

UNIQUE STUDY POINT

AMITESH NAGAR, INDORE

PRACTICE PAPER 01 (2026-27)

CHAPTER : ATMOSPHERE AND CLIMATE

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Class : IX

Subject : Social Science

General Instructions :

- This question paper contains 75 questions divided into five sections A, B, C, D and E.
- Section A has 30 objective type questions (MCQ, Match the following, Assertion-Reason) of 1 mark each.
- Section B has 18 short answer questions of 2 marks each.
- Section C has 17 short answer questions of 3 marks each.
- Section D has 5 case based questions of 4 marks each.
- Section E has 5 long answer questions of 5 marks each.
- All questions are compulsory. Use of a calculator is not permitted.

SECTION - A

This section consists of 30 objective type questions of 1 mark each.

1. Which environmental problem is a direct result of an increase in carbon footprint? **1**
(A) Global warming
(B) Decrease in sea level
(C) Increased biodiversity
(D) Ozone layer repair
2. Which instrument is used to show the direction of the wind? **1**
(A) An anemometer (B) A wind vane (C) A hygrometer (D) A barometer
3. Which greenhouse gas is produced by livestock and is a powerful heat-trapping gas? **1**
(A) Methane (B) Nitrous Oxide (C) Oxygen (D) Carbon Dioxide
4. Which of the following is characteristic of the retreating monsoon season known as 'October Heat'? **1**
(A) Clear skies, low temperature, and low humidity
(B) High temperature and humidity.
(C) Torrential rainfall with hailstorms
(D) Low temperature and high humidity

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5. What type of carbon footprint includes emissions from directly controlled activities like driving vehicles or using LPG? **1**
(A) Direct Carbon Footprint
(B) Indirect Carbon Footprint
(C) Secondary Carbon Footprint
(D) Embedded Carbon Footprint
6. Which months are generally characterized as the hot weather season in India due to the sun's northward movement causing the global heat belt to shift? **1**
(A) March to May (B) June to August (C) January to March (D) September to November
7. Which human activity is a primary cause of increased greenhouse gases in the atmosphere, leading to climate change? **1**
(A) Planting new forests
(B) Burning fossil fuels
(C) Developing renewable energy sources
(D) Recycling waste materials
8. Which instrument is used to measure changes in temperature? **1**
(A) Anemometer (B) Hygrometer (C) Thermometer (D) Barometer
9. Evaluate the statement: 'The thermosphere acts as Earth's radiation shield and communication layer, playing a vital role in protecting life and supporting technology.' **1**
(A) Communication yes, shielding partly.
(B) Exosphere does communication
(C) Blocks all radiation
(D) Thermosphere not important.
10. What is the 'probability' period with regard to floods? **1**
(A) The initial phase of a flood where water levels are low.
(B) The period during which relief operations are carried out.
(C) A heavy rainfall or snowmelt period before a flood.
(D) The time after a flood has occurred when recovery efforts begin.

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11. What is one way individuals can reduce their carbon footprint? **1**
(A) Consuming more non-renewable energy sources
(B) Increasing the use of personal vehicles
(C) Using energy-inefficient appliances
(D) Planting more trees
12. Which trade winds prevail over India during the cold weather season, causing most of the country to experience a dry season? **1**
(A) Southwest trade winds
(B) Westerly winds
(C) Northeast trade winds
(D) Southeast trade winds
13. What is the local name for the meagre rainfall important for the rabi crops during the cold weather season in north India? **1**
(A) Mahawat (B) Mango (C) October Heat (D) Loo showers
14. During the hot weather season (March-May) in India, what temperature range is commonly observed in the northwestern regions around May? **1**
(A) Around 42°C
(B) Around 38°C
(C) Around 48°C
(D) Between 24°C and 25°C
15. The exosphere is characterized by the presence of traces of which gases? **1**
(A) Water Vapour and Dust
(B) Carbon Dioxide and Argon
(C) Oxygen and Nitrogen
(D) Hydrogen and Helium
16. What is the term for the area drained by the waters of a river? **1**
(A) Catchment area (B) Flood plain (C) Drainage basin (D) Water divide

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17. Which atmospheric layer contains the ozone layer that protects from harmful UV rays? **1**

(A) Troposphere (B) Stratosphere (C) Thermosphere (D) Mesosphere

18. A coastal town in Tamil Nadu is experiencing significant rainfall during December and January, while most of India experiences a dry season. What is the most likely meteorological reason for this anomalous rainfall pattern? **1**

(A) Southwest monsoon in winter.
(B) Cyclonic depressions during retreating monsoon.
(C) Northeast winds from sea to land.
(D) Pre-monsoon mango showers.

19. What instrument is used to measure atmospheric pressure? **1**

(A) Rain gauge (B) Barometer (C) Thermometer (D) Anemometer

20. Which atmospheric layer is characterized by continuous mixing of gases and contains nearly 75 percent mass of the atmosphere? **1**

(A) Troposphere (B) Mesosphere (C) Stratosphere (D) Exosphere

21. Match the items in List I with those in List II. **1**

List I	List II
(A) Direct Carbon Footprint	(I) Manufacturing goods
(B) Indirect Carbon Footprint	(II) Global warming
(C) Effect of High Carbon Footprint	(III) Driving vehicles
(D) Carbon Footprint Measurement	(IV) Tonnes CO ₂ equivalent

(A) A-I, B-III, C-II, D-IV

(B) A-II, B-I, C-III, D-IV

(C) A-IV, B-II, C-I, D-III

(D) A-III, B-I, C-II, D-IV

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22. Match the items in List I with those in List II.

1

List I	List II
(A) Flash flood	(I) High relief feature
(B) Drainage basin	(II) Area drained by river waters
(C) Water divide	(III) Violent splash of water
(D) Flood plain	(IV) Flattish area alongside river channels

(A) A-IV, B-III, C-II, D-I

(B) A-II, B-III, C-I, D-IV

(C) A-I, B-II, C-IV, D-III

(D) A-III, B-II, C-I, D-IV

23. Match the instruments in List I with what they measure in List II.

1

List I	List II
(A) Thermometer	(I) Atmospheric Pressure
(B) Barometer	(II) Wind Direction
(C) Anemometer	(III) Temperature
(D) Wind Vane	(IV) Wind Speed

(A) A-I, B-III, C-IV, D-II

(B) A-III, B-I, C-IV, D-II

(C) A-III, B-I, C-II, D-IV

(D) A-IV, B-II, C-III, D-I

24. Match the items in List I with those in List II.

1

List I	List II
(A) Western Ghats rain	(I) Decreases westward
(B) Leeward side of Ghats	(II) Over 250 cm
(C) Northern Plains rainfall pattern	(III) Less than 50 cm
(D) Kolkata rainfall	(IV) 120 cm

(A) A-IV, B-II, C-III, D-I

(B) A-I, B-II, C-IV, D-III

(C) A-III, B-I, C-II, D-IV

(D) A-II, B-III, C-I, D-IV

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25. Match the items in List I with those in List II.

1

List I	List II
(A) Troposphere	(I) Satellite communication
(B) Stratosphere	(II) Meteoroids burn up
(C) Mesosphere	(III) Weather phenomena
(D) Ionosphere	(IV) Ozone layer

(A) A-III, B-IV, C-II, D-I

(B) A-I, B-II, C-III, D-IV

(C) A-II, B-I, C-IV, D-III

(D) A-IV, B-III, C-I, D-II

Directions (Q. 26 to Q. 30) : In each of the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option :

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false. (D) A is false but R is true.

26. Assertion (A) : Western disturbances are crucial for winter rain in northern plains.

1

Reason (R) : These low-pressure systems originate over the Mediterranean Sea.

27. Assertion (A) : Rising global temperatures lead to more frequent heatwaves.

1

Reason (R) : Melting glaciers and polar ice caps cause rising sea levels.

28. Assertion (A) : Rain gauges are essential for effective disaster management and crop planning.

1

Reason (R) : Accurate rainfall data aids in predicting floods, droughts, and irrigation needs.

29. Assertion (A) : Barometer readings below 1000 millibars often indicate unstable weather conditions.

1

Reason (R) : Low atmospheric pressure systems are associated with rising air and cloud formation.

30. Assertion (A) : The exosphere is crucial for global communication and weather monitoring.

1

Reason (R) : Many communication and weather satellites orbit within this outermost layer.

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SECTION - B

This section consists of 18 questions of 2 marks each.

31. Which atmospheric layer protects Earth from meteors and how does it accomplish this? **2**
32. Explain the distinguishing features and impacts of the 'loo' winds during the hot weather season in India. **2**
33. Explain the interconnectedness between deforestation and the concentration of carbon dioxide in the atmosphere. **2**
34. How do industrial and agricultural practices contribute to the increase of heat-trapping gases in the atmosphere? **2**
35. What is the primary function of the thermosphere? **2**
36. Explain the diverse typical effects of floods on communities, encompassing panic, disease, and both physical damage to infrastructure and environmental changes. **2**
37. How does the level of moisture in the air influence the efficiency of evaporative cooling? **2**
38. Explain the fundamental concept of atmospheric greenhouse gas accumulation resulting from human activities. **2**
39. Explain how the physical characteristics of a river system, such as its drainage basin and flood plain, contribute to the occurrence and impact of floods. **2**
40. Which gas is primarily responsible for preventing rapid combustion and aiding plant growth? **2**
41. Explain how the atmosphere regulates Earth's temperature and sustains life. **2**
42. Explain how changes in atmospheric pressure are indicative of impending weather phenomena. **2**
43. How does the ozone layer within the stratosphere contribute to the protection of ecosystems? **2**
44. Discuss the origin, movement, and significance of Western Disturbances for the winter precipitation in the north Indian Plains. **2**

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| 45. Describe the potential environmental consequences of an elevated presence of greenhouse gases in the atmosphere. | 2 |
| 46. How does the shifting of the global heat belt influence the onset and characteristics of the hot weather season across different regions of India? | 2 |
| 47. Discuss the primary purpose of mapping, land-use control, and flood forecasting in non-structural flood mitigation strategies. | 2 |
| 48. Evaluate the long-term societal implications if collective efforts to reduce atmospheric greenhouse gases are insufficient. | 2 |

SECTION - C

This section consists of 17 questions of 3 marks each.

- | | |
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| 49. Explain how the seasonal northward shift of the global heat belt influences the onset of the hot weather season in India and its impact on temperature distribution across different regions. | 3 |
| 50. Discuss two distinct ways in which water vapor in the atmosphere is essential for both weather patterns and the Earth's climate regulation. | 3 |
| 51. Describe the various natural phenomena and geographical features that can lead to an area becoming submerged. | 3 |
| 52. Explain the concept of a carbon footprint and its primary measurement unit. | 3 |
| 53. Articulate the significance of relative humidity in defining atmospheric moisture content and its implications for human comfort. | 3 |
| 54. Discuss the impact of altitude on atmospheric pressure and how this change affects human physiology. | 3 |
| 55. Name the atmospheric layer where all weather phenomena occur and where the majority of atmospheric mass is concentrated. | 3 |
| 56. Explain how temperature variations influence both immediate weather patterns and long-term climate trends. | 3 |

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57. Hypothesize what significant changes would occur on Earth if the normal lapse rate in the troposphere ceased to exist. **3**
58. Explain the concept of 'probability period' in the context of flood occurrence. **3**
59. Describe the primary mechanisms through which human activities, particularly industrial and agricultural practices, enhance the greenhouse effect. **3**
60. Analyse the potential negative consequences of floods on public health and the agricultural sector, and propose how typical effects can be mitigated. **3**
61. On the outline map of India **3**
- (a) Mark and label Mawsynram (or Cherrapunji) and Jaisalmer.
 - (b) Identify which location receives the highest rainfall and which receives the lowest rainfall.
 - (c) Mark and label the Aravalli Range, whose orientation influences rainfall distribution in northwestern India.
62. On the outline map of India **3**
- (a) Mark and label the region that receives the highest annual rainfall in India.
 - (b) Draw and label the direction of the Arabian Sea Branch of the Southwest Monsoon.
 - (c) Mark and label the state in which this highest-rainfall region is located.
63. On the outline map of India **3**
- (a) Draw and label the Bay of Bengal Branch of the Southwest Monsoon.
 - (b) Mark and label the state that first receives heavy rainfall from this branch in northeastern India.
 - (c) Mark and label the Ganga-Brahmaputra Delta, an important region influenced by the Bay of Bengal Branch.

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64. On the outline map of India **3**
(a) Mark and label Chennai.
(b) Draw arrows showing the direction of the Northeast (Retreating) Monsoon Winds.
(c) Mark and label the Coromandel Coast, which receives rainfall during the retreating monsoon season.
65. On the outline map of India **3**
(a) Shade the Thar Desert region, which experiences low rainfall.
(b) Mark and label the Western Ghats.
(c) Mark and label Mumbai, a city receiving heavy rainfall from the Arabian Sea Branch.

SECTION - D

This section consists of 5 case based questions of 4 marks each.

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66. Read the given source carefully and answer the questions that follow **4**
:

Beyond the tropopause lie specialized atmospheric zones that shield the planet and facilitate modern human technology. The stratosphere, extending up to 50 km, contains the protective ozone layer, which filters out lethal solar ultraviolet (UV) radiation, protecting terrestrial and marine food chains. Characterized by minimal air turbulence and negligible moisture, the stratosphere provides an ideal environment for long-distance aviation. Directly above the stratopause is the mesosphere, reaching up to 80 km, which burns up incoming meteorites through friction with gaseous particles. Above this middle zone rests the ionosphere, or thermosphere, where solar radiation strips electrons from gas molecules to create charged ions. This thermally intense region, reaching temperatures up to 2000°C, reflects radio waves back to Earth, enabling long-distance telecommunications. Finally, the exosphere forms the highly rarefied outermost boundary. Lacking heavy gases, it contains traces of hydrogen and helium and houses orbiting satellites that manage global GPS, weather tracking, and internet networks.

- a. Which specific layer of the Earth's atmosphere contains the ozone layer that filters out harmful solar ultraviolet radiation? **(1)**
- b. What physical process causes incoming meteoroids to burn up and appear as shooting stars within the mesosphere? **(1)**
- c. Analyze the technological importance of the ionosphere and exosphere in maintaining modern global communication and navigation networks. **(2)**

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67. Read the given source carefully and answer the questions that follow **4**
:

Atmospheric pressure - the weight of the air column pressing down on the Earth's surface - varies dynamically across altitude and weather systems. It is measured in millibars (mb) using a barometer, with standard sea-level pressure averaging about 1013 mb. As altitude increases, the air column thins, causing barometric pressure to drop. This reduction in pressure can induce hypoxia and dizziness in humans due to a lower concentration of oxygen molecules. Horizontally, pressure differences drive the movement of air, creating wind as air naturally migrates from high-pressure cells to low-pressure zones. When regional temperatures rise, the air expands and lifts, creating a low-pressure system or depression. If the pressure drops below 1000 mb, the system stabilizes into an area of atmospheric vulnerability, generating cloud cover, heavy rainfall, and storms. Conversely, high-pressure systems feature sinking, dense air masses that prevent condensation, leading to clear skies and calm weather conditions.

- a. What is the average value of atmospheric pressure recorded at sea level, measured in millibars? **(1)**
- b. Which scientific instrument is utilized by meteorologists to measure changes in atmospheric barometric pressure? **(1)**
- c. Analyze how the development of a localized low-pressure depression alters regional weather patterns compared to a high-pressure system. **(2)**

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68. Read the given source carefully and answer the questions that follow **4**
:

The monsoon climate of India is defined by a distinct seasonality, transitioning through four primary seasons: summer, winter, advancing monsoon, and retreating monsoon. During the hot weather season from March to May, intense solar heating shifts the global heat belt northward, creating an extended low-pressure trough over northern India. This phase is characterized by the "loo" - strong, hot, dry winds blowing across the northern plains. By June, this low-pressure system intensifies enough to draw in moisture-laden trade winds from the Southern Hemisphere, initiating the advancing southwest monsoon. The Indian peninsula splits this air current into the Arabian Sea branch and the Bay of Bengal branch, dropping heavy precipitation influenced by regional relief features like the Western Ghats and Himalayan foothills. As solar intensity declines in October and November, the low-pressure system weakens and migrates toward the Bay of Bengal, marking the retreating monsoon stage, which frequently triggers destructive tropical cyclones along the eastern delta coasts.

- a. What are the "loo" winds, and during which specific season do they blow across northern India? **(1)**
- b. Which low-pressure system originates over the Mediterranean Sea and brings vital winter rainfall to the northern plains? **(1)**
- c. Contrast the rainfall patterns received by the windward and leeward sides of the Western Ghats during the advancing monsoon season, and explain the role that geographical relief plays in causing this difference. **(2)**

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69. Read the given source carefully and answer the questions that follow **4**
:

A carbon footprint is the total volume of greenhouse gases, primarily carbon dioxide (CO₂), released into the atmosphere as a direct or indirect result of human actions. Measured in tonnes of carbon dioxide equivalent (tCO₂e), it serves as an indicator of how much an individual, industry, or nation contributes to global warming. A direct carbon footprint comes from activities under our immediate control, such as burning fuel in a car or using liquid petroleum gas (LPG) at home. Conversely, an indirect carbon footprint accounts for the emissions generated during the entire life cycle of products we buy, including the manufacturing, packaging, and shipping of clothes, food, and electronics. Accumulating a large global carbon footprint traps excessive solar heat, leading to rapid climate change and rising sea levels. Mitigating these effects requires a shared responsibility to lower emissions through lifestyle adjustments, sustainable consumption, and energy conservation.

- a. What is the standard scientific unit used to measure a carbon footprint? **(1)**
- b. Distinguish between a direct carbon footprint and an indirect carbon footprint by providing one daily example for each. **(1)**
- c. Analyze how purchasing locally grown, seasonal food items reduces a consumer's indirect carbon footprint compared to buying imported packaged goods. **(2)**

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70. Read the given source carefully and answer the questions that follow **4**
:

The Earth's atmosphere is a carefully balanced gaseous envelope held close by gravity, structurally divided into five distinct layers based on thermal variations relative to altitude. The lowest layer is the troposphere, extending up to 18 km near the equator and compressing to 8 km near the poles. This layer contains nearly 75 percent of the total atmospheric mass and hosts all essential water vapor and primary greenhouse gases. Because temperature in the troposphere drops uniformly at a standard lapse rate of 1°C per 165 meters of ascent, it acts as the exclusive zone for life-sustaining weather phenomena, including cloud formation, precipitation, and storms. The upper boundary of this highly dynamic mixing zone is marked by the tropopause, a transitional threshold that separates it from the stratosphere. Understanding the troposphere is critical for meteorology, as its continuous gaseous mixing and thermal properties directly regulate global climate stability, support biological respiration, and sustain the fundamental ecosystems necessary for life on Earth.

- a. What is the standard thermal lapse rate observed within the troposphere as altitude increases? **(1)**
- b. Which transitional boundary marks the uppermost limit of the troposphere, separating it from the stratosphere? **(1)**
- c. Analyze why virtually all active weather phenomena and life forms are restricted to the troposphere rather than higher atmospheric layers. **(2)**

SECTION - E

This section consists of 5 long answer questions of 5 marks each.

71. Analyze how sustained changes in wind patterns, distinct from mere temporary gusts, could significantly impact agricultural practices and environmental dynamics in a specific region. **5**
72. How does the concept of relative humidity inform our perception of air moisture, and what distinguishes 'dry' from 'humid' weather in terms of this scale? **5**

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| 73. Discuss the primary health and environmental consequences that typically arise during and immediately after a significant flood event. Elaborate on the factors contributing to these impacts. | 5 |
| 74. Explain how the 'mean daily temperature' is calculated and its utility in understanding daily thermal conditions. | 5 |
| 75. Discuss the significant environmental and health consequences that arise from a consistently high carbon footprint. | 5 |

----- All the Best -----