



An Institute For **IAS** Exam...

# **NAVIGATOR**

## **PRELIMS TEST SERIES**

### **2024**

### **ENGLISH MEDIUM**

### **GS TEST – 208**

### **Question with Explanation**

ORN OFFICE CONTACT NO. 9667779058, 7303276090, 9811293743

**GEOGRAPHY AND ENVIRONMENT & ECOLOGY - 1** (TOPICS COVERED)

**Air masses, fronts, cyclones, humidity, precipitation,  
geographical phenomenon, climatic regions of the World.**

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# Prelims Navigator



(Test Code – NAVP208)

## MINI TEST: GEOGRAPHY AND ENVIRONMENT & ECOLOGY - 1

Test Booklet Series

# A

Time Allowed: 1 hr.

Maximum Marks: 100

### INSTRUCTIONS

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET *DOES NOT* HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS, ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
2. ENCODE CLEARLY THE TEST BOOKLET SERIES A, B, C OR D AS THE CASE MAY BE IN THE APPROPRIATE PLACE IN THE ANSWER SHEET.
3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. **DO NOT** write *anything else* on the Test Booklet.

### USE BLACK BALL POINT PEN ONLY

4. This test Booklet contains **50** items (questions). Each item is printed in English. Each item comprises four responses (answers). You will select the response which you want to mark on the Answer Sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **ONLY ONE** response for each item.
5. You have to mark all your responses **ONLY** on the separate Answer Sheet provided. See directions in the Answer Sheet.
6. All items carry equal marks.
7. Before you proceed to mark in the Answer Sheet the response to various items in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your Admission Certificate.
8. After you have completed filling in all your responses on the Answer Sheet and the examination has concluded, you should handover to the Invigilator *only the Answer Sheet*. You are permitted to take away with you the Test Booklet.
9. Sheets for rough work are appended in the Test Booklet at the end.
10. **Penalty for wrong answers:**  
THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY A CANDIDATE IN THE OBJECTIVE TYPE QUESTION PAPERS.
  - (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one-third** of the marks assigned to that question will be deducted as penalty.
  - (ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above to that question.
  - (iii) If a question is left blank, i.e., no answer is given by the candidate, there will be **no penalty** for that question.

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## PRELIMS NAVIGATOR

### (NAVP208) TEST

1. Which one of the following is an ideal situation for the Inversion of temperature?
  - (a) A long winter night with clear skies and still air
  - (b) A long summer day with clear skies and still air
  - (c) A short summer night with cloudy skies and moving air
  - (d) A short winter day with cloudy skies and moving air
  
2. Which one of the following is the reason why tropical cyclones are not formed near the equator?
  - (a) At equator, Coriolis force is maximum and the wind blows perpendicular to the isobars
  - (b) At equator, Coriolis force is zero and the wind blows perpendicular to the isobars
  - (c) At equator, Coriolis force is zero and the wind blows parallel to the isobars
  - (d) At equator, Coriolis force is minimum and the wind blows parallel to the isobars.
  
3. Consider the following pairs:
 

<b>Local Wind</b>	<b>Region</b>
1. Kal Baisakhi	Punjab
2. Mango showers	Coast of Kerala and Karnataka
3. Loo	Indo-Gangetic plain
4. Bardoli Chheerha	Assam

How many of the pairs given above are **incorrectly** matched?

  - (a) Only one
  - (b) Only two
  - (c) Only three
  - (d) All four
  
4. Consider the following conditions:
  1. Large sea surface with a temperature below 27° C
  2. Absence of the Coriolis force
  3. Small variations in the vertical wind speed
  4. A pre-existing strong high-pressure area or high-level-cyclonic circulation
  5. Upper divergence above the sea level system

How many of the above conditions are favourable for the formation and intensification of tropical storms?

  - (a) Only two
  - (b) Only three
  - (c) Only four
  - (d) All five
  
5. Consider the following statements:
  1. Condensation takes place when the dew point is lower than the freezing point.
  2. The dew point must be below the freezing point for dew formation.
  3. The air must be at or above freezing point for white frost formation.

How many of the above statements are correct?

  - (a) Only one
  - (b) Only two
  - (c) All three
  - (d) None
  
6. Consider the following factors:
  1. The rotation of the earth
  2. The revolution of earth
  3. The distribution of continents and oceans
  4. The latitudinal variation of atmospheric heating

Which of the above factors influences the planetary wind system?

  - (a) 1, 3 and 4 only
  - (b) 1 and 2 only
  - (c) 2 and 4 only
  - (d) 1, 2 and 4 only

**NAVP206 (EXPLANATION)**

7. With reference to the Nebular Hypothesis, consider the following statements:
1. The planets were formed out of a cloud of materials associated with a slowly rotating Sun.
  2. It provided evidence related to the origin of the universe.
  3. This hypothesis was given by Immanuel Kant and Laplace
- How many of the above statements are correct?
- (a) Only one      (b) Only two  
(c) All three      (d) None
8. Consider the following statements:
- Statement- I:**  
P-waves cause material density differences, resulting in stretching and squeezing of material.
- Statement- II:**  
P-waves create pressure on the material in the direction of wave propagation.
- Which one of the following is correct in respect of the above statements?
- (a) Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I  
(b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I  
(c) Statement-I is correct but Statement-II is incorrect  
(d) Statement-I is incorrect but Statement-II is correct
9. With reference to Frontogenesis, which of the following statements are correct?
1. It is the process of formation of the fronts after the meeting of two air masses.
  2. When the cold air mass moves towards the warm air mass a warm front is formed.
  3. When the warm air moves towards cold air, a cold front is formed.
  4. When the air mass is fully lifted above the land surfaces, an occluded front is formed.
- Select the correct answer using the code given below:
- (a) 1 and 3 only    (b) 1 and 4 only  
(c) 2 and 3 only    (d) 2 and 4 only
10. Which one of the following best describes the term 'Isostasy'?
- (a) It is the altitude beyond which a traditional aircraft cannot fly  
(b) It is an imaginary line on a map joining together places having equal temperatures.  
(c) It is an imaginary line joining together points having equal cloud cover.  
(d) It is a physical, chemical, and mechanical difference between the mantle and crust.
11. Consider the following passage:
- "These are characterized by eruptions of cooler and more viscous lavas than basalt. These volcanoes often result in explosive eruptions. Along with lava, large quantities of pyroclastic material and ashes find their way to the ground. The accumulation of this material near the vent openings results in the formation of layers."
- Which one of the following types of volcanoes is described in the above passage?
- (a) Flood basalt province volcano  
(b) Mid-ocean ridge volcanoes  
(c) Shield volcanoes  
(d) Composite volcanoes
12. With reference to Island arcs, consider the following statements:
1. They are formed near the divergent boundary of two tectonic plates.
  2. Deep-focus earthquakes and volcanoes occur frequently along the site of island arcs.
  3. The Indonesian Archipelago and the Andaman-Nicobar Islands are examples of Island arcs.
- How many of the above statements are correct?
- (a) Only one      (b) Only two  
(c) All three      (d) None

**NAVP206 (EXPLANATION)**

13. With reference to chemical weathering, consider the following statements:
1. Weathering of rock minerals occurs more quickly in the tropical region.
  2. When minerals in a rock oxidize, they become less resistant to weathering.
  3. Iron oxide formed upon oxidation forms a bluish-grey colored material.
  4. Hydration causes an increase in the volume of the rock material.
- How many of the above statements are correct?
- (a) Only one      (b) Only two  
(c) Only three    (d) All four
14. Consider the following statements regarding igneous rocks:
1. They are formed by the process of recrystallization and reorganization of materials within the rocks.
  2. The texture of these rocks depends upon the size and depth of the material.
  3. Granite and pegmatite are examples of igneous rock.
- Which of the statements given above is/are correct?
- (a) 1 only      (b) 2 only  
(c) 2 and 3 only    (d) 1, 2 and 3
15. In geomorphology, moraines, eskers, drumlins, and outwash refer to:
- (a) Erosional landforms formed by the action of waves and currents
  - (b) Depositional landforms formed by the action of waves and currents
  - (c) Erosional landforms formed by the action of glaciers
  - (d) Depositional landforms formed by the action of glaciers
16. Stalactite, stalagmite, pillar, and sinkholes are associated with which of the following landforms?
- (a) Coastal landforms
  - (b) Karst topography
  - (c) Erosional glacier landforms
  - (d) Depositional glacier landforms
17. With reference to nuclear fuel, consider the following statements:
1. Thorium can be used directly as a fuel in a nuclear reactor.
  2. Most of the uranium reserves are located in the southern part of India.
  3. The International Atomic Energy Agency can inspect the settlements of any country using nuclear fuel.
- Which of the statements given above is/are correct?
- (a) 1 and 2 only    (b) 2 only  
(c) 2 and 3 only    (d) 1 and 3 only
18. In the context of commercial coal mining in India, consider the following statements:
1. 100% Foreign Direct Investment is allowed for coal mining under automatic route.
  2. A foreign company with a subsidiary established in India is not allowed to participate in the auction for commercial mining.
  3. Coal mines were nationalized during the first five-year plan.
- How many of the above statements are correct?
- (a) Only one      (b) Only two  
(c) All three      (d) None
19. With reference to rice cultivation, consider the following statements:
1. Area under rice cultivation is one-third of the total coverage area under kharif crops.
  2. Direct-seeded rice technique saves more irrigation water as compared to the system of Rice Intensification method.
  3. Recently for the first time the Government of India has banned the export of rice.
- Which of the above given statements is/are correct?
- (a) 1 and 2 only    (b) 2 only  
(c) 3 only          (d) 1, 2 and 3



**NAVP206 (EXPLANATION)**

20. Which of the following statements are correct with regard to coal deposits in India?

1. The majority of India's coal reserves are lignite and of non-coking quality.
2. The Singrauli coal mine is spread across the states of Madhya Pradesh and Chhattisgarh.
3. The state of Goa has no known significant coal reserves according to the Ministry of coal.
4. The tertiary coal fields are also found in the Himalayan region of India.

Select the correct answer using the code given below:

- (a) 1 and 2 only
- (b) 2, 3 and 4 only
- (c) 3 and 4 only
- (d) 1, 2, 3 and 4

21. Consider the following pairs:

**Name of Country  
shifting  
Cultivation**

- |            |                              |
|------------|------------------------------|
| 1. Tamarai | Thailand                     |
| 2. Chena   | Vietnam                      |
| 3. Ray     | Sri Lanka                    |
| 4. Masole  | Democratic Republic of Congo |

How many of the above pairs are correctly matched?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

22. The crop is tropical by origin and is cultivated in all warm countries. It is believed to have originated in the South Pacific, probably New Guinea and it spread throughout most of Southeast Asia. This crop requires fertile soil, a long growing period, plenty of water throughout the year, rainfall at least

200-225 cm, and between temperature ranges of 16- 50°C and an average temperature of 26°C. It requires a short, dry season during later stages.

Which one of the following crops is depicted in the above passage?

- (a) Wheat
- (b) Maize
- (c) Bamboo
- (d) Sugarcane

23. Consider the following statements:

1. In India, State Governments have the authority to auction mining of coal.
2. Bihar and Rajasthan do not have gold mines.
3. Private sector is not allowed to carry out gold mining activities in India.
4. In recent years (2021-22), the private sector has produced more iron ore than the public sector.

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

24. For which of the following crops the Commission for Agricultural Costs & Prices (CACP) recommends Minimum support price (MSP) and Fair and Remunerative Price (FRP)?

1. Pearl millet
2. Niger seed
3. Cotton
4. Copra
5. Ragi
6. Tea

Select the correct answer using the codes given below:

- (a) 1, 2, 3 and 6 only
- (b) 3, 4, 5 and 6 only
- (c) 1, 2, 3, 4 and 5 only
- (d) 1, 2, 4, 5 and 6 only

**NAVP206 (EXPLANATION)**

25. Consider the following statements:

**Statement-I:**

The tropical rainforest soil is poor in nutrients.

**Statement-II:**

The high temperature and moisture of tropical rainforests cause dead organic matter in the soil to decompose more quickly.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I
- (b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I
- (c) Statement-I is correct but Statement-II is incorrect
- (d) Statement-I is incorrect but Statement-II is correct

26. Consider the following pairs:

<b>Dam</b>	<b>River</b>
1. Polavaram	Krishna
2. Indira Sagar	Betwa
3. Chungthang	Teesta
4. Baglihar	Jhelum

How many of the above pairs are correctly matched?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

27. With reference to the Big Bang Theory, consider the following statements:

- 1. According to this theory, the universe is expanding like an inflating bubble.
- 2. Hoyle provided evidence that the universe is expanding.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

28. Which one of the following statements best describes "Degassing"?

- (a) The process through which the gasses were outpoured from the solar corona.
- (b) The process through which the gasses were outpoured from thermal power plants
- (c) The process through which the gasses were outpoured from nuclear power plants
- (d) The process through which the gasses were outpoured from the interior of the earth

29. Which of the following are the Direct sources of information about the interior of the earth?

- 1. Surface rocks
- 2. Deep mining
- 3. Gravitational force
- 4. Volcanic eruptions
- 5. Seismic activity

Select the correct answer using the code given below:

- (a) 1, 2 and 4 only
- (b) 3, 4, and 5 only
- (c) 1, 2 and 3 only
- (d) 1, 2, 3, 4 and 5

30. Consider the following pairs:

<b>Types of volcanoes</b>	<b>Its characteristics</b>
1. Shield Volcanoes	The largest of all the volcanoes on the earth
2. Caldera Volcanoes	Most explosive volcanoes on the earth
3. Composite volcanoes	Eruptions of cooler and more viscous lavas than basalt

How many of the above pairs are correctly matched?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

**NAVP206 (EXPLANATION)**

31. Consider the following pairs:

	<b>Name of Boundary line</b>	<b>Its Between</b>	<b>lies</b>
1.	Conrad Discontinuity	It Between the mantle and the core	lies
2.	Mohorovicic Discontinuity	It between the crust and mantle	lies
3.	Gutenberg Discontinuity	It between the hydrosphere and the crust	lies

How many of the above pairs are correctly matched?

- (a) Only one (b) Only two  
(c) All three (d) None

32. Consider the following pairs:

	<b>Name of cyclone</b>	<b>Area of Origin</b>	<b>of</b>
1.	Hurricanes	Western Pacific	
2.	Typhoons	Atlantic ocean	
3.	Willy-willies	South China Sea	
4.	Cyclones	Indian Ocean	

How many of the above pairs are correctly matched?

- (a) Only one (b) Only two  
(c) Only three (d) All four

33. With reference to geological features related to oceanic crust and continental rocks, consider the following statements:

- The volcanic eruptions are common along the mid-oceanic ridges, leading to large amounts of lava.
- The age of rocks in the oceanic crust is less than the age of rocks on the continental crust.

3. The age of rocks decreases as one moves away from the mid oceanic ridge.

Which of the statements given above are correct?

- (a) 1 and 2 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3

34. Consider the following pairs:

	<b>Plate Boundary</b>	<b>Examples</b>
1.	Ocean-Continent Convergence	The San Andreas Fault
2.	Divergent Boundary	The Nazca Plate and the South American Plate
3.	Transform Boundary	The Mid-Atlantic Ridge
4.	Continent-Continent Convergence	The Indian Plate and the Eurasian Plate

How many of the above pairs are correctly matched?

- (a) Only one (b) Only two  
(c) Only three (d) All four

35. Arrange the following elements in the descending order, according to their availability in the earth's crust:

- Iron
- Silicon
- Aluminium
- Oxygen

Select the correct answer using the code given below:

- (a) 1-2-3-4 (b) 4-3-1-2  
(c) 4-2-3-1 (d) 2-4-1-3

36. With reference to the Rock cycle, consider the following statements:

- Lithification is a process by which sediments get converted into sedimentary rocks.
- Solidification is the process by which molten magma gets converted into igneous rock.



**NAVP206 (EXPLANATION)**

- Which of the statements given above is/are correct?  
(a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2
37. Which of the following processes do not come under the term denudation?
1. Volcanic eruption
  2. Orogenic process
  3. Weathering process
  4. Diastrophism
  5. Transportation
  6. Mass Movement
- Select the correct answer using the code given below:  
(a) 1, 2 and 4 only  
(b) 1, 3 and 6 only  
(c) 3, 4 and 5 only  
(d) 3, 5 and 6 only
38. With reference to Mass Movement, consider the following statements:
1. The weathering is a prerequisite condition for mass movements.
  2. The Primary force responsible for mass movement is gravity.
  3. Geomorphic agents like running water, glaciers, wind, waves, and currents participate in the process of mass movements.
- Which of the statements given above are **incorrect**?
- (a) 1 and 2 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3
39. Which one of the following statements best describes the term Exfoliation?
- (a) An arrangement of minerals or grains in Metamorphic rocks  
(b) It is the process in which sediments compact under pressure, expel connate fluids, and gradually become solid rock  
(c) Flaking off of curved sheets of shells from over rocks or bedrock
- resulting in smooth and rounded surfaces
- (d) All processes that move, elevate, or build up portions of the earth's crust
40. Which one of the following statements best describes the Slump?
- (a) Sliding of earth debris without backward rotation of mass.  
(b) A free fall of earth debris from an overhanging face.  
(c) A free falling of rock blocks over any steep slope keeping itself away from the slope.  
(d) Slipping of one or several units of rock debris with a backward rotation of mass.
41. Which of the following activities contribute to rapid flow of mass movements?
1. The increase in gradient and height of slope.
  2. The removal of material or load from over the original slope surfaces.
  3. Indiscriminate removal of natural vegetation.
  4. The overloading due to heavy rainfall and saturation of slope materials
- Select the correct answer using the code given below:  
(a) 1 and 3 only  
(b) 2, 3 and 4 only  
(c) 1, 2 and 4 only  
(d) 1, 2, 3 and 4
42. Which of the following are the factors behind soil formation?
1. Parent material
  2. Topography
  3. Weathering
  4. Biological activity

**NAVP206 (EXPLANATION)**

5. Time  
6. Erosion  
7. Climate  
Select the correct answer using the code given below:  
(a) 1, 2, 3, 4 and 5 only  
(b) 3, 5, 6 and 7 only  
(c) 1, 2, 4, 6 and 7 only  
(d) 1, 2, 3, 4, 5, 6 and 7
43. Consider the following statements:  
1. The temperature increases as one moves from the surface of the earth to a higher altitude in the troposphere.  
2. The lowest temperature in the atmosphere is recorded in the Mesosphere.  
3. The highest temperature in the atmosphere is recorded in Stratosphere  
Which of the statements given above are **incorrect**?  
(a) 1 and 2 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3
44. Which of the following factors are responsible for variations in the insolation of the atmosphere?  
1. The rotation of the earth on its axis  
2. The angle of inclination of the sun's rays  
3. The length of the day  
4. The transparency of the atmosphere  
5. Topography of land  
Select the correct answer using the code given below:  
(a) 1 and 2 only  
(b) 1, 3 and 5 only  
(c) 3, 4 and 5 only  
(d) 1, 2, 3, 4 and 5
45. Which one of the following statements best describes Absolute Humidity ?  
(a) The actual amount of the water vapour present in the atmosphere  
(b) The percentage of moisture present in the atmosphere as compared to its full capacity at a given temperature  
(c) Weight of water vapor contained in a unit weight of air  
(d) The air containing moisture to its full capacity at a given temperature
46. The sun is directly overhead at noon on 21 March at:  
(a) The tropic of capricorn  
(b) The tropic of cancer  
(c) The equator  
(d) The arctic circle
47. With reference to Coriolis force, consider the following statements:  
1. The Coriolis force is generated due to the revolution of Earth around the sun.  
2. It deflects the wind toward the right direction in the northern hemisphere and the left direction in the southern hemisphere.  
3. The Coriolis force is directly proportional to the angle of latitude.  
Which of the statements given above are correct?  
(a) 1 and 2 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3
48. With reference to tropical and extratropical cyclones, consider the following statements:  
1. The tropical and extratropical Cyclones rotate clockwise and anti-clockwise direction respectively in the southern hemisphere.  
2. The tropical cyclones move from east to west whereas The extra tropical cyclones move from west to east.  
3. The tropical cyclones originate in equatorial regions whereas extratropical cyclones originate in temperate regions.  
Which of the statements given above are correct?  
(a) 1 and 2 only (b) 2 and 3 only  
(c) 1 and 3 only (d) 1, 2 and 3

**NAVP206 (EXPLANATION)**

49. Which one of the following statements about Geostrophic winds is correct?
- (a) Geostrophic winds blow perpendicular to the isobars line
  - (b) Geostrophic winds blow parallel to the isobar line when the friction is maximum
  - (c) Geostrophic winds blow parallel to isobars when friction force is negligible
  - (d) Geostrophic winds blow perpendicular to isobars when friction force is negligible

50. With reference to atmospheric wind circulation which of the following is/are correct?
- 1. In cyclonic circulation, wind diverges at the surface of the earth around low pressure.
  - 2. In anticyclonic circulation, wind converges at the surface of the earth around high pressure.
- Select the correct answer using the code given below:
- (a) 1 only (b) 2 only
  - (c) Both 1 and 2 (d) Neither 1 nor 2

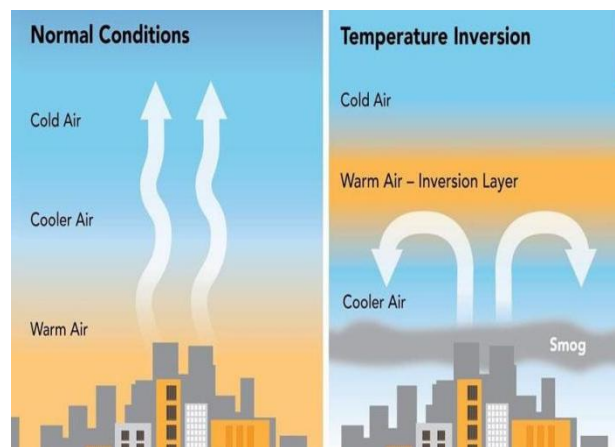
## PRELIMS NAVIGATOR (NAVP208) SOLUTION

### 1. Answer: A

#### Explanation:

Temperature decreases with an increase in elevation. It is called the **normal lapse rate**. At times, the situation is reversed and the normal lapse rate is inverted. It is called the **Inversion of temperature**.

**A long winter night with clear skies and still air is an ideal situation for inversion.** The heat of the day is radiated off during the night, and by early morning hours, the earth is cooler than the air above.



**Source:** Fundamental of physical geography, Chapter 8, page 73

### 2. Answer: B

#### Explanation:

At the equator, the Coriolis force is zero and the wind blows perpendicular to the isobars. The low pressure **gets filled instead of getting intensified**. That is the reason why tropical cyclones are not formed near the equator.

A tropical cyclone, also called a typhoon or hurricane, is an intense circular storm that originates over warm tropical oceans and is characterized by low atmospheric pressure, high winds, and heavy rain.

**Source:** Fundamental of physical geography, Chapter 9, page no. 79

### 3. Answer: A

#### Explanation:

Place	Local Wind
West Bengal	Kal Baisakhi
Assam	Bardoli Chheerha
Coast of Kerala and Karnataka	Mango showers
Karnataka	Cherry blossom Coffee blossom
Indo-Gangetic plain	Loo

**Source:** Fundamental of physical geography, Chapter 9, page 80

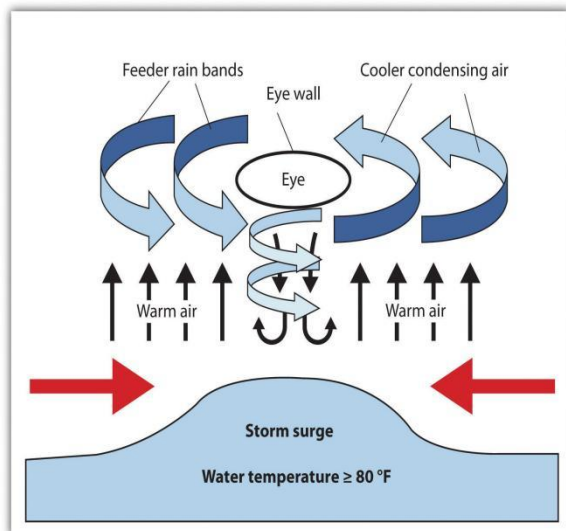
### 4. Answer: A

#### Explanation:

Favourable conditions for the formation and intensification of tropical storms are:

1. Large sea surface with a temperature higher than 27° C
2. **Small variations in the vertical wind speed**
3. A pre-existing weak low-pressure area or low-level-cyclonic circulation is required.
4. Presence of the Coriolis force
5. **Upper divergence above the sea level system**

NAVP206 (EXPLANATION)



**Source:** Fundamental of physical geography, Chapter 9, page no.83

5. Answer: A

**Explanation:**

**Statement 1 is correct:**

- **Condensation** is the process where water vapor becomes liquid. It is the reverse action of evaporation, where liquid water becomes a vapor.
- **Condensation takes place when the dew point is lower than the freezing point as well as higher than the freezing point.**
- Condensation happens one of two ways: Either the air is cooled to its dew point or it becomes so saturated with water vapor that it cannot hold any more water.

**Statement 2 is incorrect:**

- **In the case of dew formation, the dew point is above the freezing point.**
- Dew, a deposit of waterdrops formed at night by the condensation of water vapor from the air onto the surfaces of objects freely exposed to the sky. It forms on clear nights when the air is calm or, preferably, when the wind is light.

**Statement 3 is incorrect:**

- **For frost formation, the air temperature is at or below the freezing point.**

- **The ideal conditions for the formation of white frost are the same as those for the formation of dew, except that the air temperature must be at or below the freezing point.**

- Frost is water vapor, or water in gas form, that becomes solid. Frost usually forms on objects like cars, windows, and plants that are outside in air that is saturated, or filled, with moisture. Areas that have a lot of fog often have heavy frosts.

**Source:** Fundamental of physical geography, Chapter 10, page no.87

<https://education.nationalgeographic.org/resource/condensation/>

<https://www.britannica.com/science/dew>

<https://education.nationalgeographic.org/resource/frost/>

**Source:** Fundamental of physical geography, Chapter 10, page no.87

6. Answer: A

**Explanation:**

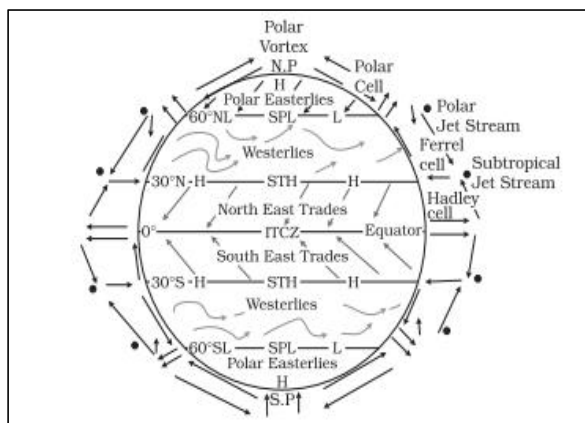
- **The pattern of the movement of the planetary winds is called the general circulation of the atmosphere.**
- The general circulation of the atmosphere also sets in motion the ocean water circulation which influences the earth's climate.

**The pattern of planetary winds largely depends on:**

- ❖ Latitudinal variation of atmospheric heating
- ❖ The emergence of pressure belts
- ❖ The migration of belts following the apparent path of the sun.
- ❖ The distribution of continents and oceans
- ❖ The rotation of the earth



NAVP206 (EXPLANATION)



7. Answer: B

Explanation:

Statement 1 is correct:

- Our solar system formed at the same time as our Sun as described in the nebular hypothesis. The nebular hypothesis is the idea that a spinning cloud of dust made of mostly light elements, called a nebula, flattened into a protoplanetary disk, and became a solar system consisting of a star with orbiting planets.
- The spinning nebula collected the vast majority of material in its center, which is why the sun Accounts for over 99% of the mass in our solar system. **The nebular hypothesis considered that the planets were formed out of a cloud of material associated with a youthful sun, which was slowly rotating.**

Statement 2 is incorrect:

- **The most popular argument regarding the origin of the universe is the Big Bang Theory.** It is also called the expanding universe hypothesis. Edwin Hubble, in 1920, provided evidence that the universe is expanding. **However, the nebular hypothesis talks about the solar system.**

Statement 3 is correct:

- A large number of hypotheses were put forth by different philosophers and scientists regarding the origin of the earth. **One of the earlier and**

**popular arguments was by German philosopher Immanuel Kant. Mathematician Laplace revised it in 1796. It is known as Nebular Hypothesis.**

**Source:** Class 11 NCERT Fundamental of Physical Geography Page- 13

[https://geo.libretexts.org/Bookshelves/Geology/Book%3A\\_An\\_Introduction\\_to\\_Geology\\_\(Johnson\\_Affolter\\_Inkenbrandt\\_and\\_Moshier\)/08%3A\\_Earth\\_History/8.02%3A\\_Origin\\_of\\_the\\_Solar\\_SystemThe\\_Nebular\\_Hypothesis](https://geo.libretexts.org/Bookshelves/Geology/Book%3A_An_Introduction_to_Geology_(Johnson_Affolter_Inkenbrandt_and_Moshier)/08%3A_Earth_History/8.02%3A_Origin_of_the_Solar_SystemThe_Nebular_Hypothesis)

8. Answer: A

Explanation:

- Different types of earthquake waves travel in different manners. As they move or propagate, the P waves are the fastest and are recorded first by the seismograph followed by S and Surface waves. vibration in the body of the rocks through which they pass.
- **P-waves vibrate parallel to the direction of the wave. This exerts pressure on the material in the direction of the propagation. As a result, it creates density differences in the material leading to stretching and squeezing of the material.**
- Other three waves vibrate perpendicular to the direction of propagation.
- The direction of vibrations of S-waves is perpendicular to the wave direction in the vertical plane. Hence, they create troughs and crests in the material through which they pass.

**Hence, both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I.**

**Source:** Class 11<sup>th</sup> NCERT Fundamentals of Physical Geography page- 20

**NAVP206 (EXPLANATION)**

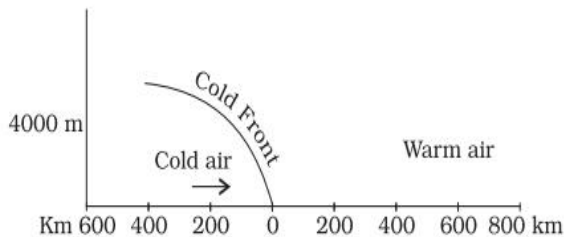
**9. Answer: B**

**Explanation:**

- **Fronts:** When two different air masses meet, the boundary zone between them is called a front.
- **The process of formation of the fronts is known as frontogenesis.**

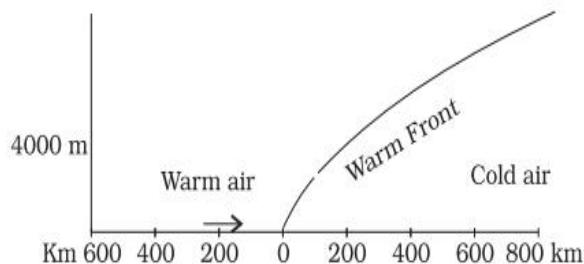
**There are four types of fronts:**

- ❖ **Cold Front:** When the cold air moves towards the warm air mass, its contact zone is called the cold front.



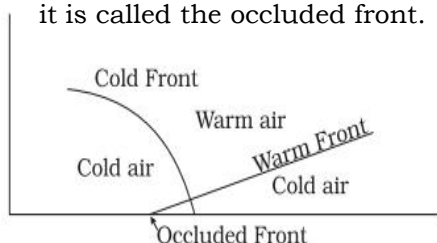
**Fig: Cold Front**

- ❖ **Warm Front:** The warm air mass moves towards the cold air mass, the contact zone is called a warm front.



**Fig: Warm Front**

- ❖ **Stationary Front:** When the front remains stationary, it is called a stationary front.
- ❖ **Occluded Front:** When an air mass is fully lifted above the land surface, it is called the occluded front.



**Fig: Occluded Front**

- The fronts occur in middle latitudes and are characterized by steep gradients in temperature and pressure.
- They bring abrupt changes in temperature and cause the air to rise to form clouds and cause precipitation.

**Source:**

1. **XIth NCERT Fundamentals of Physical Geography /Unit 6 / Chapter 9 / page,82.**

**10. Answer: D**

**Explanation:**

- **Isostasy** describes the physical, chemical, and mechanical differences between the mantle and crust that allow the crust to “float” on the more malleable mantle. Not all regions of Earth are balanced in isostatic equilibrium. Isostatic equilibrium depends on the density and thickness of the crust, and the dynamic forces at work in the mantle.
- **ISONEPH** is a line on a map connecting points that have the same average percentage of cloudiness.
- **An isotherm**, is a line drawn on a map or chart joining points with the same temperature.
- **Kármán Line:** It marks, roughly, the altitude beyond which a traditional aircraft can't fly. Any aircraft flying beyond it needs a propulsion system to pull away from the earth's tug. It also acts as a legal reference that separates airspace that a country can claim to own from space itself, which is governed like international waters.

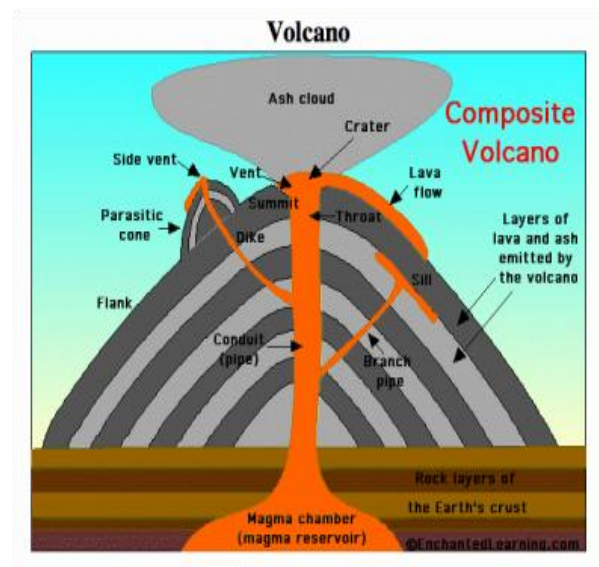
**Source:**

<https://education.nationalgeographic.org/resource/crust/>

**NAVP206 (EXPLANATION)**

**11. Answer: D**

**Explanation:**



**Composite (Strato volcano):**

These volcanoes are characterised by eruptions of cooler and more viscous lavas than basalt. These volcanoes often result in explosive eruptions. Along with lava, large quantities of pyroclastic material and ashes find their way to the ground. This material accumulates in the vicinity of the vent openings leading to formation of layers, and this makes the mounts appear as composite volcanoes.

These have steep slopes near their summits, but the slope reduces towards the base. Volcanic mudflows called lahars are common on composite volcanoes. Example/s: Fuji (Japan), Colima (Mexico), Narcondom and Barren Island in the Andaman Islands (India), Mayon volcano in the Philippines.

**Source:** Class 11<sup>th</sup> NCERT Fundamentals of Physical Geography page- 24;

<https://egyankosh.ac.in/bitstream/123456789/70609/1/Unit-2.pdf>

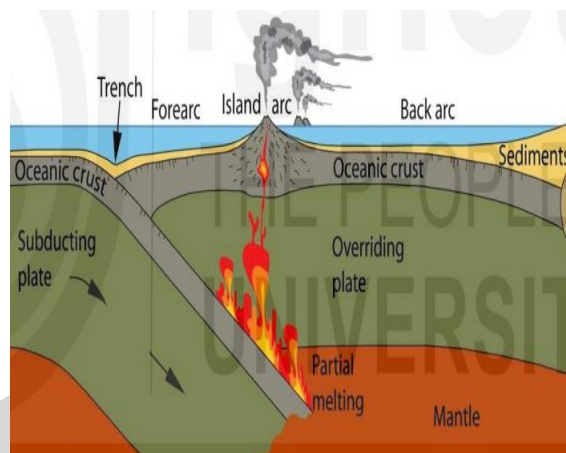
<https://www.thehindu.com/sci-tech/science/karman-line-where-space-begins/article67368859.ece>

**12. Answer: B**

**Explanation:**

**Statement 1 is incorrect: Island Arcs are long belts of active volcanoes with strong and frequent seismic activities found along convergent plate boundaries.**

Most island arcs originate on oceanic crust and have resulted from the descent of the lithosphere into the mantle along the subduction zone.



**Statement 2 is correct: Volcano and Earthquakes frequently occur along the subduction boundary with the seismic hypocenters located at increasing depth under the island arc.**

**Statement 3 is correct:** Solomon, Tonga-Kermadec and Andaman-Nicobar are common examples of island arcs. **In the Indian Ocean, a tangle of arcs commonly described as the Indonesian Archipelago.** In the Atlantic Ocean, these include Caribbean and South Sandwich island arcs.

Source:

<https://egyankosh.ac.in/bitstream/123456789/83716/1/Unit-15.pdf>

**13. Answer: C**

**Explanation:**

**Chemical weathering** is the weakening and subsequent disintegration of rock by chemical reactions. These reactions include solution, carbonation, hydration, oxidation, and reduction. These processes either form or destroy minerals, thus altering the nature of the rock's mineral composition. Water and air (oxygen and carbon dioxide) along with heat must be present to speed up all chemical reactions



**NAVP206 (EXPLANATION)**

**Statement 1 is correct:** Chemical weathering of rock minerals generally occurs more quickly in hot, humid climatic regions.

**Statement 2 is correct:** Oxidation is the reaction of rock minerals with oxygen, thus changing the mineral composition of the rock. **When minerals in rock oxidize, they become less resistant to weathering.**

**Statement 3 is incorrect:** Red color of iron upon oxidation turns to brown or yellow. **It is upon reduction the red color of iron turns to greenish or bluish grey.**

**Statement 4 is correct:** Hydration is the chemical addition of water. Minerals take up water and expand; **this expansion causes an increase in the volume of the material itself or rock.** This process is reversible and long, continued repetition of this process causes fatigue in the rocks and may lead to their disintegration. A good example of hydration is the absorption of water by Calcium sulphate resulting in the formation of gypsum.

**Source:**

<https://ncert.nic.in/ncerts/l/kegy206.pdf>

[https://passel2.unl.edu/view/lesson/ed\\_d25385ca3d/3](https://passel2.unl.edu/view/lesson/ed_d25385ca3d/3)

**14. Answer: C**

**Explanation:**

**Statement 1 is incorrect:**

- As **igneous rocks form out of magma and lava from the interior of the earth**, they are known as primary rocks. The igneous rocks are formed when magma cools and solidifies.
- When magma in its upward movement cools and turns into solid form it is called igneous rock. The process of cooling and solidification can happen in the earth's crust or on the surface of the earth.
- **It is Metamorphism where already consolidated rocks undergo recrystallization and reorganization of materials within original rocks.**

**Statement 2 is correct:** Igneous rocks are classified based on texture. **The texture depends upon the size and arrangement**

**of grains or other physical conditions of the materials.** If molten material is cooled slowly at great depths, mineral grains may be very large.

**Statement 3 is correct: Granite, gabbro, pegmatite, basalt, volcanic breccia, and tuff** are some of the examples of igneous rocks. Some other examples of igneous rock include diorite, andesite, obsidian, pumice, peridotite, rhyolite, welded tuff, fire opal, scoria, etc.

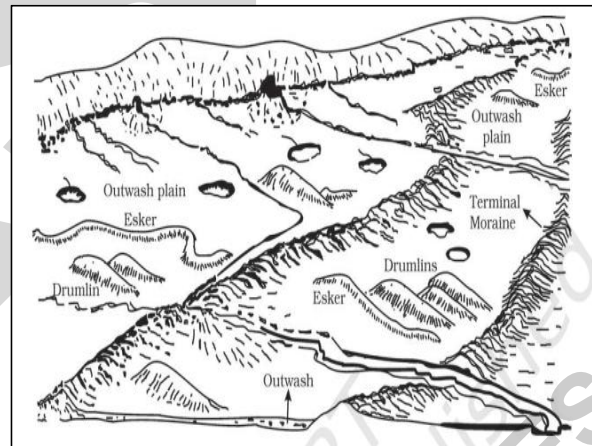
**Source:** Fundamental of Physical Geography page- 42;

<https://earthclipse.com/science/geology/formation-types-and-examples-of-igneous-rocks.html>

**15. Answer: D**

**Explanation:**

Deposition by a glacier takes place when the ice begins to melt and the glacier slows down and vanishes, losing its transporting power. Glaciers deposit material if they are overloaded with debris or glacial ice starts melting. The unsorted coarse and fine debris dropped by the melting glaciers is called glacial till.



**Figure: Glacial landscape with various depositional landforms**

**Various depositional landforms by glaciers are as follows:**

- **Moraines:** They are long ridges of deposits of glacial till. There are **five types of morainic deposits** which have been differentiated on the **basis of their location** in the valley.
  1. Ground moraine

**NAVP206 (EXPLANATION)**

2. Lateral moraine
3. Medial moraine
4. Terminal moraine
5. Recessional moraines

- **Drumlins:** They have also been described as a '**Basket of eggs**'. One end of the drumlins facing the glacier called the stoss end is blunter and steeper than the other end called the tail. Drumlins give an indication of the direction of glacier movement.
- **Eskers:** Eskers are fluvioglacial deposits that are produced by the melting of ice and deposited in the subglacial tunnel. This melted water accumulates beneath the glacier and flows like streams in a channel beneath the ice. Very coarse materials like boulders and blocks along with some minor fractions of rock debris carried into this stream settle in the valley of ice beneath the glacier and after the ice melts can be found as a sinuous ridge called *esker*.
- **Outwash plain:** Drift that has been transported by meltwater streams is called outwash, and it often forms broad sedimentary plains downstream of melting glaciers, known as outwash plains.
- Other landform includes **glacial streams, Kames or kame terraces, Crevasse filling, glacial varves, Kettle Lake Etc.**

**Source:** Fundamental of Physical Geography page- 56;

<https://egvankosh.ac.in/bitstream/123456789/53277/3/Block-2.pdf>

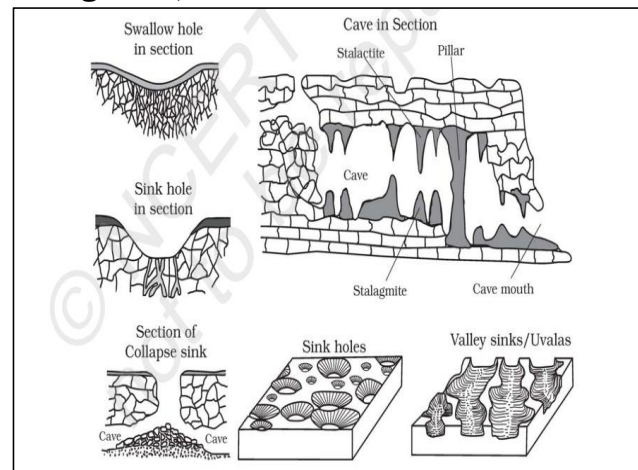
**16. Answer: B**

**Explanation:** Any limestone or dolomitic region showing typical landforms produced by the action of groundwater through the processes of solution and deposition is called Karst topography after the typical topography developed in limestone rocks of Karst region in the Balkans adjacent to the Adriatic Sea.

The karst topography is also characterized by erosional and depositional landforms.

**EROSIONAL LANDFORMS:** Pools, **Sinkholes**, Lapies, Limestone Pavements and Caves.

**Depositional Landforms:** **Stalactites, Stalagmites, and Pillars.**



**Figure: Various karst features**

**Source:** Fundamental of Physical Geography page- 64, 65

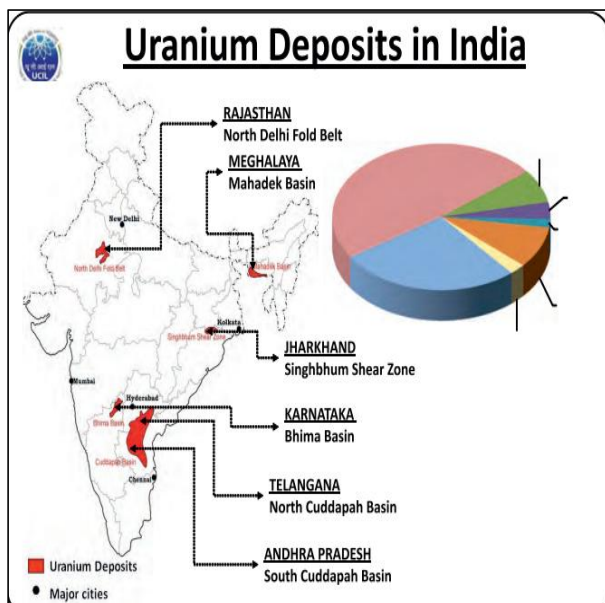
**17. Answer: B**

**Explanation:**

**Statement 1 is incorrect: Thorium (Th-232) is not itself fissile and so is not directly usable in a thermal neutron reactor.** However, it is 'fertile' and upon absorption of a neutron it will transmute to uranium-233 (U-233), which is an excellent fissile fuel material.

**Statement 2 is correct: The major uranium deposits of the country occur in geological basins of the Singhbhum shear zone (Jharkhand), Cuddapah basin (Andhra Pradesh and Telangana), Mahadek basin (Meghalaya), Rajasthan and Bhima basin (Karnataka). Of the total uranium resources identified in India, Jharkhand accounts for about 26%, Andhra Pradesh 49%, Meghalaya 9%. However, most of these uranium deposits are small and of far lower grade compared to those in the leading uranium producing countries in the world.**





**Statement 3 is incorrect:** The IAEA (International Atomic Energy Agency) was created in 1957 in response to the deep fears and expectations generated by the discoveries and diverse uses of nuclear technology. **IAEA can verify that a State is living up to its international commitment not to use nuclear programs for nuclear weapons purposes. The global Nuclear Non-Proliferation Treaty (NPT) and other treaties against the spread of nuclear weapons entrust the IAEA as the nuclear inspectorate.**

**Source:**

<https://world-nuclear.org/information-library/current-and-future-generation/thorium.aspx>

<https://www.barc.gov.in/ebooks/9789356590526/paper04.pdf>

<https://www.iaea.org/publications/factsheets/iaea-safeguards-overview>

**18. Answer: A**

**Explanation:**

**Statement 1 is correct:**

- Government has reviewed the Foreign Direct Investment (FDI) policy in the coal mining on 18.09.2019 allowing 100% FDI under automatic route for sale of coal, coal mining activities including associated processing

infrastructure subject to the provisions of the Coal Mines (Special Provisions) Act, 2015 and Mines and Mineral (Development & Regulation) Act, 1957 as amended from time to time and other relevant Acts on the subject.

- Further, the Central Government further amended the FDI Policy to prescribe a requirement to seek prior Government approval if such foreign direct investment is by an entity from a country which shares land borders with India or where the beneficial owner of such foreign direct investment into India is situated in or is a citizen of any such country.

**Statement 2 is incorrect:**

**No foreign company is eligible to participate in auction for commercial mining as per extant policy. However, companies incorporated in India are eligible to participate.**

**Statement 3 is incorrect:**

- India has a long history of commercial coal mining covering nearly 220 years starting from 1774 by East India Company in the Raniganj Coalfield along the Western bank of river Damodar. Unscientific mining practices adopted by some of them and poor working conditions of labor in some of the private coal mines became matters of concern for the Government. On account of these reasons, the Central Government took a decision to nationalize the private coal mines.

**The nationalization was done in two phases, the first with the coking coal mines in 1971-72 and then with the non-coking coal mines in 1973. The government nationalized all the mines on 1.5.1973 with the enactment of the Coal Mines (Nationalization) Act, 1973 which now is the piece of Central legislation determining the eligibility of coal mining in India. At the time of nationalization, the Fourth Five-Year Plan (1969-74) was going on.**

**NAVP206 (EXPLANATION)**

**Source:**

<https://pib.gov.in/PressReleasePage.aspx?PRID=1882739#:~:text=No%20foreign%20company%20is%20eligible,India%20are%20eligible%20to%20participate.>

<https://coal.gov.in/en/about-us/history-background>

**19. Answer: A**

**Explanation:**

- Rice is a staple food for the overwhelming majority of the population in India. Though it is considered to be a crop of tropical humid areas, it has about 3,000 varieties which are grown in different agro-climatic regions.
- These are successfully grown from sea level to about 2,000 m altitude and from humid areas in eastern India to dry but irrigated areas of Punjab, Haryana, western U.P., and northern Rajasthan.
- In southern states and West Bengal, the climatic conditions allow the cultivation of two or three crops of rice in an agricultural year. But in the Himalayas and northwestern parts of the country, it is grown as a kharif crop during southwest Monsoon season.
- India contributes 22.07 percent of rice production in the world and ranked second after China in 2018. About one-fourth of the total cropped area in the country is under rice cultivation.

**Statement 1 is correct:** According to the data released by the Department of Agriculture and Farmers' Welfare on August 18, 2023, **the total rice sowing area stood at 360.79 lakh hectares out of the total Kharif crop sowing area of 1022.51 lakh hectares.**

**Statement 2 is correct:** Direct seeding is a crop establishment system wherein rice seeds are sown directly into the field, as opposed to the traditional method of growing seedlings in a nursery, and then transplanting into flooded fields. Compared to the conventional, DSR delivers faster planting and maturing,

conserves scarce resources like water and labor, is more conducive to mechanization, and reduces emissions of greenhouse gases that contribute to climate change. Mechanized DSR also creates avenues for employment through new service provisions and is less labor intensive and free from drudgery, hence more attractive to youth and women farmers.

**Statement 3 is incorrect:**

India is the world's second-largest producer of Rice, Wheat, and other cereals. **In 2008, India imposed a ban on the export of rice wheat, etc. to meet domestic needs.**

**To check the domestic prices and to ensure domestic food security, the Government has been taking measures to restrict the export of rice from India. The export of non-basmati white rice was prohibited on 20<sup>th</sup> July 2023.**

**Source:** India: People and Economy page-26;

<https://pib.gov.in/PressReleasePage.aspx?PRID=1950123>

<https://dsrc.irri.org/our-work/what-is-dsr>

[https://apeda.gov.in/apedawebsite/six\\_head\\_product/cereal.htm](https://apeda.gov.in/apedawebsite/six_head_product/cereal.htm)

<https://pib.gov.in/PressReleaseDetail.aspx?PRID=1952629#:~:text=The%20export%20of%20non%2Dbasmati,high%20during%20the%20current%20year.>

**20. Answer: C**

**Explanation:** Coal is one of the important minerals which is mainly used in the generation of thermal power and smelting of iron ore. Coal occurs in rock sequences mainly of two geological ages, namely Gondwana and tertiary deposits.

**Statement 1 is incorrect:**

- **About 80 percent of the coal deposits in India is of bituminous type and are of non-coking grade.** The most important Gondwana coal fields in India are located in Damodar Valley.
- They lie in the Jharkhand-Bengal coal belt and the important coal fields in this region are Raniganj, Jharia, Bokaro, Giridih, and Karanpura.

**NAVP206 (EXPLANATION)**
**Statement 2 is incorrect:**

- **Jharia is the largest coal field followed by Raniganj.** The other river valleys associated with coal are Godavari, Mahanadi, and Son. **The most important coal mining centers are Singrauli in Madhya Pradesh (part of the Singrauli coal field lies in Uttar Pradesh).**
- Other important mines are Korba in Chhattisgarh, Talcher and Rampur in Odisha, Chanda-Wardha, Kamptee and Bander in Maharashtra, Singareni in Telangana, and Pandur in Andhra Pradesh.

**Statement 3 is correct: As per the coal ministry website, there are no known coal reserves in the state of Goa.**

State	Measured (331)	Indicated (332)	Inferred (333)	Total Resource
Odisha	48572.58	34080.42	5451.60	88104.60
Jharkhand	53245.02	28259.67	5155.41	86660.10
Chhattisgarh	32053.42	40701.35	1436.99	74191.76
West Bengal	17233.88	12858.84	3778.53	33871.25
Madhya Pradesh	14051.66	12722.97	4142.10	30916.73
Telangana	11256.78	8344.35	3433.07	23034.20
Maharashtra	7983.64	3390.48	1846.59	13220.71
Bihar	309.53	4079.69	47.96	4437.18
Andhra Pradesh	920.96	2442.74	778.17	4141.87
Uttar Pradesh	884.04	177.76	0.00	1061.80
Meghalaya	89.04	16.51	470.93	576.48
Assam	464.78	57.21	3.02	525.01
Nagaland	8.76	21.83	447.72	478.31
Sikkim	0.00	58.25	42.98	101.23
Arunachal Pradesh	31.23	40.11	18.89	90.23
Total	187105.32	147252.18	27053.96	361411.46

<https://coal.gov.in/en/major-statistics/coal-reserves>

**Statement 4 is correct:** Tertiary coals occur in Assam, Arunachal Pradesh, Meghalaya, and Nagaland. It is extracted from Darangiri, Cherrapunji, Mewlong and Langrin (Meghalaya); Makum, Jaipur, and Nazira in upper Assam, Namchik – Namphuk (Arunachal Pradesh) and Kalakot (Jammu and Kashmir).

**Source:** XII NCERT: Fundamentals of Human Geography page-51

**21. Answer: B**
**Explanation:**

**Primitive subsistence agriculture or shifting cultivation**

- It is widely practiced by many tribes in the tropics, especially in Africa, south and Central America and South East Asia. The vegetation is usually cleared by fire, and the ashes add to the fertility of the soil. Shifting cultivation is thus, also called slash and burn agriculture.
- The cultivated patches are very small and cultivation is done with very primitive tools such as sticks and hoes. After sometime (3 to 5 years) the soil loses its fertility and the farmer shifts to other parts and clears other patch of the forest for cultivation.
- It is prevalent in tropical regions in different names, e.g. Jhumming in North eastern states of India, Milpa in Central America and Mexico and Ladang in Indonesia and Malaysia.

The countries where this system is prevalent and names used for the systems are:

**Tamrai in Thailand (Pair 1 is correctly matched)**

**Chena in Sri Lanka (Pair 2 is incorrectly matched)**

**Ray in Vietnam (Pair 3 is incorrectly matched)**

**Masole in Democratic Republic of Congo (Pair 4 is correctly matched)**

Milpa in Central America,

Coamile in Mexico,

Conuco in Venezuela,

Roca in Brazil,

Ladang in Indonesia.

**In India, this primitive form of cultivation (shifting cultivation) is called:**

- Bewar or Dahiya - Madhya Pradesh,
- Podu or Penda - Andhra Pradesh,
- Pama Dabi or Koman or Bringa - Odisha,

**NAVP206 (EXPLANATION)**

- Kumari - Western Ghats,
- Valre or Waltre - South-eastern Rajasthan,
- Khil - the Himalayan belt,
- Kuruwa - Jharkhand, and
- Jhumming - the North-eastern region.

**Source:** Fundamentals of Human Geography page- 36;

<https://ncert.nic.in/textbook/pdf/jess104.pdf>

[http://mzuir.inflibnet.ac.in/bitstream/123456789/172/1/C.%20Lalengzama%20\(MSW\).pdf](http://mzuir.inflibnet.ac.in/bitstream/123456789/172/1/C.%20Lalengzama%20(MSW).pdf)

**22. Answer: D**

**Explanation:**

- Sugarcane is a crop in tropical areas. Under rainfed conditions, it is cultivated in sub-humid and humid climates. But it is largely an irrigated crop in India. In the Indo-Gangetic plain, its cultivation is largely concentrated in Uttar Pradesh.
- In southern India, it is cultivated in irrigated tracts of Karnataka, Tamil Nadu, Telangana, and Andhra Pradesh. Uttar Pradesh produces about two-fifths of the sugarcane of the country.
- Maharashtra, Karnataka, Tamil Nadu, and Andhra Pradesh are other leading producers of this crop where the yield level of sugarcane is high. Its yield is low in northern India.
- It accounts for about 19.7 percent of the world's production of sugarcane. But it occupies only 2.4 percent of the total cropped area in the country.
- This crop requires fertile soil, a long growing period, plenty of water throughout the year, rainfall of at least 200-225 cm, and between a temperature range of 16- 50°C and an average temperature of 26°C. It requires a short, dry season during later stages when sugar is being stored in the Stem.

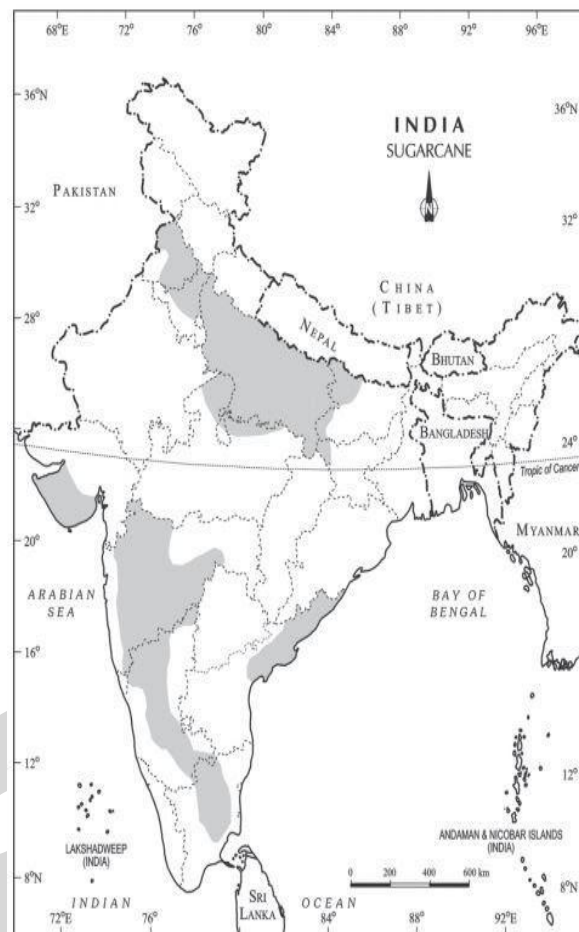


Fig. 5.9 : India - Distribution of Sugarcane

Source: India: People and Economy page-32, 33

<https://egyankosh.ac.in/bitstream/123456789/16752/1/Unit-16.pdf>

**23. Answer: A**

**Explanation:**

**Statement 1 is incorrect:**

- **Under MMDR Act and Coal Mines ( Special Provisions) Act, the authority to allocate coal mines is vested with the Union Government.** The Government adopted a two stage electronic auction process for allocation of coal mines. Bids once received, were examined and determined eligibility under technical scrutiny.
- Once these bids qualified, the entire auction was conducted transparently on an online auction



**NAVP206 (EXPLANATION)**

platform. The auction-based regime introduced in 2014 allowed private sector participation, however, it was limited to captive usage in own end-use plants. Now, the sector has been opened up for commercial coal mining by private players in 2020.

**Statement 2 is incorrect:**

- Geological Survey of India (GSI) carried out preliminary stage and general stage exploration for gold during field season programs from 2015-16 to 2020-21 and has established resources in the States of Maharashtra, Madhya Pradesh, Jharkhand, Karnataka, **Rajasthan**, **Bihar**, **Chhattisgarh**,

**Statement 3 is incorrect:**

- Parliament passed the Mines and Minerals (Development and Regulation) Amendment Bill, 2023 that allows the private sector to mine key atomic minerals, including lithium, and deep-seated minerals such as gold, silver, copper and zinc.** It has amended the Mines and Minerals (Development and Regulation) Act, 1957.
- Until now, mining and exploration of all 12 atomic minerals were within the purview of state-owned entities. One of the key reforms in the bill is to introduce exploration licenses for deep-seated and critical minerals.
- It also removes certain minerals from the list of atomic minerals – lithium, beryllium, titanium, niobium, tantalum and zirconium, which are technology and energy critical and have used in the space industry, electronics, technology and communications, the energy sector, electric batteries; and are critical in net-zero emission commitment of India
- The full-scale production of the country's first large private gold mine in Andhra Pradesh will begin by the end of next year.

**Statement 4 is correct:**

- The production of iron ore at about 253.97 million tonnes in 2021-22 registered an increase of 23.86% over the previous year. About 39.30% of the total production was shared by Public Sector Companies like NMDC (16.07%), SAIL (13.31%), Odisha Mining Corporation (9.01%), etc.

- The share of the Private Sector was 60.70% which included JSW Steel Ltd. (12.45%), Tata Steel (11.47%), Rungta Mines (5.56%), Vedanta Ltd (2.32%) and Arcelor Mittal India Private Ltd (2.16%), etc. Almost the entire production of iron ore (98.62%) accrued from Odisha (53.82%), Chhattisgarh (16.27%), Karnataka (15.88%), Jharkhand (9.74%) and Madhya Pradesh (2.91%) during the year. The remaining 1.38% production was reported from Maharashtra, Rajasthan, and Andhra Pradesh**

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<https://mines.gov.in/webportal/nationalmineralsscenario>

<https://static.pib.gov.in/WriteReadData/specificdocs/documents/2023/apr/doc2023424184801.pdf>

<https://coal.nic.in/en/nominated-authority/auction-portal>

<https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1913935>

<https://www.thehindu.com/news/national/other-states/bihar-decides-to-accord-permission-for-exploration-of-countrys-largest-gold-reserve-in-jamui/article65469863.ece>

<https://www.hindustantimes.com/india-news/rajasthan-sits-over-11-48-crore-tonne-of-gold-deposits-say-experts/story-2WkUTji0UzirsuURvhuvbO.html>



**NAVP206 (EXPLANATION)**

<https://www.hindustantimes.com/india-news/parliament-passes-bill-allowing-private-sector-to-mine-atomic-minerals-and-deep-seated-minerals-in-india-101691003599565.html>

<https://economictimes.indiatimes.com/industry/indl-goods/svs/metals-mining/indias-first-large-private-gold-mine-to-begin-full-scale-production-by-end-of-next-year-dgml-md/articleshow/104255736.cms?from=mdr>

**24. Answer: C**

**Explanation:**

Government of India announces Minimum Support Prices (MSP) for major agricultural commodities each year in both the Crop seasons on the recommendations of the Commission for Agricultural Costs and Prices (CACP). In addition, MSP for toria and de-husked coconut is also fixed on the basis of MSPs of rapeseed & mustard and copra respectively. The Commission for Agricultural Costs & Prices (**CACP is an attached office of the Ministry of Agriculture and Farmers Welfare, Government of India.** It came into existence in January 1965.

As of now, CACP recommends MSPs of 23 commodities, which comprise

- **7 cereals:** paddy, wheat, maize, sorghum, **pearl millet**, barley and **ragi**,
- **5 pulses:** gram, tur, moong, urad, lentil,
- **7 oilseeds:** groundnut, rapeseed-mustard, soyabean, seasmum, sunflower, safflower, **nigerseed**, and
- **4 commercial crops:** **copra**, sugarcane, **cotton** and raw jute.

It is the Cabinet Committee on Economic Affairs (CCEA) chaired by Prime Minister takes a final decision on the level of MSPs and other recommendations made by CACP.

**Source:**

<https://pib.gov.in/PressReleasePage.aspx?PRID=1795706>

<https://cacp.dacnet.nic.in/content.aspx?pid=32>

**25. Answer: A**

**Explanation:** The soil is formed by mixing dead organic material with weathered bedrock. Soils in the rainforest are mainly thin and poor. Nutrient levels in the soil are low due to the leaching (washing away of nutrients) by the heavy equatorial rain.

**Reasons for the poor soil of tropical rainforests:**

- The high volume of rain in tropical rainforests washes nutrients out of the soil more quickly than in other climates.
- The high temperature and moisture of tropical rainforests cause dead organic matter in the soil to decompose more quickly than in other climates, thus releasing and losing its nutrients rapidly.
- The type of clay particles present in tropical rainforest soil has a poor ability to trap nutrients and stop them from washing away. Even if humans artificially add nutrients to the soil, the nutrients mostly wash away and are not absorbed by the plants.
- The soil is highly acidic. The roots of plants rely on an acidity difference between the roots and the soil in order to absorb nutrients. When the soil is acidic, there is little difference, and therefore little absorption of nutrients from the soil.

Hence, **Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I**

**Source:**

<https://www.wtamu.edu/~cbaird/sq/2013/07/12/what-makes-the-soil-in-tropical-rainforests-so-rich/#:~:text=The%20high%20temperature%20and%20moisture,quickly%20than%20in%20other%20climates.>

<https://www.internetgeography.net/topics/the-nutrient-cycle-in-the-rainforest/>

## NAVP206 (EXPLANATION)

26. Answer: A

**Explanation:**

**Pair 1 is incorrectly matched:** Polavaram Irrigation Project an interstate project on river Godavari.

**Pair 2 is incorrectly matched:**

- **Indira Sagar Dam is constructed across the river Narmada near village Punasha of Khandwa district.**
- Other Major Projects in Narmada Basin are **Bargi Project, Tawa Project, Omkareshwar Project, Maheshwar Project, Sardar Sarovar Project.**

Narmada River is the largest west-flowing river of the peninsula of India. It rises from Narmada Kund, located at Amarkantak, in the Anuppur district of Madhya Pradesh, at an elevation of about 1057 m in the Maikala range. It forms the traditional boundary between North and South India. The river flows through Madhya Pradesh, Maharashtra and Gujarat between Vindhya and Satpura hill ranges before falling into the Gulf of Cambay in the Arabian Sea about 10 km north of Bharuch, Gujarat.

**Pair 3 is correctly matched:** Chungthang Dam (also called Teesta III) has been destroyed as a result of torrential rains and a glacial lake outburst flood (GLOF) upstream on the Teesta River in the state of Sikkim. The Teesta is a transboundary river, and its flood waters travel downstream to West Bengal and then into Bangladesh.

**Pair 4 is incorrectly matched:**

- Baglihar Dam is built on Chenab River in the Doda district of Jammu & Kashmir. It is a run-of-the-river power project on the Chenab River.
- The river Chenab (or Chandra Bhaga) is formed after the two streams the Chandra and the Bhaga merge with each other.
- The Chandra and the Bhaga originate from the southwest and north-west faces of Baralacha Pass respectively in the Himalayan region of Lahul and Spiti Valley in Himachal Pradesh.
- The Marusudar is the biggest tributary of the Chenab and meets

the Chenab at Bhandalkot. The Tawi and Manawar Tawi join Chenab in Pakistan.

**Source:**

<https://vikaspedia.in/energy/environment/river-basins-of-india/narmada-basin>

<https://www.internationalrivers.org/news/international-rivers-statement-on-teesta-dam-disaster-in-sikkim/>

<https://indiawris.gov.in/wiki/doku.php?id=chenab>

27. Answer: A

**Explanation**

**Statement 1 is correct:**

- The most popular argument regarding the origin of the universe is the Big Bang Theory. It is also called the expanding universe hypothesis.
- The expansion of the universe means an increase in space between the galaxies.
- **An alternative to this was Hoyle's concept of steady state.**
- **It considered the universe to be roughly the same** at any point in time.
- However, with greater evidence becoming available about the expanding universe, the scientific community at present favors the argument for expanding the universe.

**Statement 2 is incorrect:**

- **Edwin Hubble, in 1920**, provided evidence that the universe is expanding. As time passes, galaxies move further and further apart.

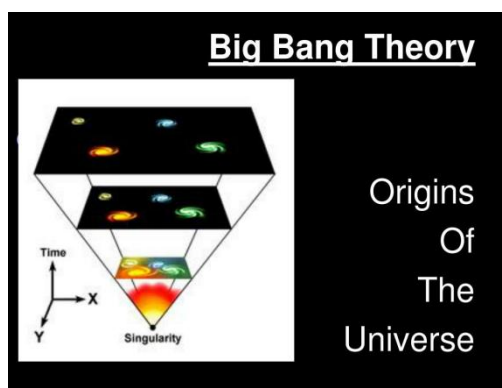
**Additional details:**

- **The Big Bang Theory considers the following stages in the development of the universe.**
- In the beginning, all matter forming the universe existed in one place in the form of a "tiny ball" (singular atom) with an unimaginably small volume, infinite temperature, and infinite density.
- At the Big Bang the "tiny ball" explodes violently. This led to a huge

**NAVP206 (EXPLANATION)**

expansion. It is now generally accepted that the event of the Big Bang took place 13.7 billion years before the present.

- The expansion continues even to the present day. As it grew, some energy was converted into matter. There was particularly rapid expansion within fractions of a second after the bang.
- Thereafter, the expansion slowed down. Within the first three minutes of the Big Bang event, the first atom began to form. Within 300,000 years from the Big Bang, the temperature dropped to 4,500K (Kelvin) and gave rise to atomic matter. The universe became transparent.

**Source:**

1. XIth NCERT Fundamentals of Physical Geography /Unit 2 / Chapter 2/ page 13,14
2. <https://www.slideserve.com/csilla/big-bang-theory>

**28. Answer: D****Explanation:**

- During the cooling of the earth, gasses and water vapour were released from the interior solid earth. This started the evolution of the present atmosphere.
- The early atmosphere largely contained water vapour, nitrogen, carbon dioxide, methane, ammonia and very little free oxygen.

- **The process through which the gasses were outpouring from the interior is called degassing.**
- Continuous volcanic eruptions contributed water vapour and gasses to the atmosphere. As the earth cooled, the water vapour released started getting condensed.
- The carbon dioxide in the atmosphere got dissolved in rainwater and the temperature further decreased causing more condensation and more rain. The rainwater falling onto the surface got collected in the depressions to give rise to oceans.

**Source:**

1. XIth NCERT Fundamentals of Physical Geography /Unit 2 / Chapter 2 / page 15

**29. Answer: A****Explanation**

**Sources of information about the interior of earth:**

**❖ Direct Sources:**

- **Surface rock** and materials obtained from mining operations provide readily available solid earth materials for analysis.
- **Mining operations**, such as gold mines in South Africa, have reached depths of 3 to 4 km due to the extreme heat below this depth, limiting further exploration.
- Ongoing scientific projects like the "Deep Ocean Drilling Project" and the "Integrated Ocean Drilling Project" aim to penetrate deeper into the Earth's crust to study conditions at greater depths.
- The deepest drilling project, located in Kola, Arctic Ocean, has reached a depth of 12 km, contributing substantial information through the analysis of collected materials.

**NAVP206 (EXPLANATION)**

- **Volcanic eruptions** provide another source of direct information as molten material (magma) ejected during eruptions becomes available for laboratory analysis.

❖ **Indirect Sources:**

- **Analysis of properties of matter** indirectly reveals information about the Earth's interior.
- Temperature and pressure increase with depth, as observed through mining activities.
- The density of materials also increases with depth.
- Scientists estimate values of temperature, pressure, and density at various depths within the Earth's interior, taking into account the Earth's total thickness.
- **Meteors that occasionally reach the Earth**, while not from the Earth's interior, share similarities in material and structure, providing additional insights into the Earth's composition.
- **Indirect sources** also include gravitational variations, magnetic field distribution, and seismic activity.
- **Gravitational force (gravity, g)** varies at different latitudes due to differences in distance from the Earth's center.
- **Gravity values** are influenced by mass distribution within the Earth and are subject to anomalies, revealing information about material distribution in the Earth's crust.
- **Magnetic surveys** offer data on the distribution of magnetic materials in the Earth's crust.

- **Seismic activity** is a crucial source of information about the Earth's interior.

**Source:**

1. **XIth NCERT Fundamentals of Physical Geography /Unit 2 / Chapter 3 page 19, 20**

30. **Answer: C**

**Explanation:**

**Pair 1 is correct:**

❖ **Shield Volcanoes:**

- **Barring the basalt flows**, the shield volcanoes are the largest of all the volcanoes on the earth. **The Hawaiian volcanoes are the most famous examples.**
- These volcanoes are mostly made up of basalt, a type of lava that is very fluid when erupted.
- For this reason, these volcanoes are not steep.
- They become explosive if somehow water gets into the vent; otherwise, they are characterized by low explosivity.
- The upcoming lava moves in the form of a fountain and throws out the cone at the top of the vent and develops into a cinder cone.

❖ **Caldera:**

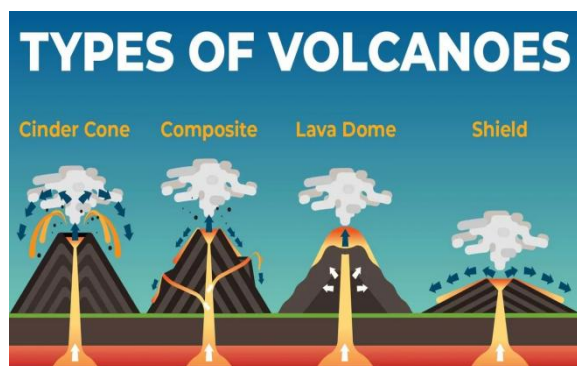
- **These are the most explosive of the earth's volcanoes. (Pair 2 is correctly matched)**
- They are usually so explosive that when they erupt they tend to collapse on themselves rather than building any tall structure.
- The collapsed depressions are called calderas. Their explosiveness indicates that the magma chamber supplying the lava is not only huge but is also in close vicinity.



**NAVP206 (EXPLANATION)**

❖ **Composite Volcanoes:**

- These volcanoes are characterized by eruptions of cooler and more viscous lavas than basalt. (Pair 3 is correctly matched)
- These volcanoes often result in explosive eruptions. Along with lava, large quantities of pyroclastic material and ashes find their way to the ground.
- This material accumulates in the vicinity of the vent openings leading to the formation of layers, and this makes the mounts appear as composite volcanoes.



**Source:**

1. XIth NCERT Fundamentals of Physical Geography /Unit 2 / Chapter 3 /page 23,24
2. <https://www.yourdictionary.com/articles/volcanoes-characteristics>

31. **Answer: A**

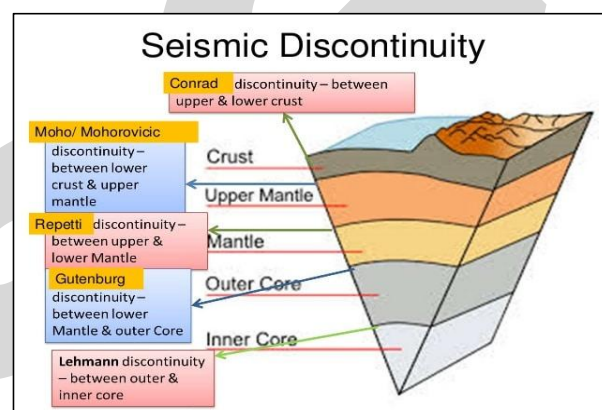
**Explanation:**

- ❖ **The Conrad Discontinuity :** Earth's crust is divided into two types: oceanic crust and continental crust. The transition zone between these two types of crust is sometimes called the Conrad discontinuity. Silicates (mostly compounds made of silicon and oxygen) are the most abundant rocks and minerals in both oceanic and continental crust. (Pair 1 is incorrectly matched)

- ❖ **Mohorovicic discontinuity:** The line separating the Earth's crust and mantle is known as the Mohorovicic discontinuity, or simply the Moho discontinuity. It occurs at a typical depth of 32 kilometers below continental surfaces and 8 kilometers beneath ocean basins. (Pair 2 is correctly matched)

- ❖ **Guttenberg Discontinuity:** The mantle-core boundary is the Gutenberg discontinuity at a depth of about 2,800 kilometers. The outer core is thought to be liquid because shear waves do not pass through it.

(Pair 3 is incorrectly matched)



**Source:**

1. XIth NCERT Fundamentals of Physical Geography /Unit 2 / Chapter 3/page 19
2. <https://education.nationalgeographic.org/resource/crust/>
3. <https://www.britannica.com/science/Gutenberg-discontinuity>

32. **Answer: A**

**Explanation**

Pair 1, 2 and 3 are incorrectly matched and pair 4 is correctly matched:

- Tropical cyclones are violent storms that originate over oceans in tropical areas and move over to the coastal areas bringing about large-scale destruction caused by violent winds,



**NAVP206 (EXPLANATION)**

very heavy rainfall, and storm surges.

- This is one of the most devastating natural calamities.
- **They are known as Cyclones in the Indian Ocean, Hurricanes in the Atlantic, Typhoons in the Western Pacific and South China Sea, and Willy-willies in Western Australia.**
- Tropical cyclones originate and intensify over warm tropical oceans.

**The conditions favorable for the formation and intensification of tropical storms are:**

1. Large sea surface with a temperature higher than 27° C.
2. Presence of the Coriolis force.
3. Small variations in the vertical wind speed.
4. A pre-existing weak low-pressure area or low-level-cyclonic circulation.
5. Upper divergence above the sea level system

**Source:**

1. **XIth NCERT Fundamentals of Physical Geography /Unit 6 / Chapter 9 / page,83.**

**33. Answer: A**

**Explanation:**

❖ **Ocean Floor Mapping and Paleomagnetic Studies:**

- **Volcanic eruptions are common along mid-oceanic ridges, resulting in significant lava release.(Hence, statement 1 is correct)**
- Rocks equidistant from the crest of mid-oceanic ridges share remarkable similarities in terms of formation period, chemical composition, and magnetic properties.
- **Rocks closer to the mid-oceanic ridges have normal polarity and are the youngest, while those farther away are**

**older.(Hence, statement 3 is incorrect)**

- **Oceanic crust rocks are much younger than continental rocks, with oceanic crust rocks generally less than 200 million years old, while some continental rocks date back to 3,200 million years.(Hence, statement 2 is correct)**
- Sediments on the ocean floor are surprisingly thin, with no sediment column older than 200 million years found.
- Deep trenches experience deep-seated earthquakes, while mid-oceanic ridge areas have shallow quake foci.

❖ **Hess's Seafloor Spreading Hypothesis (1961):**

- Constant eruptions at the crest of oceanic ridges rupture the oceanic crust.
- New lava fills the ruptured areas, pushing the oceanic crust on either side, resulting in the spreading of the ocean floor.
- The relative youth of oceanic crust and the fact that one ocean's spreading does not cause another to shrink led Hess to propose the consumption of oceanic crust.
- He suggested that oceanic crust pushed by volcanic eruptions at the crest sinks into oceanic trenches and gets consumed.

**Source:**

1. **XIth NCERT Fundamentals of Physical Geography /Unit 2 / Chapter 4 / page 32,33**

**NAVP206 (EXPLANATION)**

**34. Answer: A**

**Explanation**

**Pair 1, 2 and 3 are incorrectly matched and pair 4 is correctly matched.**

❖ **Ocean-Continent Convergence:**

- In an ocean-continent convergence, an oceanic plate collides with a continental plate.
- The denser oceanic plate is forced beneath the less dense continental plate in a process called subduction.
- This subduction can lead to the formation of deep oceanic trenches, volcanic arcs, and earthquakes.
- In the case of the **Nazca Plate and the South American Plate**, the subduction of the Nazca Plate beneath the South American Plate has created the Andes Mountains and the Peru-Chile Trench.

❖ **Divergent Boundary:**

- At a divergent boundary, two tectonic plates move away from each other.
- This movement is often associated with the upwelling of material from the mantle, leading to the formation of new crust.
- In the case of the **Mid-Atlantic Ridge**, the North American Plate and the Eurasian Plate are moving away from each other, creating a long underwater mountain range.
- As the plates separate, magma from the mantle rises to fill the gap, solidifying to form a new crust.
- This process is responsible for the continuous widening of the Atlantic Ocean.

❖ **Transform Boundary:**

- Transform boundaries are characterized by plates

sliding past each other horizontally.

- At these boundaries, the motion is typically parallel to the boundary and can be in opposite directions.
- The interaction between plates at transform boundaries can cause significant stress to build up along fault lines, resulting in earthquakes.
- In the case of the **San Andreas Fault**, the Pacific Plate and the North American Plate are sliding past each other, and the relative motion between them has caused numerous earthquakes in California.

❖ **Continent-Continent Convergence:**

- When two continental plates converge, neither plate is dense enough to be subducted beneath the other.
- Instead, the collision forces the crust to crumple and fold, leading to the formation of towering mountain ranges.
- **In the case of the Indian Plate colliding with the Eurasian Plate**, the immense pressure generated by their convergence has resulted in the formation of the Himalayan Mountains, the highest mountain range on Earth.
- This boundary is characterized by intense seismic activity and the uplift of vast mountainous regions.

**Source:**

**1. XIth NCERT Fundamentals of Physical Geography /Unit 2 / Chapter 4/ page 38**

**35. Answer: C**

**Explanation:**

- The earth is composed of various kinds of elements. These elements

**NAVP206 (EXPLANATION)**

are in solid form in the outer layer of the earth and in hot and molten form in the interior.

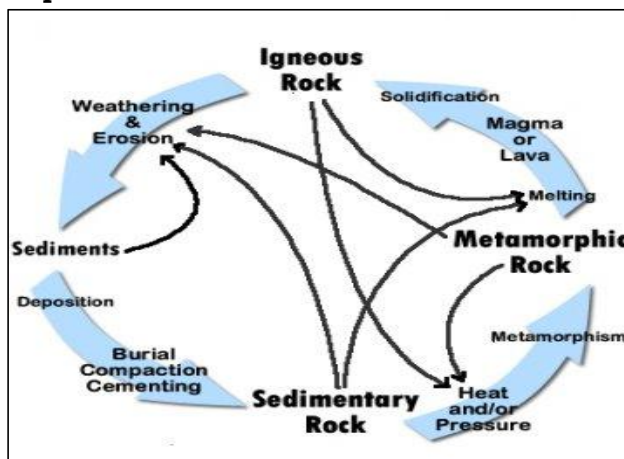
- About 98 percent of the total crust of the earth is composed of eight elements like **oxygen(46.60%), silicon(27.72%), aluminum(8.13%), iron(5%), calcium(3.63%), sodium(2.83%), potassium(2.56%) and magnesium (2.09%)**, and the rest is constituted by titanium, hydrogen, phosphorous, manganese, sulfur, carbon, nickel and other elements.

**Source:**

1. XIth NCERT Fundamentals of Physical Geography /Unit 2 / Chapter 5 / page 40

**36. Answer: C**

**Explanation**



**Fig: Rock cycle**

- ❖ **The Rock cycle** is a continuous process through which old rocks are transformed into new ones.
- ❖ Igneous rocks are primary rocks and other rocks (sedimentary and metamorphic) form from these primary rocks.
- ❖ Igneous rocks can be changed into metamorphic rocks.
- ❖ The fragments derived out of igneous and metamorphic rocks form into sedimentary rocks.
- ❖ Sedimentary rocks themselves can turn into fragments and the

fragments can be a source for the formation of sedimentary rocks.

- ❖ Increased temperature and pressure occurs in subduction zones and in areas where two plates of continental lithosphere collide to produce a mountain range, while increased pressure without increased temperature is produced when sedimentary rocks are deeply buried under more sediments. Sediments are produced when rocks are uplifted, weathered and eroded, and the resulting detrital material deposited in marine or terrestrial basins.
- ❖ **If the sediments are buried under further layers of sediment, they can become lithified to produce a sedimentary rock. Magma is produced when rocks are melted. This melting can occur when a lithospheric plate descends into the Earth's crust at a subduction zone, or when a mid-ocean ridge opens up and produces decompression melting in the athenosphere under the ridge. When the magma solidifies, it becomes an igneous rock.**

**Source:**

1. XIth NCERT Fundamentals of Physical Geography /Unit 2 / Chapter 5 / page
2. <https://geologyglasgow.org.uk/minerals-rocks-fossils/the-rock-cycle/>

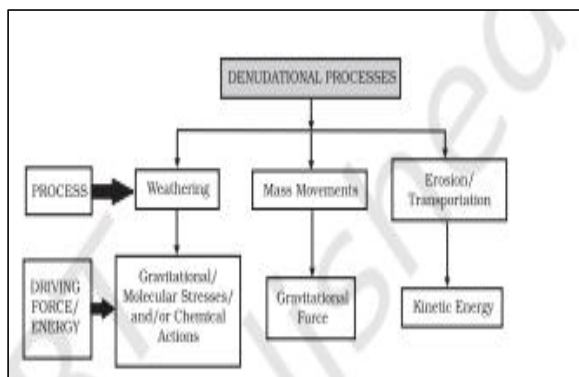
**37. Answer: A**

**Explanation:**

- ❖ **Denudation: All the exogenic geomorphic processes are covered under a general term, denudation.**
  - The word 'denude' means to strip off or to uncover.
  - **Weathering, mass wasting/movements, erosion, and transportation are included in denudation.**

**The flow chart gives the denudation processes and their respective driving forces.**

NAVP206 (EXPLANATION)



**Fig: denudation processes and their respective driving forces.**

- ❖ **Diastrophism:** All processes that move, elevate, or build up portions of the earth's crust come under diastrophism.
- ❖ They include
  - **Orogenic processes** involving mountain building through severe folding and affecting long and narrow belts of the earth's crust,
  - **Epeirogenic processes** involving uplift or warping of large parts of the earth's crust,
  - **Earthquakes** involving local relatively minor movements,
  - **Plate tectonics** involving horizontal movements of crustal plates.

**Source:** XIth NCERT Fundamentals of Physical Geography /Unit 2 / Chapter 6 page 39

38. **Answer: C**

**Explanation**



**Fig: mass movements**

- ❖ **Mass Movement** refers to the transfer of the mass of rock debris down the slopes under the direct influence of gravity.
- ❖ That means, air, water, or ice do not carry debris with them from place to place but on the other hand the debris may carry with it air, water, or ice.
- ❖ The movements of mass may range from slow to rapid, affecting shallow to deep columns of materials and include creep, flow, slide, and fall.
- ❖ Gravity exerts its force on all matter, both bedrock and the products of weathering. So, **weathering is not a prerequisite for mass movement though it aids mass movements.**
- ❖ Mass movements are very active over weathered slopes rather than over unweathered materials.
- ❖ **Mass movements are aided by gravity and no geomorphic agents like running water, glaciers, wind, waves, and currents participate in the process of mass movements.**
- ❖ That means mass movements do not come under erosion though there is a shift (aided by gravity) of materials from one place to another.
- ❖ Materials over the slopes have their own resistance to disturbing forces and will yield only when force is



**NAVP206 (EXPLANATION)**

greater than the shearing resistance of the materials.

- ❖ Weak unconsolidated materials, thinly bedded rocks, faults, steeply dipping beds, vertical cliffs or steep slopes, abundant precipitation and torrential rains and scarcity of vegetation, etc. favour mass movements.

**Source:**

1. **XIth NCERT Fundamentals of Physical Geography /Unit 2 / Chapter 6 / page 41,42**

**39. Answer: C**

**Explanation:**

- ❖ Exfoliation means flaking off of more or less curved sheets of shells from over rocks or bedrock resulting in smooth and rounded surfaces.
- ❖ Exfoliation can occur due to expansion and contraction induced by temperature changes.
- ❖ Exfoliation domes and tors result from unloading and thermal expansion respectively.
- ❖ Exfoliation is a result but not a process.



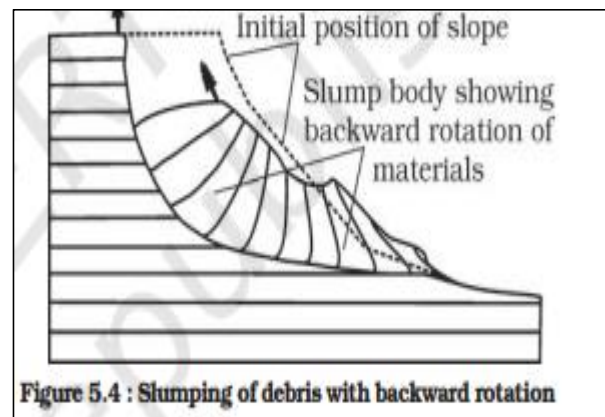
**Fig: Exfoliation**

**Source:**

1. **XIth NCERT Fundamentals of Physical Geography /Unit 2 / Chapter 6 / page 41**
2. [https://www.geo.fu-berlin.de/en/v/geolearning/mountain\\_building/weathering/media/esferoidal\\_weathering.jpg?html=1&locale=en&ref=44653463](https://www.geo.fu-berlin.de/en/v/geolearning/mountain_building/weathering/media/esferoidal_weathering.jpg?html=1&locale=en&ref=44653463)

**40. Answer: D**

**Explanation**



**Figure 5.4 : Slumping of debris with backward rotation**

**Fig: Slumping of debris**

- **Depending upon the type of movement of materials several types of landslides are identified in this category.**
  - **Slump** is the slipping of one or several units of rock debris with a backward rotation with respect to the slope over which the movement takes place .
  - **Rapid rolling or sliding** of earth debris without backward rotation of mass is known as debris slide.
  - **Debris fall** is nearly a free fall of earth debris from a vertical or overhanging face.
  - **Rock Slide** Sliding of individual rock masses down bedding, joint or fault surfaces is rockslide
  - **Rock sliding** is very fast and destructive. Slides occur as planar failures along discontinuities like bedding planes that dip steeply.
  - **Rock fall** is free falling of rock blocks over any steep slope keeping itself away from the slope. Rock falls occur from the superficial layers of the rock face, an occurrence that distinguishes it from rockslide which affects materials up to a substantial depth.

**Source:**

1. **XIth NCERT Fundamentals of Physical Geography /Unit 2 / Chapter 6 / page 42,43**

NAVP206 (EXPLANATION)

41. Answer: D

Explanation:

- ❖ **Mass Movement** refers to the transfer of the mass of rock debris down the slopes under the direct influence of gravity.
- ❖ **The following factors contribute to the rapid flow of mass movements:**
  - removal of support from below to materials above through natural or artificial means.
  - increase in gradient and height of slopes.
  - overloading through addition of materials naturally or by artificial filling.
  - overloading due to heavy rainfall, saturation and lubrication of slope materials.
  - removal of material or load from over the original slope surfaces.
  - occurrence of earthquakes, explosions, or machinery.
  - excessive natural seepage.
  - Heavy drawdown of water from lakes, reservoirs, and rivers leading to a slow outflow of water from under the slopes or river banks.
  - indiscriminate removal of natural vegetation.

Source:

1. XIth NCERT Fundamentals of Physical Geography /Unit 2 / Chapter 6 / page 4,43

42. Answer: D

Explanation:

- ❖ Soil is a dynamic medium in which many chemical, physical and biological activities go on constantly.
- ❖ Soil is a result of decay, it is also the medium for growth. It is a changing and developing body. It has many characteristics that fluctuate with the seasons.
- ❖ It may be alternatively cold and warm or dry and moist. Biological activity is slowed or stopped if the soil becomes too cold or too dry.

Organic matter increases when leaves fall or grasses die.

**Five basic factors control the formation of soils:**

1. parent material
2. topography
3. Climate
4. Biological activity
5. time

All these soil-forming factors act in union and affect the action of one another.

**Erosion: Agricultural development is often reliant on the nutrient-rich soils created by the accumulation of eroded earth.** When the velocity of wind or water slows, eroded sediment is deposited in a new location. The sediment builds up in a process called sedimentation and creates fertile land. River deltas are made almost entirely of sediment that has eroded from the banks and bed of a river.

**Soil forms through the mechanical and chemical weathering of rocks and sediments, and the accumulation and decay of organic matter.** The factors that affect the nature of soil and the rate of its formation include:

- Climate, especially average temperature and precipitation amounts, and the consequent types of vegetation
- The parent rock or sediment that was weathered to make the soil
- The slope of the surface where soil is accumulating
- How long soil has been forming at a location

Source:

1. XIth NCERT Fundamentals of Physical Geography /Unit 2 / Chapter 6 / page 44
2. <https://education.nationalgeographic.org/resource/erosion/>
3. <https://openpress.usask.ca/physicogeology/chapter/8-5-weathering-and-soil-formation/>

## NAVP206 (EXPLANATION)

43. Answer: C

Explanation:

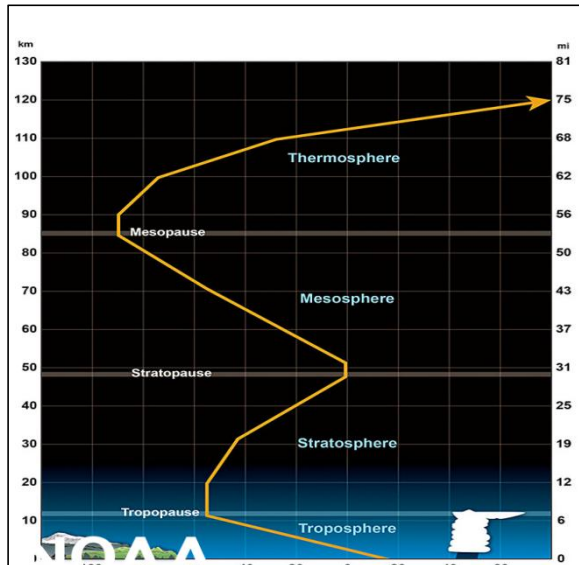


Fig Layers of atmosphere

**Troposphere:**

- The temperature decreases (not increases) as one moves from the surface of the earth to a higher altitude in the troposphere. (Hence, statement 1 is incorrect)
- The troposphere is known as the lower atmosphere, where almost all weather occurs in this region.
- The troposphere begins at the Earth's surface, but the height of the troposphere varies.
- It is 11-12 miles (18-20 km) high at the equator, 5½ miles (9 km) at 50°N and 50°S, and just under four miles (6 km) high at the poles.
- As the density of the gasses in this layer decreases with height, the air becomes thinner. Therefore, the temperature in the troposphere also decreases with height.
- As one climbs higher, the temperature drops from an average of around 62°F (17°C) to -60°F (-51°C) at the tropopause.

**Stratosphere:**

- The highest temperature in the atmosphere is recorded in the thermosphere (2500 degrees

Celsius) and not in the stratosphere. (Hence, statement 3 is incorrect)

- The stratosphere extends from 4 -12 miles (6-20 km) above the Earth's surface to around 31 miles (50 km).
- This layer holds 19 percent of the atmosphere's gases but very little water vapor.
- In this region, the temperature increases with height. Heat is produced in the process of the formation of, and this heat is responsible for temperature increases, from an average of -60°F (-51°C) Ozone at tropopause to a maximum of about 5°F (-15°C) at the top of the stratosphere.
- This increase in temperature with height means warmer air is located above cooler air.
- This prevents convection as there is no upward vertical movement of the gasses.
- As such, the location of the bottom of this layer is readily seen by the anvil-shaped tops of cumulonimbus clouds.

**Mesosphere:**

- The lowest temperature in the atmosphere is recorded in the Mesosphere (-90 degrees Celsius). Hence, statement 2 is correct.
- This layer extends from around 31 miles (50 km) above the Earth's surface to 53 miles (85 km).
- The gasses that comprise this layer continue to become denser as one descends.
- As such, temperatures increase as one descends, rising to about 5°F (-15°C) near the bottom of this layer.
- The gasses in the mesosphere are now thick enough to slow down meteors hurtling into the atmosphere, where they burn up, leaving fiery trails in the night sky.
- Both the stratosphere (next layer down) and the mesosphere are considered the middle atmosphere.

**NAVP206 (EXPLANATION)**

- The transition boundary which separates the mesosphere from the stratosphere is called the stratopause.

**Thermosphere:**

- **The highest temperature in the atmosphere is recorded in thermosphere (2500 degrees Celsius).**
- Between about 53 miles (85 km) and 375 miles (600 km) lies the thermosphere, known as the upper atmosphere.
- **While still extremely thin, the gasses of the thermosphere become increasingly denser as one descends toward the Earth.**
- **As such, incoming high-energy ultraviolet and x-ray radiation from the sun begins to be absorbed by the molecules in this layer and causes a large temperature increase.**
- **Because of this absorption, the temperature increases with height.**
- From as low as -184°F (-120°C) at the bottom of this layer, temperatures can reach as high as 3,600°F (2,000°C) near the top.
- However, despite the high temperature, this layer of the atmosphere would still feel very cold to our skin.
- The high temperature indicates the amount of energy absorbed by the molecules, but with so few molecules in this layer, the total number would not be enough to heat our skin.
- The bottom of the thermosphere is the mesopause - the transition into the mesosphere.

**Exosphere:**

- This is the outermost layer of the atmosphere.
- It extends from about 375 miles (600 km) to 6,200 miles (10,000 km) above the earth.
- In this layer, atoms and molecules escape into space and satellites orbit the earth.

- At the bottom of the exosphere is a transition layer called the thermopause.

**Source:**

1. **XIth NCERT Fundamentals of Physical Geography /Unit 5 / Chapter 7 / page 65,66**
2. <https://www.noaa.gov/jetstream/atmosphere/layers-of-atmosphere>

**44. Answer: D**

**Explanation:**

- The earth's surface receives most of its energy in short wavelengths.
- The energy received by the earth is known as incoming solar radiation which in short is termed insolation.
- As the earth is a geoid resembling a sphere, the sun's rays fall obliquely at the top of the atmosphere and the earth intercepts a very small portion of the sun's energy.
- On an average, the earth receives 1.94 calories per sq. cm per minute at the top of its atmosphere.
- The amount and the intensity of insolation vary during the day, in a season, and in a year.

**The factors that cause these variations in insolation are :**

- **The rotation of the earth on its axis.**
- **The angle of inclination of the sun's rays.**
- **The length of the day.**
- **The transparency of the atmosphere.**
- **The configuration of land in terms of its aspect.**
- The fact that the earth's axis makes an angle of 66.5 with the plane of its orbit around the sun has a greater influence on the amount of insolation received at different latitudes.
- The second factor that determines the amount of insolation received is the angle of inclination of the rays. This depends on the latitude of a place.



**NAVP206 (EXPLANATION)**

- The higher the latitude the less the angle they make with the surface of the earth resulting in slant sun rays.
- The area covered by vertical rays is always less than the slant rays.
- If more area is covered, the energy gets distributed and the net energy received per unit area decreases.
- Moreover, the slant rays are required to pass through greater depth of the atmosphere resulting in more absorption, scattering, and diffusion.

**The Passage of Solar Radiation through the Atmosphere:**

- The atmosphere is largely transparent to shortwave solar radiation.
- The incoming solar radiation passes through the atmosphere before striking the earth's surface.
- Within the troposphere water vapor, ozone, and other gasses absorb much of the near-infrared radiation.

**Source:**

1. **XIth NCERT Fundamentals of Physical Geography /Unit 5 / Chapter 7 / page 67,68.**

**45. Answer: A****Explanation**

- ❖ **Absolute humidity:**
  - The actual amount of the water vapour present in the atmosphere is known as the absolute humidity.
- ❖ **Relative humidity:**
  - The percentage of moisture present in the atmosphere as compared to its full capacity at a given temperature is known as the relative humidity.
- ❖ **Saturated air :**
  - The air containing moisture to its full capacity at a given temperature is said to be saturated.
- ❖ **Specific Humidity:**
  - It refers to the weight (amount) of water vapor

contained in a unit weight (amount) of air (expressed as grams of water vapor per kilogram of air).

**Source :**

1. **XIth NCERT Fundamentals of Physical Geography /Unit 6 / Chapter 10 / page 86.**

**46. Answer: C****Explanation:**

- **The sun is directly overhead at noon on 21 March - The equator**
- The sun is directly overhead at noon on 21 June - The tropic of cancer
- The sun is directly overhead at noon on 21 December- tropic of Capricorn

**Source:**

1. **XIth NCERT Fundamentals of Physical Geography /Unit 5 / Chapter 7 / page,68.**

**47. Answer: B****Explanation****Statement 1 is incorrect:**

- **The rotation of the earth about its axis affects the direction of the wind.** This force is called the Coriolis force after the French physicist who described it in 1844.

**Statement 2 is correct:**

- **The Coriolis force deflects the wind to the right direction in the northern hemisphere and to the left in the southern hemisphere.**
- The deflection is more when the wind velocity is high.

**Statement 3 is correct:**

- **The Coriolis force is directly proportional to the angle of latitude.**
- It is maximum at the poles and is absent at the equator.
- The Coriolis force acts perpendicular to the pressure gradient force.
- The pressure gradient force is perpendicular to an isobar.
- The higher the pressure gradient force, the higher the velocity of the

**NAVP206 (EXPLANATION)**

wind and the larger is the deflection in the direction of the wind.

- As a result of these two forces operating perpendicular to each other, in the low-pressure areas, the wind blows around it.
- At the equator, the Coriolis force is zero and the wind blows perpendicular to the isobars.
- The low pressure gets filled instead of getting intensified. That is the reason why tropical cyclones are not formed near the equator.

**Source:**

1. **XIth NCERT Fundamentals of Physical Geography /Unit 5 / Chapter 7 / page,78,79**

48. **Answer: A**

**Explanation**

**Statement 1 and 2 is correct :**

- The extra tropical cyclones move from west to east but tropical cyclones move from east to west.
- The Extra tropical cyclones form along the polar front whereas tropical cyclones form in tropical regions.
- The extra tropical cyclones have a clear frontal system which is not present in the tropical cyclones.
- Extratropical cyclones cover a larger area and can originate over the land and sea. Whereas tropical cyclones originate only over the seas and on reaching the land they dissipate.
- The extratropical cyclone affects a much larger area as compared to the tropical cyclone.
- The wind velocity in a tropical cyclone is much higher and it is more destructive.

Table 9.2 : Pattern of Wind Direction in Cyclones and Anticyclones

Pressure System	Pressure Condition at the Centre	Pattern of Wind Direction	
		Northern Hemisphere	Southern Hemisphere
Cyclone	Low	Anticlockwise	Clockwise
Anticyclone	High	Clockwise	Anticlockwise

**Statement 3 is incorrect:**

- Tropical cyclones do not originate in the equatorial region due to the absence of the Coriolis force.
- Tropical cyclones originate and intensify over warm tropical oceans.

**The conditions favorable for the formation and intensification of tropical storms are:**

1. Large sea surface with a temperature higher than 27° C.
2. Presence of the Coriolis force.
3. vertical wind speed.
4. A pre-existing weak low-pressure area or low-level-cyclonic circulation.
5. Upper divergence above the sea level system.

**Source:**

1. **XIth NCERT Fundamentals of Physical Geography /Unit 5 / Chapter 9 / page,82,83.**

49. **Answer: C**

**Explanation:**

- The velocity and direction of the wind are the net results of the wind-generating forces.
- The winds in the upper atmosphere, 2 - 3 km above the surface, are free from the frictional effect of the surface and are controlled mainly by the pressure gradient and the Coriolis force.
- **When isobars are straight and when there is no friction, the pressure gradient force is balanced by the Coriolis force and the resultant wind blows parallel to the isobar. This wind is known as the geostrophic wind**

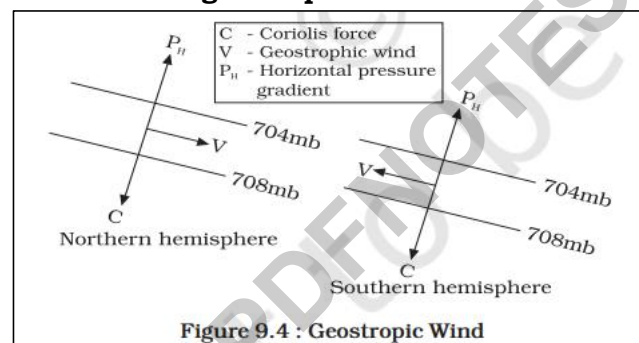


Figure 9.4 : Geostrophic Wind

NAVP206 (EXPLANATION)

Source:

1. XIth NCERT Fundamentals of Physical Geography /Unit 6 / Chapter 9 / page,79.

50. Answer: D

Explanation:

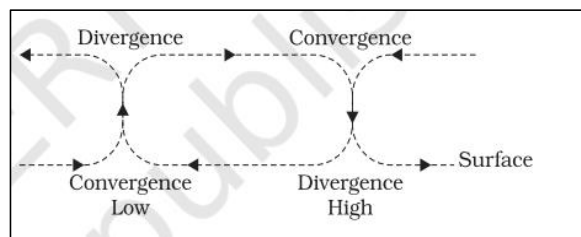
- The wind circulation around a low is called cyclonic circulation.
- The wind circulation Around a high is called anticyclonic circulation.
- The direction of winds around such systems changes according to their location in different hemispheres.

Table 9.2 : Pattern of Wind Direction in Cyclones and Anticyclones

Pressure System	Pressure Condition at the Centre	Pattern of Wind Direction	
		Northern Hemisphere	Southern Hemisphere
Cyclone	Low	Anticlockwise	Clockwise
Anticyclone	High	Clockwise	Anticlockwise

- The wind circulation at the earth's surface around low and high on many occasions is closely related to the wind circulation at higher levels.

- Generally, over a low-pressure area, the air will converge and rise.
- Over high-pressure areas, the air will subside from above and diverge at the surface.
- Apart from convergence, some eddies, convection currents, orographic uplift, and uplift along fronts cause the rising of air, which is essential for the formation of clouds and precipitation.



Source:

1. XIth NCERT Fundamentals of Physical Geography /Unit 6 / Chapter 9 / page ,79.