the Earth's rotation, moving air is deflected from its path. This apparent deflection is known as the **Coriolis force**.
Step 2: Direction of deflection.

- In the **Northern Hemisphere**: deflection is to the **right**.
- In the **Southern Hemisphere**: deflection is to the **left**.

Step 3: Eliminating incorrect options.

- Pressure gradient force drives air from high to low pressure.
- Gravitational force acts vertically downward.
- Frictional force slows down wind near the surface.

Conclusion:
Thus, the correct answer is **Coriolis Force**.

Quick Tip

Coriolis Force: Right in North, Left in South.
