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Geography PYQs With Explanation 2020–2025 UPSC Prelims

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Author: Kranti Pavel (Director), MAX IAS, New Delhi

Emai-id. Email: info@maxias.in

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Solved Geography Prelims PYQ (2020-2025) With Complete Explanation

Explanation from Standard Reference Text Books Referred by UPSC

Compiled by Kranti Pavel- Director MAX IAS, assisted by GS expert Content team

6 Year Solved GEOGRAPHY PYQs With Explanation 2020- 2025 UPSC Prelims

Contents

2025

Previous Year UPSC Geography Questions With Explanation 2025

1. Consider the following countries:
I. Bolivia
II. Brazil
III. Colombia
IV. Ecuador
V. Paraguay
VI. Venezuela
Andes mountains pass through how many of the above countries?
(a) Only two
(b) Only three
(c) Only four
(d) Only five

1.Ans-c
Explanation
The Andes Mountains form the largest continental range of mountains in the world. They extend about 4,500 miles along the western coast of South America. The Andes Mountains go through **seven countries** in the continent of South America. Ranging from north to south they are **Venezuela**, **Columbia**, **Ecuador**, Peru, **Bolivia**, Chile, and Argentina. The Andes Mountain range has many very high peaks. The only higher mountains in the world are the Himalayas in Asia. The highest mountain in the Andes range is Mount Aconcagua in Argentina: it measures almost 23,000 feet high,

2. Consider the following water bodies:
I. Lake Tanganyika
II. Lake Tonlé Sap
III. Patos Lagoon
Through how many of them does the equator pass?
(a) Only one
(b) Only two
(c) All the three
(d) None

2. Ans-d

Explanation

Lake Tanganyika is situated in central Africa and is recognized as one of the deepest and oldest freshwater lakes in the world. It lies along the 6.25° S latitude, south of the Equator

Lake Tonle Sap, one of the largest freshwater lakes in Cambodia,It is located at the latitude of 13°N, lying north to the equator

Patos Lagoon, known locally as Lagoa dos Patos, is a significant coastal lagoon in southern Brazil and ranks among the largest lagoons in South America. This lagoon lies around 30° south of the Equator.

3. Consider the following statements about turmeric during the year 2022–23:

I. India is the largest producer and exporter of turmeric in the world.

II. More than 30 varieties of turmeric are grown in India.

III. Maharashtra, Telangana, Karnataka and Tamil Nadu are major turmeric producing States in India.

Which of the statements given above are correct?

(a) I and II only

(b) II and III only

(c) I and III only

(d) I, II and III

3. Ans-d

Explanation

India is the **largest producer, consumer and exporter of turmeric in the world**. In the year 2022-23, an area of 3.24 lakh ha was under turmeric cultivation in India with a production of 11.61 lakh tonnes (over 75% of global turmeric production).

Hence, statement 1 is correct

More than 30 varieties of Turmeric are grown in India and it is grown in over 20 states in the country. The largest producing states of Turmeric are Maharashtra, Telangana, Karnataka and Tamil Nadu.

Hence, statements 2&3 are incorrect

India has more than 62% share of world trade in turmeric. During 2022-23, 1.534 lakh tonnes of turmeric and turmeric products valued at 207.45 million USD was exported . The leading export markets for Indian Turmeric are Bangladesh, UAE, USA and Malaysia.

4. Which of the following are the evidences of the phenomenon of continental drift?

I. The belt of ancient rocks from Brazil coast matches with those from Western Africa.

II. The gold deposits of Ghana are derived from the Brazil plateau when the two continents lay side by side.

III. The Gondwana system of sediments from India is known to have its counterparts in six

different landmasses of the Southern Hemisphere.

Select the correct answer using the code given below:

(a) I and III only
(b) I and II only
(c) I, II and III
(d) II and III only

4. Ans-c

Explanation

Evidence in Support of the Continental Drift

The Matching of Continents (Jig-Saw-Fit)

The shorelines of Africa and South America facing each other have a remarkable and unmistakable match. It may be noted that a map produced using a computer programme to find the best fit of the Atlantic margin was presented by Bullard in 1964. It proved to be quite perfect. The match was tried at 1,000- fathom line instead of the present shoreline

Rocks of Same Age Across the Oceans

The radiometric dating methods developed in the recent period have facilitated correlating the rock formation from different continents across the vast ocean. **The belt of ancient rocks of 2,000 million years from Brazil coast matches with those from western Africa.** The earliest marine deposits along the coastline of South America and Africa are of the Jurassic age. This suggests that the ocean did not exist prior to that time.

Hence, statement 1 is correct

Tillite

It is the sedimentary rock formed out of deposits of glaciers. **The Gondawana system of sediments from India is known to have its counterparts in six different landmasses of the Southern Hemisphere.** At the base, the system has thick tillite indicating extensive and prolonged glaciation. Counterparts of this succession are found in Africa, Falkland Island, Madagascar, Antarctica and Australia. Overall resemblance of the Gondawana-type sediments clearly demonstrates that these landmasses had remarkably similar histories. The glacial tillite provides unambiguous evidence of palaeoclimates and also of drifting of continents

Hence, statement 3 is correct

Placer Deposits

The occurrence of rich placer deposits of gold in the Ghana coast and the absolute absence of source rock in the region is an amazing fact. The gold bearing veins are in Brazil and it is obvious that the

gold deposits of the Ghana are derived from the Brazil plateau when the two continents lay side by side.
Hence, statement 2 is correct

Distribution of Fossils
When identical species of plants and animals adapted to living on land or in fresh water are found on either side of the marine barriers, a problem arises regarding accounting for such distribution. The observations that Lemurs occur in India, Madagascar and Africa led some to consider a contiguous landmass 'Lemuria' linking these three landmasses. Mesosaurus was a small reptile adapted to shallow brackish water. The skeletons of these are found only in two localities: the Southern Cape province of South Africa and Iraver formations of Brazil. The two localities are presently 4,800 km apart with an ocean in between them.

5. Consider the following statements:
Statement I: The amount of dust particles in the atmosphere is more in subtropical and temperate areas than in equatorial and polar regions.
Statement II: Subtropical and temperate areas have less dry winds.
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 explains Statement I
(b) Both Statement I and Statement II are correct but Statement II doesnot explain Statement I
(c) Statement I is correct but Statement II is not correct
(d) Statement I is not correct but Statement II is correct

5. Ans-c
Explanation
Dust Particles Atmosphere has a sufficient capacity to keep small solid particles, which may originate from different sources and include sea salts, fine soil, smoke-soot, ash, pollen, dust and disintegrated particles of meteors. Dust particles are generally concentrated in the lower layers of the atmosphere; yet, convectional air currents may transport them to great heights. **The higher concentration of dust particles is found in subtropical and temperate regions due to dry winds in comparison to equatorial and polar regions.** Dust and salt particles act as hygroscopic nuclei around which water vapour condenses to produce clouds.
Hence, statement 1 is correct & statement 2 is incorrect

6. Consider the following statements:
Statement I: In January, in the Northern Hemisphere, the isotherms bend equatorward while crossing the landmasses, and poleward while crossing the oceans.

Statement II: In January, the air over the oceans is warmer than that over the landmasses in the Northern Hemisphere.

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 explains Statement I

(b) Both Statement I and Statement II are correct but Statement II doesnot explain Statement I

(c) Statement I is correct but Statement II is not correct

(d) Statement I is not correct but Statement II is correct

6. Ans-a

Explanation

The lines drawn on maps joining the places of equal temperature relative to sea level are called isotherms

In January, the sun shines vertically overhead near the tropic of Capricorn. Hence, it is summer in southern hemisphere and winter in the northern hemisphere.

Isotherms are generally parallel to the latitude. Generally, isotherms are straight but they bend at the junction of continents and oceans due to differential heating and cooling of land and water. The deviation from this general trend is more pronounced in January than in July, especially in the northern hemisphere.

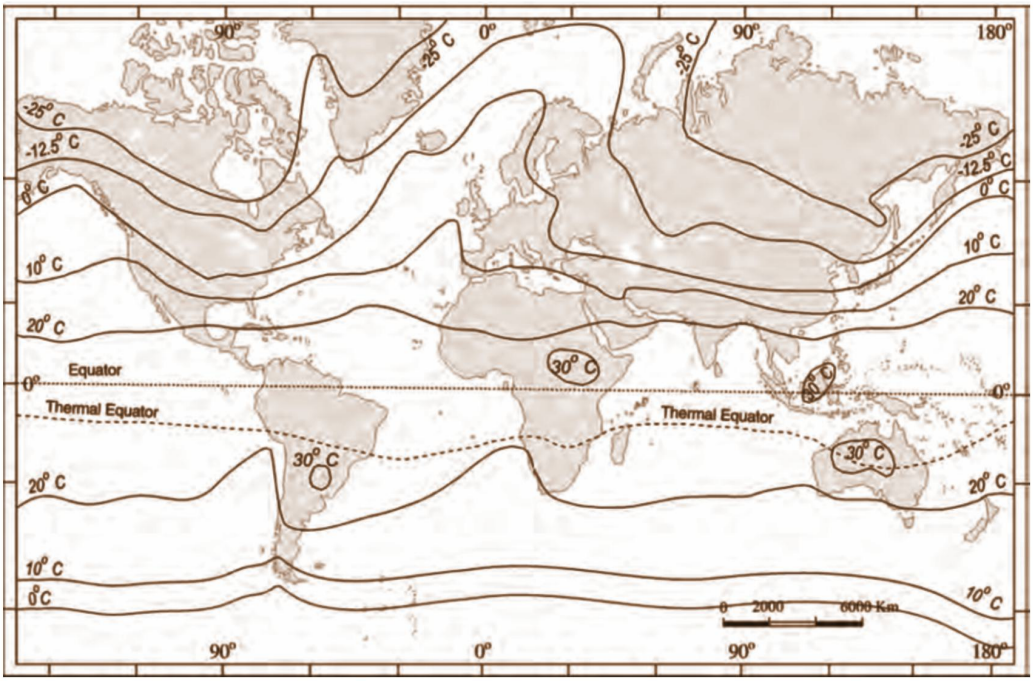
In January, isotherms suddenly bend poleward while passing through warm portions of oceans and bend equatorward while passing through cold portions of the oceans in January in northern hemisphere while the trend is opposite in July.

Hence, statement 1 is correct

In the northern hemisphere the land surface area is much larger than in the southern hemisphere. Hence, the effects of land mass and the ocean currents are well pronounced. This can be seen on the North Atlantic Ocean. **The presence of warm ocean currents,** Gulf Stream and North Atlantic drift, **make the Northern Atlantic Ocean warmer and the isotherms bend towards the north. Over the land the temperature decreases sharply and the isotherms bend towards south in Europe.**

Hence, statement 2 is correct & explains statement 1

The distribution of surface air temperature in the month of January



7. Consider the following statements:

Statement I: In the context of effect of water on rocks, chalk is known as a very permeable rock whereas clay is known as quite an impermeable or least permeable rock.

Statement II: Chalk is porous and hence can absorb water.

Statement III: Clay is not at all porous.

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

(a) Both Statement II and Statement III are correct and both of them explain Statement I

(b) Both Statement II and Statement III are correct but only one of them explains Statement I

(c) Only one of the Statements II and III is correct and that explains Statement I

(d) Neither Statement II nor Statement III is correct

7. Ans-c

Explanation

Chalk is characterized by its high porosity and permeability, which enables it to easily absorb water. Its structure consists of numerous small pores that allow water to pass through effortlessly. On the other hand, clay possesses exceptionally fine pores that render it nearly impermeable. Although it is not entirely devoid of porosity, the minuscule size of its pores significantly restricts water flow, making it much less permeable than chalk.

Hence, only Statement II is correct and it explains Statement I.

8. Consider the following statements:

I. Without the atmosphere, temperature would be well below freezing point everywhere on the Earth's surface.

II. Heat absorbed and trapped by the atmosphere maintains our planet's average temperature.

III. Atmosphere's gases, like carbon dioxide, are particularly good at absorbing and trapping radiation.

Which of the statements given above are correct?

(a) I and III only

(b) I and II only

(c) I, II and III

(d) II and III only

8. Ans-d

Explanation

The atmosphere functions as a protective blanket of air enveloping the Earth, effectively retaining the heat necessary to maintain a livable environment—often referred to as Goldilocks' planet. Within the atmosphere, certain gases, such as carbon dioxide and water vapor, are capable of absorbing the sun's infrared radiation. This process helps to prevent surface temperatures from plummeting during the night, when the sun is absent.

Additionally, the atmosphere regulates the amount of solar energy that reaches the Earth's surface. This is why regions with thicker layers of atmosphere, such as the poles, receive less solar energy, despite receiving the same radiation as equatorial regions.

Without the atmosphere, surface temperatures on Earth would experience extreme fluctuations, reaching up to 100 degrees Celsius during the day and dropping to near freezing at night, similar to the conditions observed on the moon. This freezing impact would be particularly pronounced in areas where sunlight strikes at an angle, such as the poles and temperate regions, while equatorial regions may still experience temperatures above freezing, as evidenced by the north and south poles of the moon.

Hence statement 1 is incorrect

Consequently, the assertion in statement I is incorrect. Conversely, the greenhouse effect describes the mechanism by which certain gases trap heat close to the Earth's surface, contributing to a warmer temperature than would otherwise exist.

Hence, statement 2 is correct.

Greenhouse gases include carbon dioxide, methane, ozone, nitrous oxide, chlorofluorocarbons, and water vapor.

Hence, statement 3 is correct.

9. Consider the following statements about the Rashtriya Gokul Mission:

I. It is important for the upliftment of rural poor, as majority of low producing indigenous animals are with small and marginal farmers and landless labourers.

II. It was initiated to promote indigenous cattle and buffalo rearing and conservation in a scientific and holistic manner.

Which of the statements given above is/are correct?

(a) I only

(b) II only

(c) Both I and II

(d) Neither I nor II

9. Ans-c

Explanation

The Rashtriya Gokul Mission (RGM) is being implemented for development and conservation of indigenous bovine breeds since December 2014. The scheme is important in enhancing milk production and productivity of bovines to meet growing demand of milk and making dairying more remunerative to the rural farmers of the country. The scheme is also continued under umbrella scheme Rashtriya Pashudhan Vikas Yojna from 2021 to 2026 with a budget outlay of Rs.2400 crore. The RGM will result in enhanced productivity and benefit of the programme, percolating to all cattle and buffaloes of India especially with small and marginal farmers. This programme will also benefit women in particular since over 70% of the work involved in livestock farming is undertaken by women.

Objectives:

a) To enhance productivity of bovines and increasing milk production in a sustainable manner using advance technologies.

b) To propagate use of high genetic merit bulls for breeding purposes.

c) To enhance Artificial insemination coverage through strengthening breeding network and delivery of Artificial insemination services at farmers doorstep.

d) To promote indigenous cattle & buffalo rearing and conservation in a scientific and holistic manner.

Hence, statements 1 and 2 are correct.

10. Consider the following countries :

I. United Kingdom

II. Denmark

III. New Zealand

IV. Australia

V. Brazil

How many of the above countries have more than four time zones?
(a) All the five
(b) Only four
(c) Only three
(d) Onl

10.Ans-c

Explanation

Countries with more than four time zones
France (13 Time Zones)
Russia (11 Time Zones)
The United States (11 Time Zones)
Australia (9 Time Zones)
The United Kingdom (9 Time Zones)
Canada (6 Time Zones)
Denmark (5 Time Zones)
New Zealand (5 Times Zones)
Brazil (4 Times Zones)

11. Consider the following statements :
I. Anadyr in Siberia and Nome in Alaska are a few kilometers from each other, but when people are waking up and getting set for breakfast in these cities, it would be different days.
II. When it is Monday in Anadyr, it is Tuesday in Nome.
Which of the statements given above is/are correct?
(a) I only
(b) II only
(c) Both I and II
(d) Neither I nor II

11.Ans-a

Explanation

Anadyr is a port town and the administrative center of Chukotka Autonomous Okrug, Russia, located at the mouth of the Anadyr River at the tip of a peninsula .
It was founded in 1889 as the easternmost outpost of the Russian Empire.
The Port Of Nome is in western Alaska. The city is located on the southern Seward Peninsula coast on Norton Sound of the Bering Sea.
The time difference between Nome, Alaska, and Anadyr is 20 hours. Anadyr is 20 hours ahead of Nome.
Hence Statement 1 is correct & Statement 2 is incorrect

12. Consider the following pairs :

Country ***Resource-rich in***

I. Botswana : Diamond

II. Chile : Lithium

III. Indonesia : Nickel

In how many of the above rows is the given information correctly matched?

(a) Only one

(b) Only two

(c) All the three

(d) None

12.Ans-c

Explanation

Botswana is now the largest diamond exporter in the world by value, and the second largest by volume

Chile has the world's largest lithium reserves (36%) and is the second-largest global producer (32%)

Indonesia leads the global nickel mining and smelting industry, producing nearly half of the world's refined nickel and two-thirds of its mined nickel, primarily on the islands of Sulawesi and Maluku.

All three are correctly matched

13. Consider the following pairs :

Region ***Country***

I. Mallorca : Italy

II. Normandy : Spain

III. Sardinia : France

In how many of the above rows is the given information correctly matched?

(a) Only one

(b) Only two

(c) All the three

(d) None

13.Ans-c

Explanation

Mallorca, or Majorca, is the largest of the Balearic Islands, which are part of **Spain**, and the seventh largest island in the Mediterranean Sea.

Hence 1st pair is incorrectly matched

Normandyis a geographical and cultural region in northwestern Europe

Normandy comprises mainland Normandy (a part of **France**) and insular Normandy (mostly the British Channel Islands)

Hence 2nd pair is incorrectly matched

Sardinia is the second-largest island in the Mediterranean Sea, after Sicily, and one of the twenty regions of **Italy.**

Hence 3rd pair is incorrectly matched

2024

Previous Year UPSC Geography Questions With Explanation 2024

There were 18 Questions from Geography in 2024, of which

- **9 Questions on Physical geography, which were directly picked from NCERT and G.C.Leong**
- **2 Questions on Economic Geography**
- **5 Questions on World Geography, of which two were map-based**
- **2 Questions from Indian Geography, which were map-based**

The level of the questions was moderate.

Most of the questions were aimed at testing the basic understanding of the subject and conceptual clarity.

1. Consider the following statements:
Statement-I : The atmosphere is heated more by incoming solar radiation than by terrestrial radiation.
Statement-II: Carbon dioxide and other greenhouse gases in the atmosphere are good absorbers of long-wave radiation.
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 explains Statement-I
(b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
(c) Statement I is correct, but Statement II is incorrect
(d) Statement I is incorrect, but Statement II is correct

1. Ans: d
Explanation:
The **insolation** (incoming solar radiation) received by the earth is in **short waveforms and heats up its surface.** The earth after being heated itself becomes a radiating body and it **radiates energy to the atmosphere in the long waveform.** This energy heats up the atmosphere from below. This process is known as **terrestrial radiation.**
Hence, statement 1 is incorrect.

The long wave radiation is absorbed by the atmospheric gases particularly by carbon dioxide and the other greenhouse gases. Thus, the atmosphere is indirectly heated by the Earth's radiation.
Hence, statement 2 is correct.

2. Consider the following statements:
Statement-I Thickness of the troposphere at the equator is much greater as compared to the poles.
Statement-II At the equator, heat is transported to great heights by strong convectional currents.
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 explains Statement-I
(b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
(c) Statement I is correct, but Statement II is incorrect
(d} Statement-I is incorrect, but Statement-II is correct.

2. Ans: a
Explanation:
The troposphere is the lowermost layer of the atmosphere. Its average height is 13 km and extends roughly to a height of **8 km near the poles and about 18 km at the equator**. **The thickness of the troposphere is greatest at the equator because heat is transported to great heights by strong convectional currents.**

This layer contains dust particles and water vapour. All changes in climate and weather take place in this layer.
The temperature in this layer decreases at the rate of 1° C for every 165m of height. This is the most important layer for all biological activity.
Hence, both statements 1 & 2 are correct, and statement 2 correctly explains statement 1.

3. Consider the following:
1. Pyroclastic debris
2. Ash and dust
3. Nitrogen compounds
4. Sulphur compounds
How many of the above are products of volcanic eruptions?
(a) Only one
(b) Only two
(c) Only three
(d) All four

3. Ans: d
Explanation:

The material that reaches the ground includes lava flows, **pyroclastic debris,** volcanic bombs, **ash and dust and gases such as nitrogen compounds, sulphur compounds** and minor amounts of chlorene, hydrogen and argon.
Hence, option d is correct.

4. Which of the following is/are correct inference/inferences from isothermal maps in the month of January?
1. The isotherms deviate to the north over the ocean and to the south over the continent.
2. The presence of cold ocean currents, Gulf Stream and North Atlantic Drift makes the North Atlantic Ocean colder and the isotherms bend towards the north.
Select the answer using the code given below:
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

4. Ans: a
Explanation:
The temperature distribution is generally shown on the map with the help of isotherms. The Isotherms are lines joining places having equal temperatures. In general, the effect of the latitude on temperature is well pronounced on the map, as the isotherms are generally parallel to the latitude. The deviation from this general trend is more pronounced in January than in July, especially in the northern hemisphere. In the northern hemisphere the land surface area is much larger than in the southern hemisphere. Hence, the effects of land mass and ocean currents are well-pronounced. **In January, the isotherms deviate to the north over the ocean and to the south over the continent. This can be seen in the North Atlantic Ocean.**
Hence, statement 1 is correct.

The presence of *warm ocean currents*, Gulf Stream and North Atlantic drift, make the Northern Atlantic Ocean warmer and the isotherms bend towards the north.
Hence, statement 2 is incorrect.

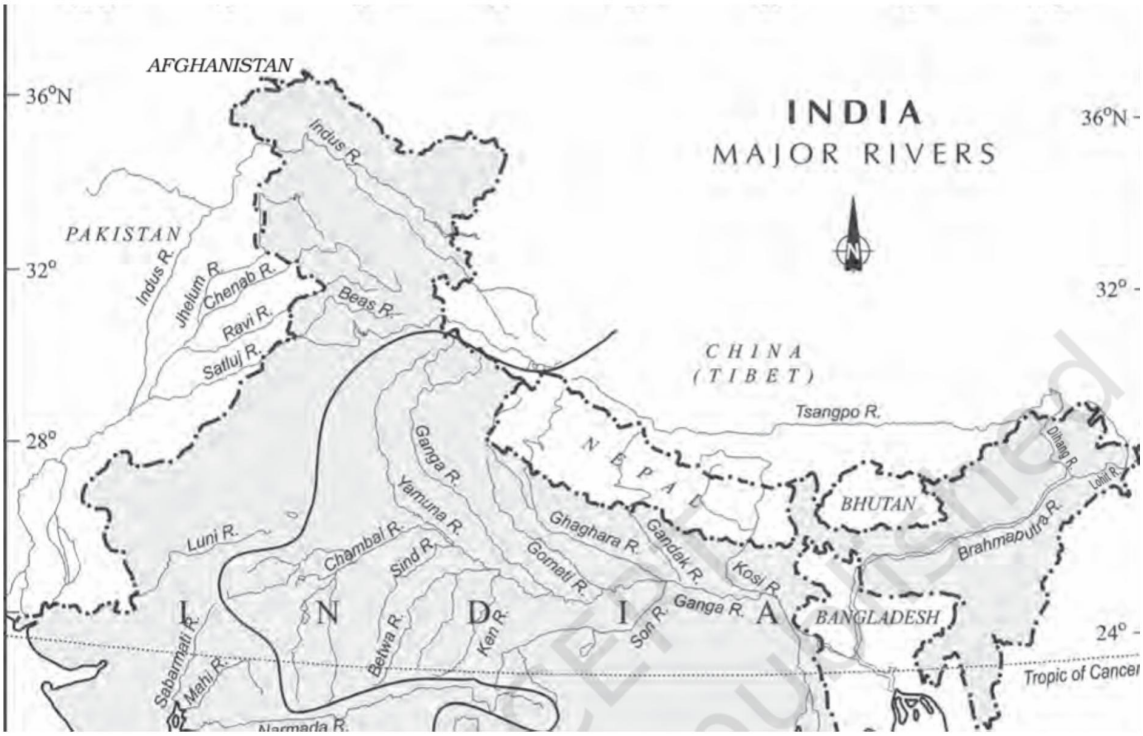
5. Which of the following countries are well known as the two largest cocoa producers in the world?
(a) Algeria and Morocco
(b) Botswana and Namibia
(c) Cote d'Ivoire and Ghana
(d) Madagascar and Mozambique

5. Ans: c
Explanation:

Côte d'Ivoire (the Ivory Coast) is the largest producer of cocoa in the world, producing over 2 million tons a year**. Ghana ranks second** in the world.
Hence, option c is correct.

6. With reference to the Himalayan rivers joining the Ganga downstream of Prayagraj from West to East, which one of the following sequences is correct?
(a) Ghaghara - Gomati - Gandak - Kosi
(b) Gomati - Ghaghara - Gandak - Kosi
(c) Ghaghara - Gomati - Kosi - Gandak
(d) Gomati - Ghaghara - Kosi – Gandak

6. Ans: b
Explanation:



Gomti: The Gomti river originates near Manikot in the Pillibhit district of Uttar Pradesh. From its origin to its confluence with Ganga, the river flows entirely in the State of Uttar Pradesh. Lucknow the capital city of Uttar Pradesh is situated on the banks of Gomti and it joins the Ganga in Audihar in the Jaunpur district of Uttar Pradesh.

Ghaghara: The Ghaghara river known variously as the Sarju or the Dehwa contains the combined waters of the Chauka or Sarda and the Kauriala which unite near Bahramghat in the Baranki district in Uttar Pradesh.
The Sarda River is the important tributary of the Ghaghara, which forms the **boundary between India and Nepal** for some distance. The total length of the Ghaghara before its confluence with the Ganga River at Doriganj downstream of Chapra town in Bihar is 1,080 km.

Gandak: The Gandak river (Sadanira, Saligrami in Nepal, or Narayani in the plains), known as the Kali or Krishna Gandak in the upper reaches rises at the altitude of 7620 m in Tibet near the Nepal border. It cuts through the Mahabharat Range and covering a distance of 425 km joins the Ganga near Patna.

Kosi: The Kosi (Kausika) is the largest of the tributaries of the Ganga is formed by the confluence of three streams namely the Sun Kosi, the Arun Kosi and the Tamur Kosi, all taking their origin in the Himalayan region of Nepal and Tibet.

The Kosi is notorious for its frequent and disastrous floods and shifting of courses. It is also called as 'the sorrow of Bihar' and meets the Ganga 32 km west of Manihari.

Hence, option b is correct.

7. Consider the following statements:
Statement I: Rainfall is one of the reasons for the weathering of rocks.
Statement-II: Rainwater contains carbon dioxide in solution.
Statement-III: Rainwater contains atmospheric oxygen.
Which one of the following is correct in respect of the above statements?
(a) Both Statement II and Statement III are correct and both of them explain Statement I
(b) Both Statement II and Statement III are correct, but only one of them explains Statement I
(c) Only one of StatementS II and III is correct and that explains Statement I
(d) Neither Statement II nor Statement III is correct

7. Ans: a
Explanation:
Chemical weathering
Chemical weathering is the basic process by which denudation proceeds. It is the extremely slow and gradual decomposition of rocks due to exposure to air and water. Soil absorbs rainwater and keeps the underlying rocks in contact with this moisture. The rainwater absorbs organic acids from the soil and thus becomes a stronger weathering agent.
Hence, statement 1 is correct.

There are three major chemical weathering processes.

(a) **Solution:** many minerals are **dissolved** by water, especially when, as **with rainwater, it contains enough carbon dioxide to make it a weak acid.** The solution is the most potent weathering process in limestone regions because the rainwater attacks and dissolves the calcium carbonate from which the rock is chiefly formed.

Hence, statement 2 is correct.

(b) **Oxidation:** Oxidation is the reaction of oxygen in air or water with minerals in rocks. For example, most rocks contain a certain amount of iron, which, when it comes in contact with air, is changed to iron oxide, a familiar brownish crust or rust.

Hence, statement 3 is correct.

(c) **Decomposition by organic acids:** with the soil, which covers most rocks are bacteria that thrive on decaying plants or animal materials. These bacteria produce **acids** which, when dissolved in water, help to speed up the weathering of the underlying rocks.

Hence, both statements 1 & 3 are correct and both of them explain statement 1.

8. Consider the following countries:

1. Finland
2. Germany
3. Norway
4. Russia

How many of the above countries have a border with the North Sea?

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

8. Ans: b

Explanation:

The North Sea, a shallow, northeastern arm of the Atlantic Ocean, is located between the British Isles and the mainland of northwestern Europe and covers an area of 2,20,000 square miles (5,70,000 square km).

The sea is bordered by the island of Great Britain to the southwest and west, the Orkney and Shetland islands to the northwest, **Norway** to the northeast, Denmark to the east, **Germany** and the Netherlands to the southeast, and Belgium and France to the south. It is connected to the Atlantic by the ***Strait of Dover*** and the English Channel and opens directly onto the ocean between the Orkney and Shetland Islands and between the Shetland Islands and Norway. The Skagerrak, an eastward extension of the North Sea between Norway and Denmark, connects the North and Baltic seas via the Kattegat and the Danish straits.

Hence, option b is correct.

9. Consider the following information:

	Waterfall	***Region***	***River***
1.	Dhuandhar	Malwa	Narmada
2.	Hundru	Chota Nagpur	Subarnarekha
3.	Gersoppa	Western Ghats	Netravati

In how many of the above rows is the given information correctly matched?

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

9. Ans: a

Explanation:

	Waterfall	***Region***	***River***
1.	Dhuandhar	Vindhyanchal Baghelkhand region	Narmada
2.	**Hundru**	**Chota Nagpur**	**Subarnarekha**
3.	Gersoppa	Western Ghats	Shravati

Narmada

Narmada is the largest west-flowing river of the peninsula India. It rises from a Kund near Amarkantak, in the Anuppur district of Madhya Pradesh, at an elevation of about 1057 m in the Maikala range. 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.

Flowing in a rift valley between the Satpura in the south and the Vindhyan range in the north, Narmada forms a picturesque gorge in marble rocks and the Dhuandhar waterfall near Jabalpur.

Vindhyanchal Baghelkhand region **-** The region is a hill-valley complex covering Annupur, Shahdol, Dindori, Mandla, Balaghat, Jabalpur, Narsimhapur and Chhindwara districts of Madhya Pradesh falling in Narmada basin.

The Subarnarekha is one of the longest east-flowing inter-state rivers. It originates near Nagri village in Ranchi district of Jharkhand at an elevation of 600 m. The total length of the river is about 395 km.

The principal tributaries of the river are Kanchi, Kharkai and Karkari. The Subernarekha basin extends over the States of Jharkhand, Odisha and a comparatively smaller part of West Bengal.

The Hundru Falls in Ranchi is created on the course of the Subarnarekha River, where it falls from a height of 320 feet creating the highest waterfalls in the state of Jharkhand.

The River Sharavathi - The streams of the Western Ghats flow swiftly down the steep slope and some of them make waterfalls. The Jog or Gersoppa Falls (289m) made by the Sharavati river is the most famous waterfall in India.

The River Sharavathi flows across Uttara Kannada and the Shimoga District of Karnataka. Originating at Ambutirthha (Tirthahalli), it flows for nearly 128 km before joining the Arabian Sea at Karki, Honnavar.
The plain regions of the catchment are dominated by lakes whereas the Ghats are dominated by streams.
The variations in the terrain have led to the formation of various waterfalls such as the Jog Falls/ Gersoppa, Apsarakonda, Mavinagundi falls, and Dabbe fall .
Only 2nd row is correctly matched.
Hence, option a is correct.

10. Consider the following information:

	Region	***Name of the mountain range***	***Type of mountain***
1.	Central Asia	Vosges	Fold mountain
2.	Europe	Alps	Block mountain
3.	North America	Appalachians	Fold mountain
4.	South America	Andes	Fold mountain

In how many of the above rows is the given information correctly matched?
(a) Only one
(b) Only two
(c) Only three
(d) All four

10. Ans: b
Explanation:

	Region	***Name of the Mountain Range***	***Type of Mountain***

1.	Europe	Vosges	Block Mountain
2.	Europe	Alps	Fold Mountain
3.	North America	Appalachians	Fold Mountain
4.	South America	Andes	Fold Mountain

Fold Mountains: They are caused by large-scale earth movements when stresses are set up in the earth's crust. When stresses are initiated, the rocks are subjected to compressive forces that produce wrinkling or folding along the lines of weakness.
The great fold mountains of the world are the Himalayas, Rockies, **Appalachians, Andes and Alps.**

Block Mountains: When the earth's crust bends folding occurs, but when it cracks, faulting takes place. Faulting may be caused by tension or compression, forces that lengthen or shorten the earth's crust, causing a section of it to subside or to rise above the surrounding level.
Examples of block mountains include the Hunsruck Mountains, the **Vosges** and the Black Forest of the Rhineland.

- **Vosges,** massif extending west of the Rhine River Valley in the Haut-Rhin, Bas-Rhin, and Vosges *départements* of **eastern France (Europe).**
- **Alps:** The Alps form part of France, Italy, Switzerland, Germany, Austria, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, and Albania **(Europe).**
- **Appalachian Mountains**: They are the great highland system of **North America**, the eastern counterpart of the Rocky Mountains. Extending for almost 2,000 miles (3,200 km) from the Canadian province of Newfoundland and Labrador to central Alabama in the United States, the Appalachian Mountains form a natural barrier between the eastern Coastal Plain and the vast Interior Lowlands of North America.
- **Andes Mountains Range:** The Andes Mountains are the longest continental mountain range in the world. It forms **a continuous highland along the western edge of South America. Venezuela, Col**ombia, Ecuador, Peru, Bolivia, Chile, and Argentina are the seven South American nations that the Andes pass through on their way from north to south.

Only 3rd and 4th rows are correctly matched.
Hence, option b is correct.

11. Consider the following airports:
1. Donyi Polo Airport
2. Kushinagar International Airport
3. Vijayawada International Airport
In the recent past, which of the above have been constructed as Greenfield projects?
(a) 1 and 2 only
(b) 2 and 3 only

(c) 1 and 3 only
(d) 1, 2 and 3

11. Ans: a

Explanation:

A Greenfield project is a type of project that starts from scratch with no existing infrastructure or resources.

Under the Greenfield Airports policy 2008, the Government of India has accorded 'In-Principle' approval for the setting up of 21 Greenfield Airports namely, Mopa in Goa, Navi Mumbai, Shirdi and Sindhudurg in Maharashtra, Kalaburagi, Vijayapura, Hassan and Shivamogga in Karnataka, Dabra (Gwalior) in Madhya Pradesh, **Kushinagar** and Noida (Jewar) in **Uttar Pradesh,** Dholera and Hirasar in Gujarat, Karaikal in Puducherry, Dagadarthi, Bhogapuram and Orvakal (Kurnool) in Andhra Pradesh, Durgapur in West Bengal, Pakyong in Sikkim, Kannur in Kerala and **Itanagar in Arunachal Pradesh** across the country.

Out of these, 9 Greenfield airports viz. Durgapur, Shirdi, Kannur, Pakyong, Kalaburagi, Orvakal (Kurnool), Sindhudurg, **Kushinagar** and **Donyi Polo, Itanagar** have been operationalised.

Donyi Polo Airport is located in Itanagar, Arunachal Pradesh.

Kushinagar International Airport is located in Uttar Pradesh.

Hence, option a is correct.

12. With reference to "water vapour", which of the following statements is/are correct?

1. It is a gas, the amount of which decreases with altitude.
2. Its percentage is maximum at the poles.

Select the answer using the code given below.

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

12. Ans: a

Explanation:

Water vapour is a variable gas in the atmosphere, which decreases with altitude. In the warm and wet tropics, it may account for four per cent of the air by volume, while in the dry and cold areas of desert and polar regions, it may be less than one per cent of the air.

Hence, statement 1 is correct.

Water vapour also decreases from the equator towards the poles. It also absorbs parts of the insolation from the sun and preserves the earth's radiated heat. It thus, acts like a blanket allowing

the earth neither to become too cold nor too hot. Water vapour also contributes to the stability and instability in the air.
Hence, statement 2 is incorrect.

13. Consider the following description:
1. Annual and daily range of temperatures is low.
2. Precipitation occurs throughout the year.
3. Precipitation varies between 50 cm - 250 cm.
What is this type of climate?
(a) Equatorial climate
(b) China type climate
(c) Humid subtropical climate
(d) Marine West Coast climate

13. Ans: d
Explanation:
Marine West Coast Climate: Marine west coast climate is located poleward from the Mediterranean climate on the west coast of the continents.

The main areas are Northwestern Europe, the west coast of North America, north of California, southern Chile, southeastern Australia and New Zealand. Due to marine influence, the temperature is moderate and in winter, it is warmer than for its latitude.
The mean temperature in summer months ranges from 15°-20°C and in winter 4°-10°C.
The annual and daily ranges of temperature are small.
Precipitation occurs throughout the year.
Precipitation varies greatly from 50-250 cm.
Hence, option d is correct.

14. With reference to "Coriolis force", which of the following statements is/are correct?
1. It increases with an increase in wind velocity.
2. It is maximum at the poles and is absent at the equator.
Select the answer using the code given below:
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

14. Ans: c
Explanation:
Coriolis Force

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. It 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.**

Hence, statement 1 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.**

Hence, statement 2 is correct.

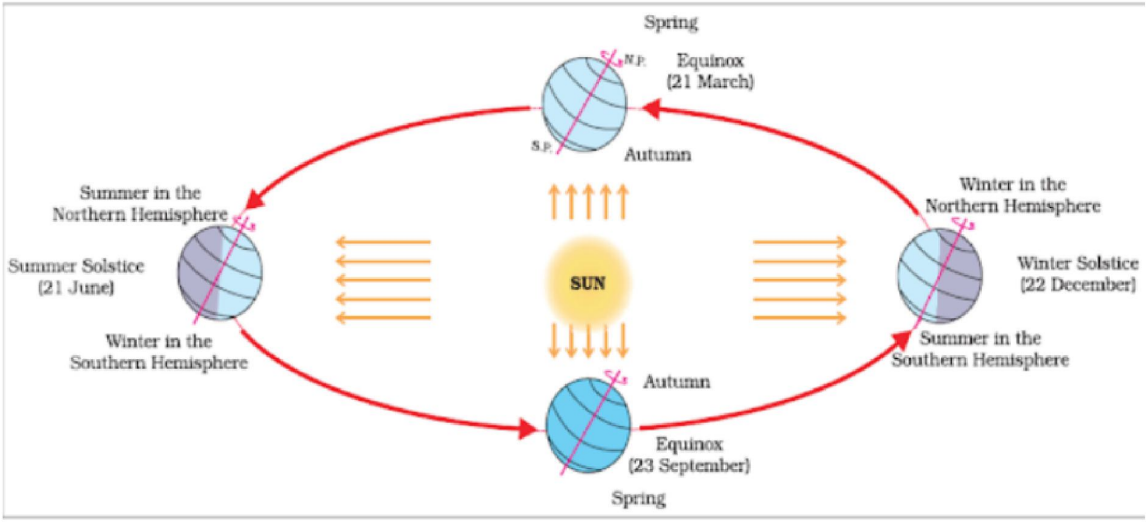
15. On June 21 every year, which of the following latitude(s) experiences(s) sunlight of more than 12 hours?

1. Equator
2. Tropic of Cancer
3. Tropic of Capricorn
4. Arctic Circle

Select the correct answer using the code given below:

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

15. Ans: d



Explanation:

In the summer (June), the daylight increases as we go poleward. **At the Arctic Circle, the sun never 'sets' at mid-summer (June 21) and there is a complete 24-hour period of continuous daylight.** In

summer, the region north of the Arctic Circle is popularly referred to as the 'Land of the Midnight Sun'. At the North Pole, there will be six months of continuous daylight.

After the March equinox the sun appears to move north and is vertically overhead at the Tropic of Cancer on about 21 June. This is known as the June or summer solstice, when the northern hemisphere will have its longest day and shortest night.

Hence, option d is correct.

16. The longest border between any two countries in the world is between:

(a) Canada and the United States of America
(b) Chile and Argentina
(c) China and India
(d) Kazakhstan and Russian Federation

16. Ans: a

Explanation:

The international land border between the United States and Canada is the longest in the world at almost 8,900 kilometres. It includes the border between Canada and the continental U.S. as well as the border between Alaska and northern Canada.

Length of longest international land borders worldwide:

	Countries	*Length (in kilometres)*
1.	**Canada-United States**	**8893**
2.	Kazakhstan-Russia	7644
3.	Argentina-Chile	6691
4.	China-Mongolia	4630
5.	Bangladesh-India	4142
6.	China-Russia	4133
7.	Mongolia-Russia	3452
8.	Bolivia-Brazil	3403
9.	India-Pakistan	3190
10.	Mexico-United States	3155

Hence, option a is correct.

17. Consider the following statements:
1. The Red Sea receives very little precipitation in any form.
2. No water enters the Red Sea from rivers.
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

17. Ans: c

Explanation:

The Red Sea region receives very little precipitation in any form, although prehistoric artifacts indicate that there were periods with greater amounts of rainfall.
Hence, statement 1 is correct.

No water enters the Red Sea from rivers, and rainfall is scant; but the evaporation loss—in excess of 80 inches per year.
The Red Sea, home to the second-longest coral reef system in the world, is a vital resource for the Kingdom of Saudi Arabia. The Red Sea provides 90% of the Kingdom's potable water by desalinisation (it is one of the world's saltiest water masses), and it supports tourism, shipping, aquaculture, and fishing industries, which together contribute about 10%–20% of the country's GDP.
Hence, statement 2 is correct.

18. Consider the following:
1. Cashew
2. Papaya
3. Red sanders
How many of the above trees are actually native to India?
(a) Only one
(b) Only two
(c) All three
(d) None

18. Ans: a

Explanation:

The Papaya originated in Mesoamerica, likely in southern Mexico
The cashew is native to northeastern Brazil. Portuguese missionaries took it to East Africa and India during the late 16th century.

The **Red Sanders** (Pterocarpus santalinus) is an **endemic** tree species to the forests of Seshachalam, Veligonda, Lankamala and Palakona Hills range of AndhraPradesh.
Hence, option a is correct.

2023

Previous Year UPSC Geography Questions (PYQs) With Explanation 2023

There were 15 Questions from Geography in 2023, of which

- **3 Questions on Fundamentals of Physical Geography**
- **3 Questions on Indian Physical Geography**
- **2 Questions on World Physical Geography**
- **7 Questions on Economic Geography**

Most of the questions were aimed at testing the basic understanding of the subject and conceptual clarity.

Overall, the level of the questions was moderate.

1. Consider the following statements :
1. Jhelum River passes through Wular Lake.
2. Krishna River directly feeds Kolleru Lake.
3. Meandering of Gandak River formed Kanwar Lake.

How many of the statements given above are correct?
(a) Only one
(b) Only two
(c) All three
(d) None

1. Ans: a

Explanation:

The Jhelum rises in a spring at Verinag in the south-eastern part of the Kashmir Valley. **If flows northwards from Wular Lake** and further down south-westwards. The river flows through the Kashmir Valley. At Muzaffarabad, the river takes a sharp swing southward and the Kishanganga joins it on its right bank. Thereafter, it forms the India-Pakistan boundary and emerges at the Potwar Plateau. It joins the Chenab at Timmu.

Hence, statement 1 is correct.

Kolleru Lake - A natural eutrophic lake, situated between the two major river basins of the Godavari and the Krishna functions as a natural flood balancing reservoir between the deltas of the two rivers.
Hence, statement 2 is incorrect.

Kabartal Wetland, also known as Kanwar Jheel, is situated in Begusarai district in the state of Bihar, within an extensive floodplain complex; it floods during the monsoon season to a depth of 1.5 metres. This absorption of floodwaters is a vital service in Bihar State where 70% of the land is vulnerable to inundation. During the dry season, areas of marshland dry out and are used for agriculture.
The Gandak comprises two streams, namely Kaligandak and Trishulganga. It rises in the Nepal Himalayas between the Dhaulagiri and Mount Everest and drains the central part of Nepal. It enters the Ganga plain in Champaran district of Bihar and joins the Ganga at Sonpur near Patna.
Hence, statement 3 is incorrect.

2. Consider the following pairs :

Port		Well known as
1. Kamarajar Port	:	First major port in India registered as a company
2. Mundra Port	:	Largest privately owned port in India
3. Visakhapatnam Port	:	Largest container port in Port India

How many of the above pairs are correctly matched?
(a) Only one pair
(b) Only two pairs
(c) All three pairs
(d) None of the pairs

2. Ans: b
Explanation:
Kamarajar Port: It is the 12th major port of India, and the **first port in India which is a public company.** The Kamarajar Port is the only corporatised major port and is registered as a company. The port was declared as a major port under the **Indian Ports Act, 1908** in March 1999 and incorporated as **Ennore Port Limited** under the Companies Act, 1956 in October 1999.
Hence, 1st pair is correctly matched.

Mundra Port: All-weather port is the largest commercial port in India. It also has the largest Coal Import Terminal which gives faster cargo evacuation and minimal turnaround time.
It is located on the northern shores of the Gulf of Kutch near Mundra, Kutch district, Gujarat. Formerly operated by Mundra Port and Special Economic Zone Limited (MPSEZ) owned by Adani Group, it was later expanded into Adani Ports & SEZ Limited (APSEZ) managing several ports.
Hence, 2nd pair is correctly matched.

The **Jawaharlal Nehru Port Authority (JNPA)** at Navi Mumbai is a **premier container handling Port in India** accounting for around **50% of the total containerised cargo volume**. **It is India's leading container port.**

The Visakhapatnam Port, one of the thirteen Major Ports of India, **is an all-weather natural Port** and the fastest-growing maritime gateway to peninsular India.
Hence, 3rd pair is incorrectly matched.

3. Consider the following trees:
1. Jackfruit (Artocarpus heterophyllus)
2. Mahua (Madhuca indica)
3. Teak (Tectona grandis)
How many of the above are deciduous trees?
(a) Only one
(b) Only two
(c) All three
(d) None

3. Ans: b
Explanation:
Tropical Moist Deciduous Forests:
These forests are found in areas of moderate rainfall of 100 to 200 cm per annum, mean annual temperature of about 27^0C and the average annual relative humidity of 60 to 75 per cent. The trees of these forests drop their leaves for about 6-8 weeks during the spring and early summer when sufficient moisture for the leaves is not available. **The main species found in these forests are *teak,* sal, padauk, laurel, white chuglam, badam, dhup, chikrosi, kokko, haldu, rosewood, *mahua*, bijasal, lendi, semul, irul, dhaman, amla, kusum, bamboo etc.**
Tropical Rain Forests

Cauliflory or bearing of flowers and fruits on the trunk of the tree rather than at the ends of branches is a characteristic of Rain forest, the advantage is that the plant can produce larger, heavier fruits, the biggest of all such cauliflorous fruits is Jackfruit (Artocarpus heterophyllus). Jack fruit probably originated in Rain forest which once covered Southern India, currently cultivated throughout southeastern Asia.
Hence, option b is correct.

4. Consider the following statements:
1. India has more arable area than China.
2. The proportion of irrigated area is more in India as compared to China.
3. The average productivity per hectare in Indian agriculture is higher than that in China.

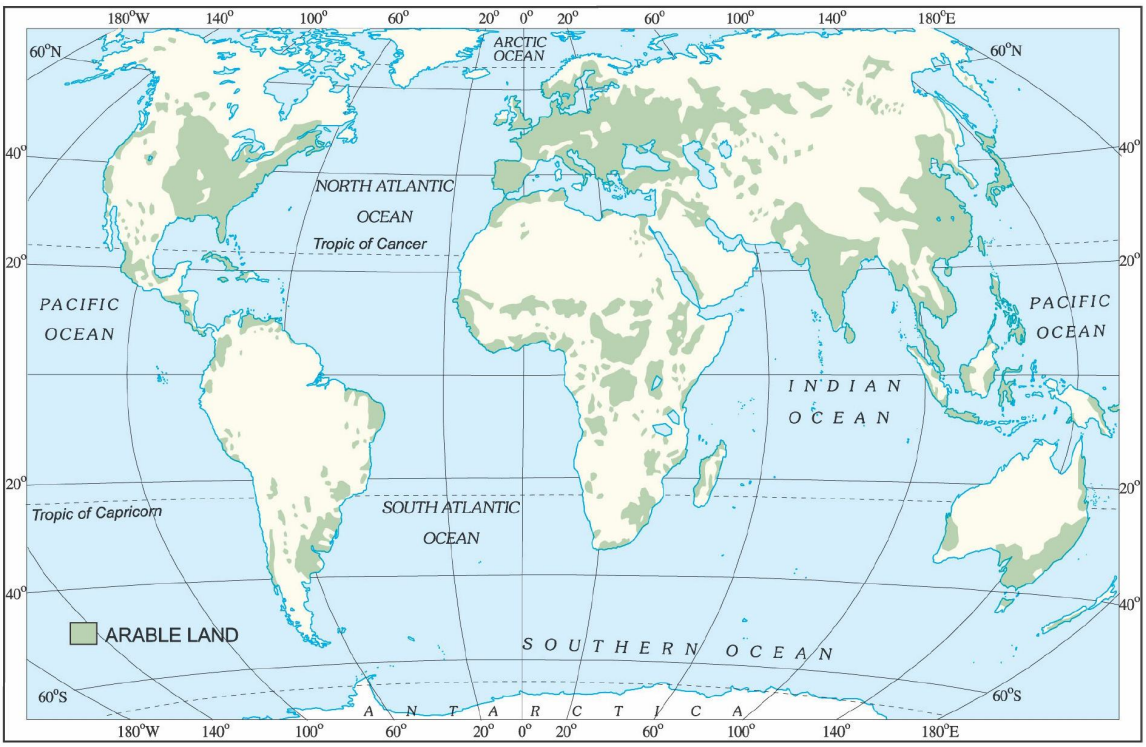
How many of the above statements are correct?

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

4. Ans: a

Explanation:

Arable land is defined by the United Nations Food and Agriculture Organization (FAO) as land currently used, or potentially capable of being used, to grow seasonal crops. This definition includes annual crops, such as wheat, beans, and rice, but excludes land used for pasturing, tree farming (or "silviculture"), or more durable agricultural installations such as vineyards, orchards, and coffee and rubber plantations.



World Distribution of Arable Land

India's Position in World Agriculture

	Area (Million Hectares)	India's Rank	Next To
Total Area	328.73	Seventh	Russian Federation, Canada, U.S.A, China, Brazil, Australia
Land Area	297.32	Seventh	Russian Federation, China, U.S.A, Canada, Brazil, Australia
Arable Area	155.37	Second	U.S.A

Hence, statement 1 is correct.

China has a higher percentage of irrigated land compared to India's irrigated area.

China- 53.8%

India 36.6%

Hence, statement 2 is incorrect.

China's productivity in most crops is 50 to 100% higher than India's. Both India and China are among the world's top three producers of important crops such as rice, wheat, cotton, and maize, but China produces much more from each hectare of land than India does.

It is worth noting that China's fertiliser consumption in 2016 was 503 kg/ha of arable area compared to just 166 kg/ha for India, as per World Bank estimates.
Hence, statement 3 is incorrect.

As per the Seventh Schedule of the Constitution of India, land comes under the purview of State Governments. Therefore, State governments are to take suitable steps to check the diversion of arable land for commercial non-agricultural purposes.

5. Ilmenite and rutile, abundantly available in certain coastal tracts of India, are rich sources of which one of the following?
(a) Aluminium
(b) Copper
(c) Iron
(d) Titanium

5. Ans: d

Explanation:

Heavy mineral sands comprise a group of seven minerals, viz, ilmenite, leucoxene (brown ilmenite), rutile, zircon, sillimanite, garnet, and monazite. **Ilmenite ($FeO.TiO_2$) and rutile (TiO_2) are the two chief minerals of titanium.**

Ilmenite and rutile along with other heavy minerals are important constituents of beach sand deposits found right from Moti Daman-Umbrat coast (Gujarat) in the west to Odisha coast in the east.

Tamil Nadu is the leading producer of ilmenite contributing 66% of the total production followed by Odisha 25% and Kerala 9 per cent.

Odisha is the leading producer of rutile accounting for 43% of the total production followed by Tamil Nadu 38% and Kerala 19 per cent.

Hence, option d is correct.

6. About three-fourths of world's cobalt, a metal required for the manufacture of batteries for electric motor vehicles, is produced by:

(a) Argentina
(b) Botswana
(c) The Democratic Republic Of the Congo
(d) Kazakhstan

6. Ans: c

Explanation:

Democratic Republic Of the Congo (DRC) is the **world's largest producer of cobalt from mines, accounting for over 70 per cent of global cobalt mine production in 2023.**

DRC is also Africa's leading producer of copper.

Cobalt is a silver-grey, hard, and lustrous metal that is only found in the Earth's crust in chemically combined form. Cobalt is, therefore, primarily mined as a byproduct of nickel and copper mining. From there, cobalt is produced by reductive smelting.

DRC has by far the world's largest reserves of cobalt. Cobalt is primarily used in lithium-ion batteries for electric devices such as laptops and electric vehicles.

Hence, option c is correct.

7. Which one of the following is a part of the Congo Basin?

(a) Cameroon
(b) Nigeria

(c) South Sudan
(d) Uganda

7. Ans: a

Explanation:

The Congo Basin is Known as the "lungs of Africa", it is the largest carbon sink in the world, absorbing more carbon than the Amazon. **The Congo Basin spans across six countries—Cameroon, Central African Republic, Democratic Republic of the Congo, Republic of the Congo, Equatorial Guinea and Gabon.**

Hence, option a is correct.

8. Consider the following statements :

1. Amarkantak Hills are at the confluence of Vindhya and Sahyadri Ranges.
2. Biligirirangan Hills constitute the easternmost part of Satpura Range.
3. Seshachalam Hills constitute the southernmost part of Western Ghats.

How many of the statements given above are correct?

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

8. Ans: d

Explanation:

Location of Amarkantak in Madhya Pradesh in India at the **confluence of Maikal Hill, Satpura and Vindhyan ranges.** The area is a "Genetic Express Highway" linking two biological Hot Spots namely Western Ghats and Eastern Himalayas. A total of more than a thousand species spread over 151 plant families have been reported from the area.

Hence, statement 1 is incorrect.

Biligirirangan is a hill range situated in south-eastern Karnataka, at its border with Tamil Nadu in South India.

The Satpura Range is a series of seven mountains. It runs in an east-west direction south of the Vindhyas and in between the Narmada and the Tapi. Commencing from the Rajpipla Hills in the west, through the Mahadev Hills to the Maikala Range, it stretches for a distance of about 900 km.

Hence, statement 2 is incorrect.

Seshachalam Hills, hill ranges of the Eastern Ghats, southern Andhra Pradesh state, southeastern India. They are bounded by the Rayalaseema uplands in the west and northwest and the Nandyal Valley (formed by the Kunderu River) in the northeast.

Hence, statement 3 is incorrect.

9. With reference to India's projects on connectivity, consider the following statements:
1. East-West Corridor under Golden Quadrilateral Project connects Dibrugarh and Surat.
2. Trilateral Highway connects Moreh in Manipur and Chiang Mai in Thailand via Myanmar.
3. Bangladesh-China-India-Myanmar Economic Corridor connects Varanasi in Uttar Pradesh with Kunming in China. ·
How many of the above statements are correct?
(a) Only one
(b) Only two
(c) All three
(d) None

9. Ans: d
Explanation:
Golden Quadrilateral links the Delhi-Kolkata-Chennai-Mumbai-Delhi circuit; includes a North-South Corridor connecting Kashmir to Kanyakumari, and a similar **East-West Corridor** connecting **Silchar (Assam) to Saurashtra (Porbandar, Gujarat)**.
Hence, statement 1 is incorrect.

Under the Look East Policy of India, **the trilateral highway** stretching over 1,400 kilometres will connect the **Indian city of Moreh in Manipur to Thailand's Mae Sot** (located on the border of Thailand and Myanmar, while Chiang Mai is located in the interior of Thailand) via Myanmar. This project aims to establish smooth connectivity and improve economic cooperation between India, Myanmar, and Thailand.
Hence, statement 2 is incorrect.

The 2800 km **BCIM corridor** proposes to link **Kunming in China's Yunnan province with Kolkata**, passing through nodes such as Mandalay in Myanmar and Dhaka in Bangladesh before heading to Kolkata.
Hence, statement 3 is incorrect.

10. Consider the following statements:
Statement I: India, despite having uranium deposits, depends on coal for most of its electricity production.
Statement II: Uranium, enriched to the extent of at least 60%, is required for the production of electricity.
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

10. Ans: c

Explanation:

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), Delhi Supergroup of rocks (Rajasthan) and Bhima basin (Karnataka).

Installed Generation Capacity (Fuelwise)

Category	Installed Generation Capacity (GW)	% Share in Total
Coal	210.970	47.4%
Lignite	6.620	1.5%
Gas	24.818	5.6%
Diesel	0.589	0.1%
Total Fossil Fuel	**242.997**	**54.6%**

Renewable Energy	**193.580**	**43.5%**
Hydro	46.928	10.6%
Wind	46.422	10.4%
Solar	84.277	18.9%
BM Power/Cogen.	10.355	2.3%
Waste to Energy	0.591	0.1%
Small hydro Power	5.005	1.1%
Nuclear	**8.180**	**1.8%**
Total Non-Fossil Fuel	**201.760**	**45.4%**

Total Installed Capacity (Fossil Fuel & Non-Fossil Fuel)	**444.757**	**100%**

In India, power is generated from conventional (Thermal, Nuclear & Hydro) and renewable sources (Wind, Solar, Biomass etc.). However, **major production of Electricity is achieved through coal a thermal power plant.**
Hence, statement 1 is correct.

Uranium found in nature consists largely of two isotopes: U-235 and U-238. The production of energy in nuclear reactors is from the 'fission' or splitting of the U-235 atoms, a process which releases energy in the form of heat. Natural uranium contains 0.7% of the U-235 isotope. **Most reactors are light water reactors (of two types- PWR and BWR) and require uranium to be enriched from 0.7% to 3-5% U-235 in their fuel. This is normal low-enriched uranium (LEU).** There is some interest in taking enrichment levels to about 7% and even close to 20% for certain special power sector fuels.
Hence, statement 2 is incorrect.

11. Consider the following countries:
1. Bulgaria
2. Czech Republic
3. Hungary
4. Latvia
5. Lithuania
6. Romania

How many of the above-mentioned countries share a land border with Ukraine?
(a) Only two
(b) Only three
(c) Only four
(d) Only five

11. Ans: a
Explanation:
Ukraine shares border with seven other countries- Poland, Slovakia, **Hungary, Romania,** Moldova, Russia and Belarus.

Hence, option a is correct.

12. With reference to the Earth's atmosphere, which one of the following statements is/are correct?

(a) The total amount of insolation received at the equator is roughly about 10 times of that received at the poles.

(b) Infrared rays constitute roughly two-thirds of insolation.

(c) Infrared waves are largely absorbed by water vapour that is concentrated in the lower atmosphere.

(d) Infrared waves are a part of visible spectrum of electromagnetic waves of solar radiation.

12. Ans: c

Explanation:

Maximum insolation is over the subtropical deserts as the cloudiness is the least here. The insolation received at the surface varies from about 320 watts/m2 in the tropics to about 70 watts/m2 in the poles. The Equator receives comparatively less insolation even than the tropics (less than 320 watts/m2). So, even if the insolation is greater at the equator than at the poles, it's not 10 times larger.

Hence, statement 1 is incorrect.

Insolation includes a broad spectrum of electromagnetic radiation in the form of visible light, ultraviolet (UV) radiation, and other wavelengths as well. **While infrared radiation is a significant component of solar radiation, it does not account for two-thirds of the insolation.**
Hence, statement 2 is incorrect.

Water vapour is a potent absorber of infrared radiation, particularly in certain wavelength bands. **In the lower atmosphere, where water vapour concentration is relatively higher, it absorbs a significant amount of infrared radiation emitted by the Earth's surface.** This absorption contributes to the greenhouse effect and plays a crucial role in regulating the Earth's temperature.
Hence, statement 3 is correct.

Infrared waves and visible light waves form the different parts of the electromagnetic spectrum. The visible spectrum ranges from around 400 to 700 nanometers and includes the colours we perceive. Infrared radiation, on the other hand, has longer wavelengths than visible light and is not visible to the human eye. It lies just beyond the red end of the visible spectrum and is typically divided into near-infrared, mid-infrared, and far-infrared regions based on wavelength.
Hence, statement 4 is incorrect.

13. Consider the following statements:
Statement I: The temperature contrast between continents and oceans is greater during summer than in winter.
Statements II: The specific heat of water is more than that of land surface.
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

13. Ans: d
Explanation:
In summer, the continents manufacture warm rather than cold air, and **there is much less contrast between temperatures than in winter.**
Hence, statement 1 is incorrect.
Specific heat is the amount of heat energy required to raise the temperature of a substance by a certain amount. Water has a relatively high specific heat compared to land surfaces. This means that it takes a larger amount of heat energy to raise the temperature of water compared to an equal mass of land surface material by the same amount. The high specific heat of water is due to its molecular structure and the presence of hydrogen bonding, which allows water to absorb and store a

significant amount of heat energy. **Land surfaces are heated more quickly than water surfaces because of the higher specific heat of water.** In other words, it requires only one-third as much energy to raise the temperature of a given volume of land by 1^0F as it does for an equal volume of water.

Hence, statement 2 is correct.

14. Consider the following statements:

1. In a seismograph, P waves are recorded earlier than S waves.
2. In P waves, the individual particles vibrate to and fro in the direction of wave propagation whereas in S waves, the particles vibrate up and down at right angles to the direction of wave propagation.

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

14. Ans: c

Explanation:

The variations in the direction of waves are inferred with the help of their record on seismography. There are two types of body waves. They are called P and S-waves. **P-waves move faster and are the first to arrive at the surface.** These are also called 'primary waves'. They travel through gaseous, liquid and solid materials. **S-waves arrive at the surface with some time lag.** These are called secondary waves. They can travel only through solid materials. The surface waves are the last to report on seismography.

Hence, statement 1 is correct.

Different types of earthquake waves travel in different manners. As they move or propagate, they cause vibration in the body of the rocks through which they pass. **P-waves vibrate parallel to the direction of the wave.** As a result, it creates density differences in the material leading to stretching and squeezing of the material. **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, statement 2 is correct.

15. With reference to coal-based thermal power plants in India, consider the following statements:

1. None of them uses seawater.
2. None of them is set up in water-stressed district.
3. None of them is privately owned.

How many of the above statements are correct?

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

15. Ans: d

Explanation:

The Mundra Thermal Power Plant employs a closed-cycle induced draft circulating cooling water system that utilises seawater. Seawater is drawn from the Gulf of Kutch through robust glass-reinforced pipes of significant diameter. In addition, purified seawater from a reverse osmosis plant is utilised by various supplementary systems.

Hence, statement 1 is incorrect.

According to recent research by WRI (World Resources Institute), **40 per cent of India's thermal power plants are situated in regions experiencing significant water stress.** This poses a challenge as these plants rely on water for cooling purposes. The scarcity of water is already causing disruptions in electricity generation in these areas, with 14 out of India's 20 largest thermal utilities having experienced at least one shutdown between 2013 and 2016 due to water shortages. These shutdowns have resulted in significant financial losses, amounting to $1.4 billion for the affected companies.

Hence, statement 2 is incorrect.

India has a total of 269 Thermal Power Plants, with **138 of them being owned by the public sector and the remaining 131 owned by the private sector.**

Hence, statement 3 is incorrect.

F

2022

Previous Year UPSC Geography Questions (PYQs) With Explanation 2022

There were 9 Questions from Geography in 2022, of which

- **1 Question on Fundamentals of Physical Geography**
- **3 Questions on Indian Physical Geography**
- **3 Questions on World Physical Geography**
- **2 Questions on Economic Geography**

Most of the questions were aimed at testing the conceptual clarity and understanding of map.

Overall, the level of the questions was easy to moderate.

1. Which one of the following lakes of West Africa has become dry and turned into a desert?
(a) Lake Victoria
(b) Lake Faguibine
(c) Lake Oguta
(d) Lake Volta

1. Ans: b
Explanation:
The Faguibine system, located in the Tombouktou region in Mali, is a series of five interlinked lakes (Télé, Takara, Gouber, Kamango and Faguibine). The system is fed from the overflows of the Niger River during the rains; and when full, it was among the largest lakes in West Africa, covering approximately 590 km with a total shoreline of 213 kilometres.

In the late 19th century, the floodplain extended over an area of 1,000 km–, however, declining rainfall led to it shrinking to about 90 km^2 by 2010. Prolonged droughts over the years also led to the lake completely drying up in 1914, 1924 and 1944.
The decline of the Faguibine is an important issue because of its impacts on livelihoods, food security and the resulting collapse of the natural ecosystem.
Hence, option b is correct.

2. Gandikota canyon of South India was created by which one of the following rivers?
(a) Cauvery
(b) Manjira
(c) Pennar
(d) Tungabhadra

2. Ans: c
Explanation:
The Pennar (also known as Uttara Pinakini) is one of the major rivers of the peninsula.

Pennar River rises from the Chenna Kesava hills of the Nandi ranges of Karnataka and flows for about 597 km before outfalling into the Bay of Bengal. The Principal tributaries of the river are the Jayamangal, the Kunder, the Sagileru, the Chitravati, the Papagni and the Cheyyeru.

Gandikota village, located in Kadapa district, Andhra Pradesh, is home to a stunning canyon, by the Pennar river.
Over time, the Pennar River carved the pink granite rock of Erramala Hills and formed Gandikota Canyon.
Gandikota Canyon has been an important part of Andhra Pradesh's history. From the Kakatiyas and Vijayanagaras to the Qutub Shahis.
Hence, option c is correct.

3. Consider the following pairs:

Peak		**Mountains**
Namcha Barwa	:	Garhwal Himalaya
Nanda Devi	:	Kumaon Himalaya
Nokrek	:	Sikkim Himalaya

Which of the statements given above is/are correctly matched?
(a) 1 and 2
(b) 2 only
(c) 1 and 3
(d) 3 only

3. Ans: b
Explanation:
The Eastern Himalayas
Also known as the Assam Himalayas, the Eastern Himalayas lie between the Tista River in the west and the Brahmaputra River in the east. It mainly occupied the areas of Arunachal Pradesh and Bhutan. The prominent peaks of this area are **Namcha Barwa (7,756 m)**, Kula Kangri (7,554 m), Chamo Lhari (7,327 m), Hozin Kang Sa (7,252 m), Gyalaperi and Kangto.
Hence, 1st pair is incorrectly matched.

The Kumaon Himalayas
Between the Satluj and the Kali rivers is the 320 km long Kumaon Himalayas. Its western part is called Garhwal Himalayas while the eastern part is known as Kumaon Himalayas. **Nanda Devi (7,817 m)**,

Kamet (7,756 m), Trisul (7,140 m), Badrinath (7,138 m), Kedarnath (6,968 m), Gangotri (6,510 m) are important peaks. The sources of sacred rivers like the Ganga and the Yamuna are located in the Kumaon Himalayas.
Hence, 2nd pair is correctly matched.

Nokrek is the highest peak in the West Garo Hills of Meghalaya. Nokrek (Meghalaya) have been included in the World Network of Biosphere Reserves of UNESCO.

Nokrek is not situated in Sikkim Himalaya.
Hence, 3rd pair is incorrectly matched.

4. The term "Levant" often heard in the news roughly corresponds to which of the following regions?
(a) Region along the eastern Mediterranean shores
(b) Region along North African shores stretching from Egypt to Morocco
(c) Region along the Persian Gulf and Horn of Africa
(d) The entire coastal areas of the Mediterranean Sea.

4. Ans: a
Explanation:
The Levant is a historical term referring to a large area in the Eastern Mediterranean. This region includes modern-day Levant **countries such as Syria, Lebanon, Jordan, Israel, Palestine, and parts of Turkey.** In some contexts, Cyprus and parts of Iraq are also considered part of the Levant.

The region stretches from the eastern Mediterranean coast to the deserts of the Arabian Peninsula, bordered by the Taurus Mountains to the north and the Arabian Desert to the south.
The Levant is often called the "cradle of civilisation" because it is home to some of the earliest human settlements.

The Levant's location at the crossroads of three continents(Africa, Asia, and Europe.) has made it a strategic area for military and political power.
The ongoing conflict between Palestinians and Israelis is centered in the Levant. The Gaza Strip and the West Bank are both part of the Levant. The conflicts in Levant countries such as Syria and Israel have global implications.
Hence, option a is correct.

5. Consider the following countries:
1. Azerbaijan
2. Kyrgyzstan
3. Tajikistan
4. Turkmenistan
5. Uzbekistan

Which of the above has borders with Afghanistan?
(a) 1, 2 and 5 only
(b) 1, 2,3 and 4 only

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

5. Ans: c

Explanation:

Afghanistan is a landlocked mountainous country in Southern Asia. It is bordered by six nations – Pakistan in the east and south, Iran in the west, **Turkmenistan, Uzbekistan and Tajikistan** in the north and China in the northeast.

Hence, option c is correct.

6. With reference to India, consider the following statements:
1. Monazite is a source of rare earths.
2. Monazite contains thorium.
3. Monazite occurs naturally in the entire Indian coastal sands in India.
4. In India, Government bodies only can process or export monazite.

Which of the statements given above are correct?
(a) 1, 2 and 3 only
(b) 1, 2 and 4 only
(c) 3 and 4 only
(d) 1, 2, 3 and 4

6. Ans: b

Explanation:

The coastal region of peninsular India contains economically **important minerals such as garnet, ilmenite, leucoxene, monazite, rutile, sillimanite and zircon** commonly known as beach sand minerals.
Hence, statement 1 is correct.

Thorium is mainly obtained from monazite and ilmenite in the beach sands along the coast of Kerala and Tamil Nadu.
Hence, statement 2 is correct.

World's richest monazite deposits occur in Palakkad and Kollam districts of Kerala, near Vishakhapatnam in Andhra Pradesh and Mahanadi river delta in Odisha.
Hence, statement 3 is incorrect.

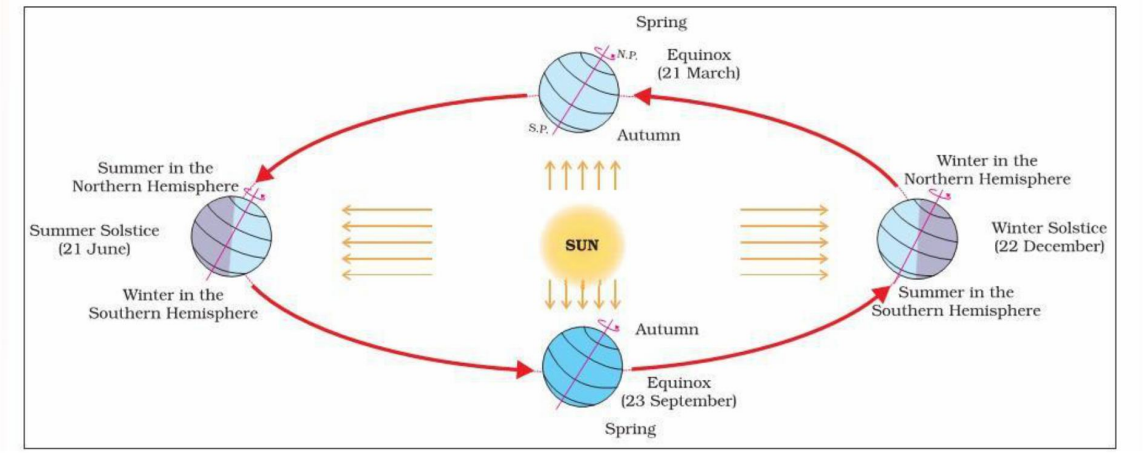
Indian Rare Earths Limited (IREL), a wholly owned Public Sector Undertaking of the **Government of India (GOI) under DAE, is the only entity which has been permitted to produce and process monazite, and handle it for domestic use as well as for export.**

A license from the Department of Atomic Energy (DAE) under the Atomic Energy (Working of the Mines, Minerals and Handling of Prescribed Substances) Rules 1984 promulgated under the Atomic Energy Act 1962 is necessary for exporting monazite.
Hence, statement 4 is correct.

7. In the northern hemisphere, the longest day of the year normally occurs in the :
(a) First half of the month of June
(b) Second half of the month of June
(c) First half of the month of July
(d) Second half of the month of July

7. Ans: b
Explanation:
21st of June every year marks the summer solstice of the Northern hemisphere (winter solstice in the Southern hemisphere). On this day the Earth travels the longest path in the sky, hence making it the longest day of the year.

Aphelion is the day when the Earth is farthest from the sun. It typically occurs 'after 14 days from Summer solstice' and not on the same day.



Hence, option b is correct.

8. Consider the following States:
1. Andhra Pradesh
2. Kerala
3. Himachal Pradesh
4. Tripura

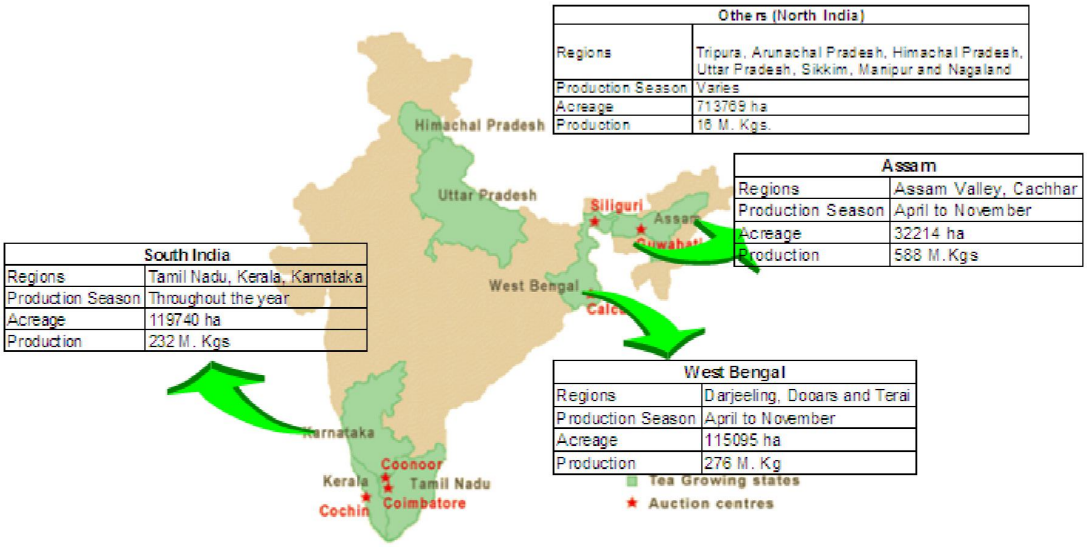
How many of the above are generally known as tea-producing States?
(a) Only one State
(b) Only two States
(c) Only three States
(d) All four States

8. Ans: d

Explanation:

As per the India Tea Association, tea-growing regions are- **Tripura, Arunachal Pradesh, Himachal Pradesh, Uttar Pradesh, Sikkim, Manipur, Nagaland, Assam, West Bengal, Tamil Nadu, Kerala and Karnataka.**

Andhra Pradesh, though not a major tea-producing state, tea is cultivated in the Araku valley of the state.



Hence, option d is correct.

9. Consider the following pairs:

Reservoirs	**States**
1. Ghataprabha —	Telangana
2. Gandhi Sagar —	Madhya Pradesh
3. Indira Sagar —	Andhra Pradesh
4. Maithon —	Chhattisgarh

How many pairs given above are not correctly matched?

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

9. Ans: c

Explanation:

Ghatprabha Reservoir is situated in the **Belgavi district of Karnataka.** Ghatprabha is a major tributary of River Krishna.

Hence, 1st pair is incorrectly matched.

Gnadhisagar Reservoir is built upon the Chambal River in **Mandsaur district of Madhya Pradesh.** The reservoir created by the related dam is the third largest in India (after the Indirasagar Reservoir and Hirakud Reservoir). It is one of the four major dams built on India's Chambal River, the others being the Jawahar Sagar, Rana Pratap Sagar, and Kota Barrage.

Hence, 2nd pair is correctly matched.

Indira Sagar Reservoir is located on the Narmada River in Khandwa district of **Madhya Pradesh.** It is the largest reservoir of India.
Hence, 3rd pair is incorrectly matched.

The **Maithon Dam is located in Jharkhand.** Maithon derived its name from "Mai Ka Sthan", meaning the place for the Hindu Goddess Maa Kalyaneshwari. It is located on the banks of river Barakar. The Maithon Dam is located about 48 km from the Coal City of Dhanbad.
Hence, 4th pair is incorrectly matched.

2021

Previous Year UPSC Geography Questions (PYQs) With Explanation 2021

There were 12 Questions from Geography in 2021, of which

- **2 Questions on Fundamentals of Physical Geography**
- **4 Questions on Indian Physical Geography**
- **2 Questions on World Physical Geography**
- **4 Questions on Economic Geography**

Most of the questions were aimed at testing the conceptual clarity and understanding of basics.

Overall, the level of the questions was moderate.

1. With reference to the Indus river system, of the following four rivers, three of them pour into one of them which joins the Indus directly. Among the following, which one is such a river that joins the Indus directly?

a. Chenab
b. Jhelum
c. Ravi
d. Sutlej

1. Ans: d

Explanation:

The Sutlej rises from the Manasarovar-Rakas Lakes near Darma Pass in western Tibet at a height of 4570 m within 80 Km of the source of the Indus. It enters Himachal Pradesh through Shipki La on the Tibet-Himachal Pradesh boundary. It cuts deep gorges where it pierces the Great Himalayas and other Himalayan ranges. It creates an extraordinary canyon, comparable to the Grand Canyon of Colorado.

Before entering the Punjab plain, it cuts a gorge in Naina Devi Dhar, where Bhakra Dam has been created. It is joined by Beas at Harike. During Its downward journey, **it receives the collective drainage of the Ravi, Chenab, and Jehlum rivers (Chenab joins the Satluj after receiving the waters**

of Jhelum and Ravi rivers) and further downstream, Sutlej joins the Indus a few Kms above Mithankot. Out of a total length of 1450 km, it flows for 1050 km in Indian territory.

Major Rivers and Lakes of India

Hence, option d is correct.

2. With reference to India, Didwana, Kuchaman, Sargol, and Khatu are the names of:

a) Glaciers

b) Mangrove areas

c) Ramsar sites

d) Saline lakes

2. Ans: d

Explanation:

The Rajasthan Plain

Thar or the Great Indian Desert, covers western Rajasthan and the adjoining parts of Pakistan. The eastern edge of the **Thar Desert there are several saline lakes.** They are a great source of common salt and many other salts. **The Sambhar, the Didwana, the Degana, the Kuchaman, the Sargol and the Khatu are some of the important lakes.** The largest and most outstanding is the Sambhar Lake.

Hence, option d is correct.

3. Consider the following rivers:

1. Brahamani
2. Nagavali
3. Subarnarekha
4. Vamsadhara

Which of the above rises from the Eastern Ghats?

a) 1 and 2
b) 2 and 4
c) 3 and 4
d) 1 and 3

3. Ans: b

Explanation:

Rivers of Odisha

The Brahmani: It is the second largest river in Odisha. Two major rivers, the Sankh and the Koel, originate from the Chhotanagpur Plateau and join at Vedavyasa near Rourkela in the Sundargarh district of Odisha to form a major river called the Brahmani.

Hence, statement 1 is incorrect.

The Nagavali: It originates from the Bijipur hills of the Eastern Ghats near the village Lakhabahal in Kalahandi district. The total length of the river is 217 Km of which 125 Km lies in Odisha and the remaining portion in Andhra Pradesh. The prominent tributaries are Pitadar Nalla, Datteibannda Nalla, Sana-nadi, Barha-nadi, Baldiya-nadi, Sat Nalla, Sitagura Nalla, Ghora Nalla, Sitaghera Nalla, Srikona-nadi, Bonamarha-nadi, Errigeda Nalla & Jhanjhabati river.

Hence, statement 2 is correct.

The Subarnarekha: It originates near Nagri village of the Chhotnagpur plateau of Jharkhand. The total length of the river from its origin to its outfall into Bay of Bengal is 446.12 Km, including 79 km in side Odisha. The prominent tributaries of the Subarnarekha are Raru river, Kanchi river, Damra

river, Karru river, Kharkhai river, Chinguru river, Karakari river, Gurma river, Garra river, Singaduba river, Kodia river, Dulunga river and Khaijori river.
Hence, statement 3 is incorrect.

The Vamsadhara: It originates from the flanks of the Durgakangar hills (Lingaraj hills) of the Eastern Ghats in Kalahandi district. The river traverses a total distance of 239 km before its outfall into the Bay of Bengal in Andhra Pradesh. The prominent tributaries of river Vamsadhara are Bhangi, Pedagoda on right side and Badanalla, Chauladhua, Pandaka Nalla, Badajhar, Harbhangi, Sananadi, Mahendratanaya on the left side.
Hence, statement 4 is correct.

The Mahanadi: It originates from the Amarkantak hills of the Bastar Plateau near Pharasiya village in the Raipur district of Chhatisgarh. The river traverses a total distance of 851 Km (in Odisha - 494 Km.) and falls in to the Bay of Bengal.
The major branches and sub-branches of Mahanadi are Kathajodi, Birupa, Kuakhai, Daya, Bhargavi, Kushabhadra, Biluakhai, Devi, Kandala, Luna, Chitrotpala, Karandia, Paika and Badagenguti. All the major branches and sub-branches including Mahanadi falls into the Bay of Bengal except **Daya & Bhargavi which fall into Chilika Lake.**

The Baitarani: It rises from the Gonasika in the Guptaganga hills (Eastern ghats) of Keonjhar district. The river traverses a total distance of 360 km before falling into the Bay of Bengal.

The Indravati: It originates from the Eastern Ghats of Dandakaranya range in Kalahandi district & flows in a westerly direction; it enters into Jagdalpur district in Chhatisgarh state. It further traverses in the westerly direction & thereafter in the southern direction before finally meeting river Godavari at the border of Maharastra, Chhatisgarh & Andhra Pradesh.

The Kolab: It originates from the Sinkaran hills of the Eastern Ghats in Koraput districts and finally meets the Godavari in Andhra Pradesh

The Rushikulya: It rises from the Rushyamala hills of the Eastern Ghats in Kandhamal district and flows in the south east direction and falls into the Bay of Bengal near Chatrapur. The prominent tributaries of the river Rushikulya are Padma, Boringanalla, Joro, Badanadi, Baghua, Dhanei and Ghodhado. It has no delta in its mouth.

The Bahuda: It rises near the village Luba from the Singharaj hills of the Eastern Ghats in the Gajapati district. It flows in the north east direction upto 55km, south east direction for 17 Km in Odisha before entering Andhra Pradesh to flow for 18 Km. Then it turns in North-east direction for 6 Km in Odisha before meeting the Bay of Bengal near the village Sunapurapeta, Odisha.

The Budhabalanga: The Budhabalanga originates from the Similipal range of hills (Eastern Ghats) on Mayurbhanj district and travels a total length of 198.75 km before it finally empties into the Bay of Bengal.

The Jambhira: It originates from Chandra Reserve forest in Mayurbhanj district and travels a total length of 90 km before it finally falls in the Bay of Bengal.

4. Among the following, which one is the least water-efficient crop?

a) Sugarcane
b) Sunflower
c) Pearl Millet
d) Red gram

4. Ans: a

Explanation:

Sugarcane is generally considered the least water-efficient crop, meaning it requires a large amount of water to produce a unit of yield compared to many other crops, making it a very water-intensive crop.

Hence, option a is correct.

5. Consider the following statements:

1. In the tropical zone, the western sections of the oceans are warmer than the eastern sections owing to the influence of trade winds.
2. In the temperate zone, westerlies make the eastern sections of oceans warmer than the western sections.

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

5. Ans: c

Explanation:

The Planetary winds are the dominant influence on the flow of ocean currents. They are so strong, for example, in the North Indian Ocean, the direction of the currents changes completely with the direction of the monsoon winds which come from the north east in winter and south west in summer.

Between the equator and the tropics, there blow the Trade Winds which move 'equatorial waters polewards and westwards', **thus warming up the western margins of the oceans and eastern coasts of continents.**

Example: the North-East Trade Winds move the North Equatorial Current and its derivatives, the Florida Current and the Gulf Stream Drift to warm the southern and eastern coasts of USA **adjacent to the Western Atlantic Ocean**. Similarly, the South East Trade Winds drive the South Equatorial Current which warms the eastern coast of Brazil **(lying adjacent to the Western Atlantic Ocean**) as the warm Brazilian current.
Hence, statement 1 is correct.

In the temperate latitudes, blow the Westerlies. They are less reliable than the Trade Winds. They make the eastern sections of the oceans warmer than the western.

They result in a north-easterly flow in the northern hemisphere. For example, the Warm Gulf Stream is driven to the western coast of Europe as the North Atlantic drift, **thus warming the Eastern Atlantic Ocean.**

Also, in Southern Hemisphere, the westerlies drive the west wind drift equatorwards as the Peruvian Current off South America and the Benguela current off Southern Africa. Thus in the Southern hemisphere, the **Eastern part of the ocean, in this case the Atlantic, gets warm.**
Hence, statement 2 is correct.

6. With reference to 'palm oil', consider the following statements:
1. The palm oil tree is native to Southeast Asia.
2. The palm oil is a raw material for some industries producing lipstick and perfumes
3. The palm oil can be used to produce biodiesel.
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

6. Ans: b
Explanation:
Oil palm trees are native to Africa but were brought to South-East Asia just over 100 years ago as an ornamental tree crop. Now, Indonesia and Malaysia make up over 85% of global supply but there are 42 other countries that also produce palm oil.
Hence, statement 1 is incorrect.

Palm oil is versatile. It is a part of our daily lives, from many of the foods we eat, especially packaged foods, to consumer goods. Beyond enhancing the texture and durability of consumer goods, it plays a

vital role in industries like pharmaceuticals and biofuels, contributing significantly to global trade and employment.

Palm oil, obtained from fruits, is used in making soaps, cosmetics, candles, biofuels, and lubricating greases and in processing tinplate and coating iron plates.

Hence, statements 2 & 3 are correct.

7. Consider the following statements:

1. The Global Ocean Commission grants licences for seabed exploration and mining in international waters.
2. India has received licences for seabed mineral exploration in international waters.
3. 'Rare earth minerals' are present on the seafloor in international waters.

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

7. Ans: b

Explanation:

The **International Seabed Authority (ISA),** an autonomous international organisation established under the 1982 United Nations Convention on the Law of the Sea, grants the license for sea bed exploration and mining in international waters.

Hence, statement 1 is incorrect.

India was the first country to receive the status of a 'Pioneer Investor ' in 1987 and was given an area of about 1.5 lakh sq km in the Central Indian Ocean Basin (CIOB) for nodule exploration. In 2002, **India signed a contract with the ISA and after complete resource analysis of the seabed 50% was surrendered and the country retained an area of 75,000 sq km.**

Hence, statement 2 is correct.

The sea floor of various oceans boasts one of the world's **largest untapped collections of rare-earth elements.**

Hence, statement 3 is correct.

8. "Leaf litter decomposes faster than in any other biome and as a result, the soil surface is often almost bare. Apart from trees, the vegetation is largely composed of plant forms that reach up into the canopy vicariously, by climbing the trees or growing as epiphytes, rooted on the upper branches of trees". This is the most likely description of

a) Coniferous forest
b) Dry deciduous forest
c) Mangrove forest

d) Tropical rainforest

8. Ans: d

Explanation:

Tropical rainforests appear like a thick canopy of foliage, broken only where it is crossed by large rivers or cleared for cultivation. All plants struggle upwards for sunlight resulting in a peculiar layer arrangement. The taller trees, smaller trees form the next layer, and the ground is rooted with ferns and herbaceous plants which can tolerate shade.

Almost all the action in a rainforest (not just photosynthesis but also flowering, fruiting, predation and herbivory) happens high in the canopy. **Apart from the trees, the vegetation is largely composed of plant forms that reach up into the canopy vicariously, by climbing the trees (vines and lianas, including many species and fig) or growing as epiphytes, which are plants that grow on other plants, rooted on the damp upper branches.**

There is intense biological activity in the soil of tropical rainforests. Leaf litter decomposes faster than in any other biome, and as a result the soil surface is often almost bare. The mineral nutrients in fallen leaves are rapidly released, and, as rainfall seeps down the soil profile, nutrients may be carried well below the levels at which roots can recover them. Almost all the mineral nutrients in a rain forest are held in the plants themselves, where they are safe from leaching, when such forests are cleared for agriculture or timber is felled or destroyed by fire, the nutrients are released and leached or washed away.

Hence, option d is correct.

9. The vegetation of the savannah consists of grassland with scattered small trees, but extensive areas have no trees. The forest development in such areas is generally kept in check by one or more or a combination of some conditions. Which of the following are such conditions?

1. Burrowing animals and termites
2. Fire
3. Grazing herbivores
4. Seasonal rainfall
5. Soil properties

Select the correct answer using the codes given below

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

9. Ans: c

Explanation:

The vegetation of savanna characteristically consists of grassland with scattered small trees, but extensive areas have no trees. **The trees actively grow only during the rainy season.** In the absence of other controlling factors, these tropical areas would be expected to be covered by forest. But forest development is kept in check, in part **by the limited moisture that limits their growth to the rainy season, but also by grazing and fire.**
Hence, option c is correct.

10. With reference to the water on the planet Earth, consider the following statements:
1. The amount of water in the rivers and lakes is more than the amount of groundwater.
2. The amount of water in polar ice caps and glaciers is more than the amount of groundwater.
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

10. Ans: b
Explanation:
Water on Earth's surface

Reservoir	*Volume (Million Cubic km)*	*Percentage of the Total*
Oceans	1,370	97.25
Ice Caps and Glaciers	29	2.05
Groundwater	9.5	0.68
Lakes	0.125	0.01
Soil Moisture	0.065	0.005
Atmosphere	0.013	0.001
Streams and Rivers	0.0017	0.0001
Biosphere	0.0006	0.00004

Water percentage in and on the Earth:- oceans > ice cape and glaciers > groundwater > lakes > soil moisture > atmosphere > stream & rivers > biosphere.
Hence, statement 1 is incorrect & statement 2 is correct.

11. Consider the following statements:

1. Moringa (drumstick tree) is a leguminous evergreen tree.

2. Tamarind tree is endemic to South Asia.

3. In India, most of the tamarind is collected as minor forest produce.

4. India exports tamarind and seeds of moringa.

5. Seeds of moringa and tamarind can be used in the production of biofuels.

Which of the statements given above are correct?

a) 1, 2, 4 and 5

b) 3, 4 and 5

c) 1, 3 and 4

d) 1, 2, 3 and 5

11. Ans: b

Explanation:

Moringa oleifera is a deciduous tree, occasionally growing up to 15 m in height. Almost all parts of the plant are potentially useful, including for food, fodder, medicine, fuel wood and fertiliser. The seeds are probably the most useful part of the plant, containing a significant percentage of high-quality oil. Recently, the **large-scale cultivation of Moringa oleifera has been suggested as a potential source of biofuel.**

The exact origin of this species is somewhat obscure, M. oleifera is thought to be indigenous to the sub-Himalayan tracts of northern India.

Hence, statement 1 is incorrect.

Tamarindus indica, commonly known as tamarind, is a frost-free, tropical evergreen tree belonging to family fabaceae, that typically grows to 40-60' (less frequently to 90') tall. **It is native to eastern Africa,** but is now commonly grown and in some cases has naturalised in a number of tropical to subtropical areas around the world.

Hence, statement 2 is incorrect.

The tamarind seed oil has evolved as one of the most essential and economical biodiesel raw material oils.

India exports tamarind and seeds of moringa.

Economically Important Minor Forest Products

Lac (resin), mahuwa flower, mahua fruits, **tamarind**, Tendu leaves, sal seeds, Chironji, mango, silk cocoons, bamboo, Lac, kullu gum, resins used in incense sticks

Hence, statements 3, 4 & 5 are correct.

12. The black cotton soil of India has been formed due to the weathering of:
a. Brown forest soil
b. Fissure volcanic rock
c. Granite and schist
d. Shale and limestone

12. Ans: b
Explanation:
The black cotton soils are also called regur. These are black cotton because cotton is the most important crop grown on these soils. **These soils have been formed due to the solidification of lava spread over large areas during volcanic activity in the Deccan Plateau,** thousands of years ago. The black colour of these soils has been attributed to the presence of a small proportion of titaniferous magnetite or even to iron and black constituents of the parent rock.

Black soil is mainly found in Maharashtra, Madhya Pradesh, parts of Karnataka, Telangana, Andhra Pradesh, Gujarat and Tamil Nadu.
Hence, option b is correct.

2020

Previous Year UPSC Geography Questions (PYQs) With Explanation 2020

There were 7 Questions from Geography in 2020, of which

- **2 Questions on Fundamentals of Physical Geography**
- **1 Question on Indian Physical Geography**
- **1 Question on World Physical Geography**
- **3 Questions on Economic Geography**

Most of the questions were aimed at testing the basic understanding of the subject and conceptual clarity.

Overall, the level of the questions was moderate to tough.

1. Consider the following pairs:

River		***Flows into***
1. Mekong	:	Andaman Sea
2. Thames	:	Irish Sea
3. Volga	:	Caspian Sea
4. Zambezi	:	Indian Ocean

Which of the pairs given above is/are correctly matched?

a. 1 and 2 only
b. 3 only
c. 3 and 4 only
d. 1, 2 and 4 only

1. Ans: c

Explanation:

The Mekong is a trans-boundary river in Southeast Asia. It is the world's 12th-longest river and the 7th-longest in Asia.

The Mekong rises as the Lancang (Lantsang) in the "Three Rivers Area" on the Tibetan Plateau, From the Tibetan Plateau this river runs through China's Yunnan province, Burma (Myanmar), Laos, Thailand, Cambodia and Vietnam. **It forms a complex delta system in Vietnam before entering the South China Sea.**

The river is a major trading route linking China's southwestern province of Yunnan to Laos, Burma (Myanmar) and Thailand to the south, an important trade route between western China and Southeast Asia.

Mekong River

Hence, pair 1 is incorrectly matched.

River Thames -The River Thames is the second longest river in the UK flowing 346km. Its source is at the Thames Head, just north of the village of Kemble and south-west of Cirencester in Gloucester. Its mouth is the Thames Estuary, at Southend in Essex. **It flows into the North Sea.**

Hence, pair 2 is incorrectly matched.

The Volga River is the world's 18th longest and Europe's longest river, covering a distance of about 3,530 kilometers from its source Valdai Hills in Tver Oblast to the mouth in the Caspian Sea. **It is the longest river flowing into the Caspian Sea, the world's largest closed basin.**

Hence, pair 3 is correctly matched.

Zambezi River, is Africa's 4th longest river and the continent's longest east-flowing stream. The river rises from the Central African Plateau in Zambia and flows for about 2,574 kilometers through Angola, Namibia, Botswana, Zimbabwe, and Mozambique before **emptying into the Indian Ocean.**
The Zambezi is a Tonga word for "Great River."
The river is known for several notable waterfalls, including Victoria Falls, one of the world's largest waterfalls, and the Chavuma Falls on the Zambia-Angola border.

Hence, pair 4 is correctly matched.

2. "The crop is subtropical in nature. A hard frost is injurious to it. It requires at least 210 frost-free days and 50 to 100 centimeters of rainfall for its growth. A light well-drained soil capable of retaining moisture is ideally suited for the cultivation of the crop."
Which one of the following is that crop?
(a) Cotton
(b) Jute
(c) Sugarcane
(d) Tea

2. Ans: a
Explanation:
Cotton is a kharif crop which requires 6 to 8 months to mature.

Cotton is the most important fibre crop not only of India but of the entire world. It provides the basic raw material (cotton fibre) to the cotton textile industry. Its seed (binola) is used in the vanaspati industry and can also be used as part of fodder for milch cattle to get better milk.

Conditions of Growth

a. Temperature:

- ***Cotton is the Crop of tropical and sub-tropical areas*** and requires uniformly high temperatures varying between 21^0C and 30^0C.
- The growth of cotton is retarded when the temperature falls below 20^0C.
- ***Frost is the no. one enemy of the cotton plant and it is grown in the areas having at least 210 frost-free days in a year.***

b. Rainfall:

- **The modest requirement of water can be met by an average annual rainfall of 50-100cm.** However, it is successfully grown in areas of lesser rainfall with the help of irrigation.
- About one-third of the total area under cotton cultivation is irrigated. About 80 percent of the total irrigated Area under Cotton is in Punjab, Haryana, Gujarat and Rajasthan.
- Moist weather and heavy rainfall at the time of boll-opening and picking are detrimental to cotton as the plant becomes vulnerable to pests and diseases.
- High amount of Rainfall in the beginning and sunny and dry weather at ripening time are very useful for a good crop.

c. Soil:

- Cotton cultivation is closely related to deep black soil ***(because black soil has high fertility and retentivity of moisture)*** of the Deccan Plateau and the Malwa Plateau and those of Gujarat.
- It also grows well in alluvial soils of Sutlej-Ganga plain and Red and Laterite soils of the Peninsular region.
- Cotton quickly exhausts the fertility of the soil. Therefore, regular application of Manures and fertilisers to the soil is necessary.

Hence, option a is correct.

3. With reference to the current trends in the cultivation of sugarcane in India, consider the following statements:
1. A substantial saving in seed material is made when 'bud chip settings' are raised in a nursery and transplanted in the main field.
2. When direct planting of setts is done, the germination percentage is better with single-budded setts as compared to setts with many buds.
3. If bad weather conditions prevail when setts are directly planted, single-budded setts have better survival as compared to large setts.
4. Sugarcane can be cultivated using settings prepared from tissue culture.
Which of the statements given above is/are correct?
(a) 1 and 2 only
(b) 3 only
(c) 1 and 4 only
(d) 2, 3 and 4 only

3. Ans: c
Explanation:
Tissue culture
The tissue culture technique in sugarcane can be used for rapid multiplication of newly developed high yielding, high sugar, disease resistant varieties and rejuvenation of outstanding varieties under cultivation. The vegetative propagation of sugarcane through seed cane cuttings is cumbersome requiring larger quantities of vegetative seed material and seed multiplication rate is too low, needing about ten years for a new variety to be released for cultivation and cover larger areas in the field subsequently. With tissue culture technique, it is possible to release a variety within five years and propagate it quickly in the field.

Raising of seedlings through bud chip:

Transplanting of settlings raised in polybags offers great advantages in sugarcane seed production. **Nursery raised from sugarcane bud chips and planting them in main field was found to be more economical than traditional methods.**

Spaced transplanting technology:

The technology consist of transplanting of nursery raised settlings. Settling are raised by planting of single bud set in nursery about one month before transplanting in the main field. About 2 tonnes of cane seed are required to obtain settlings for transplanting in one hectare of field
Hence, option c is correct.

4. Consider the following minerals:
1. Bentonite
2. Chromite
3. Kyanite
4. Sillimanite

In India, which of the above is/are officially designated as major minerals?
(a) 1 and 2 only
(b) 4 only
(c) 1 and 3 only
(d) 2, 3 and 4 only

4. Ans: d

Explanation: **MAJOR MINERALS - Chromite, kyanite, Sillimanite** **MINOR MINERALS - Bentonite**

List of minerals used in the estimation of Gross Value Added

I. **MAJOR MINERALS**	
Fuel Minerals	
Coal	Mica (Crude)
Lignite	Mica (Waste and Scrap)
Natural Gas	Ochre
Petroleum (Crude)	Pyrites
Other Major Minerals	Pyrophyllite
metallic minerals	Quartz
Bauxite	Fuchsite Quartzite
Chromite	Quartzite
Copper Ore	Silica Sand
Diaspore	Moulding Sand
Gold	Salt (Rock)
Iron Ore	Sand (Others)
Lead Concentrates	Sillimanite
Manganese Ore	Slate
Silver	Steatite
Tin Concentrates	Staurolite
Tungsten Concentrates	Vermiculate
Zinc Concentrates	Wollastonite
Non-metallic minerals	**II.MINOR MINERALS**
Agate	Building Stones
Apatite	Quartzite
Phosphorite	Sand Stone
Asbestos	Granite
Ball Clay	Laterite
Barytes	Boulder
alcite	Shingle
halk	Gravel
lay (Others)	Chalcedony pebblesused for
orundum	ballmill purposes only
Diamond	Lime Shell
Dolomite	Kankar and limestone used in
Emerald (Crude)	kilns for manufacture of lime
Felsite	used as building material
Felspar	Murrum
Fire Clay	Brick Earth
Flourite (Concentrates)	Fuller's Earth
Flourite (Graded)	Bentonite
Garnet (Abrasives)	Road Metal
Garnet (Gem)	Rehmatti
Graphite run-on-mines	Slate and shale used for the
(r.o.m.)	building material
Gypsum	Ordinary Clay
Jasper	Ordinary sand used for
Kaolin	purposes other than refractory
Kyanite	Ceramics, Metallurgical, Optical
Andalusite	and Stowing in coal mines
Limestone	Manufacture of silvicrete
Lime kankar	cement, sodium silicate,
Lime shell	pottery and glass
Calcerous sand	Stone used for household utensils
Magnesite	Marble and salt petre

Hence, option d is correct.

5. With reference to Ocean Mean Temperature (OMT), which of the following statements is/are correct?
1. OMT is measured up to a depth of 26°C isotherm which is 129 meters in the southwestern Indian Ocean during January — March.
2. OMT collected during January — March can be used in assessing whether the amount of rainfall in the monsoon will be less or more than a certain long-term mean.
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

5. Ans: b
Explanation:
Distribution of Temperature in Oceans
The distribution of temperature can be ocean mean temperature, Horizontal Distribution of Temperature and Vertical Distribution of Temperature.

Ocean Mean Temperature

- Ocean Mean Temperature (OMT) is measured up to a depth of 26 degrees' isotherm. **During January–March, the mean 26^{0}C isotherm depth in the Southwestern Indian Ocean is 59 metres.**

- It is measured with the help of satellites that orbit the earth. In the Indian Ocean, **OMT is analaysed by measuring the ocean thermal energy during the period from January to March.**

Hence, statement 1 is incorrect & statement 2 is correct.

6. Siachen Glacier is situated to the:
(a) East of Aksai Chin
(b) East of Leh
(c) North of Gilgit
(d) North of Nubra Valley

6. Ans: d
Explanation:
Siachen Glacier, is the world's second-longest glacier in non-polar areas, lies in the **Karakoram** Range of the **Himalayas**, in the disputed **Kashmir** region. The glacier covers 76 km from its head at Indira Col on the **China**-**India** border to its terminus.

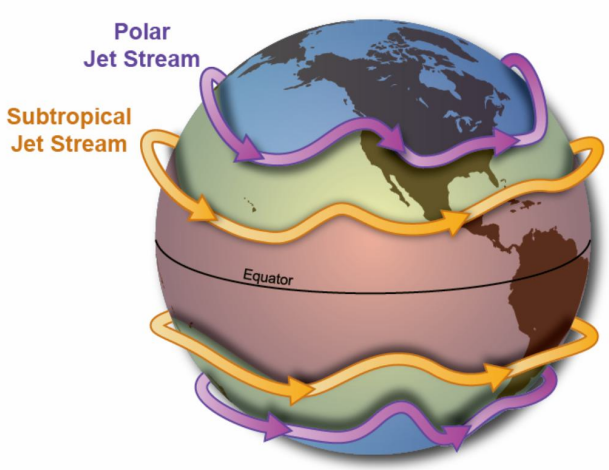
- The Siachen Glacier is bordered to the north by the great drainage divide, a divide separating the Indian Subcontinent and the **Eurasian Plate** in the Karakoram region.
- The 75 Km long **Siachen Glacier in Nubra valley** has the distinction of being the largest glacier outside the polar and sub-polar regions. Lolofond and Teram Shehr are its main tributaries.
- The Siachen Glacier is the major source of the 80km long Nubra River, a major tributary of the Shyok River.
- The Shyok River feeds into the 3,180km long Indus River, which is the source of water for the world's largest irrigation system.
- **Siachen Glacier is situated to the North of Nubra Valley.**

Hence, option d is correct.

7. Consider the following statements:
1. Jet streams occur in the Northern Hemisphere only.
2. Only some cyclones develop an eye.
3. The temperature inside the eye of a cyclone is nearly 10°C less than that of the surroundings.

Which of the statements given above is/are correct?
(a) 1 only
(b) 2 and 3 only
(c) 2 only
(d) 1 and 3 only

7. Ans: c
Explanation:
There are several different jet streams, or jets, around the globe. The polar jet is located between the 50°-60° latitude lines in both the northern and southern hemispheres. The subtropical jet is located around the 30° latitude line. Jet streams vary in height of four to eight miles and can reach speeds of more than 275 mph (239 kts / 442 km/h). **Jet streams occur in both the Northern and Southern Hemispheres.**



Hence, statement 1 is incorrect.

The "eye" is a roughly circular area of comparatively light winds and fair weather found at the center of **a severe tropical cyclone.**

The eye is the region of lowest surface pressure and warmest temperatures aloft - **the eye temperature may be 10°C [18°F] warmer or more** at an altitude of 12 km [8 mi] than the surrounding environment, but only 0-2°C [0-3°F] warmer at the surface in the tropical cyclone. Eyes range in size from 8 km [5 mi] to over 200 km [120 mi] across, but most are in the *range* 30-60 km [20-40 mi] in diameter.

The eye is surrounded by the **"eyewall"**, the roughly circular ring of deep convection which is the area of highest surface winds in the tropical cyclone. The eye is composed of air that is slowly sinking and the eyewall has a net upward flow as a result of many moderate - occasionally strong - updrafts and downdrafts. The eye's warm temperatures are due to compressional warming of the subsiding air. Most soundings taken within the eye show a low-level layer which is relatively moist, with an inversion above - suggesting that the sinking in the eye typically does not reach the ocean surface, but instead only gets to around 1-3 km [1-2 mi] of the surface.

The formation of the **eyewall** is related to the convergence of air in a shallow layer some 500 m to 1 km deep adjacent to the sea surface. This layer is referred to as the boundary layer, or friction layer. Above this layer, the swirling winds are approximately in gradient wind balance , that is, the inward-directed pressure gradient force is approximately balanced by the sum of the outward-directed centrifugal and Coriolis forces.
Hence, statement 2 is correct & statement 3 is incorrect.

8. In the context of India, which of the following is/are considered to be practice(s) of eco-friendly agriculture?
1. Crop diversification
2. Legume intensification
3. Tensiometer use
4. Vertical farming

Select the correct answer using the code given below:
(a) 1, 2 and 3 only
(b) 3 only
(c) 4 only
(d) 1, 2, 3 and 4

8. Ans: a
Explanation:
Crop diversification

- Crop diversification refers to the addition of new crops or cropping systems to agricultural production on a particular farm taking into account the different returns from valueadded crops with complementary marketing opportunities.
- The aim of crop diversification is to increase crop portfolio so that farmers are not dependent on a single crop to generate their income.

- Introducing a greater range of varieties in a particular agro - ecosystem leads to diversification of agricultural production which can also **increase natural biodiversity, strengthening the ability of the agroecosystem to respond to these stresses.**
- The introduction of new cultivated species and improved varieties of crop is a technology aimed at **enhancing plant productivity, quality, health and nutritional value and/or building crop resilience to diseases, pest organisms and environmental stresses.**
- It reduces the risk of total crop failure and also provides alternative means of generating income, as different crops will respond to climate scenarios in different ways.
- Crop diversification and growing of large number of crops are practised in dryland areas to reduce the risk factor of crop failures due to recurring droughts.

Legume intensification:

- The inclusion of legumes in the cropping systems is recognized as a pathway for sustainable agricultural production with substantial environmental benefits. **The legumes provide multiple ecosystem services to societies and agroecosystems, such as providing food, supplying nitrogen to crops through biological nitrogen fixation, reducing greenhouse gas emissions**, improving carbon sequestration and soil fertility, and reducing water use and disease and pest infection.

Tensiometer:

- A tensiometer is a device for measuring soil water tension. It measures the amount of energy required by the plant to pull soil water (water potential) at the current moisture level and guides farmers on when to irrigate.
- Several studies based on experimental data have reported that the use of tensiometers is a technically feasible option for efficient management of groundwater resources without any yield penalty
- Compared to the continuous flooding method in paddy cultivation, the tensiometer-based application of irrigation reduces water and power consumption by 13%, cutting variable costs by 7% without any yield penalty.

Vertical farming:

- Vertical farming is a highly profitable method involving the production of plants in **vertically stacked structures to maximize land utilization.** Vertical farming in India is done inside structures like **greenhouses, warehouses, rooftops, etc.**
- Contrary to conventional practice, it can be done in seemingly uncultivable areas. Vertical farming technology in India requires the integration of modern technologies like hydroponics, aeroponics, etc. for their successful implementation.
- Although **capital-intensive vertical farming in India** has enormous benefits like **Space utilization, High yield**, **Resource conservation**, unlike traditional practice, vertical farming technology in India utilizes less water and fertilizers due to efficient absorption, **Free from chemical pesticide**s due to cultivation in controlled environments, the crops are free of pest attacks, annulling the need for chemical pesticides.

9. What are the advantages of fertigation in agriculture?

1. Controlling the alkalinity of irrigation water is possible.
2. Efficient application of Rock Phosphate and all other phosphatic fertilizers is possible.

3. Increased availability of nutrients to plants is possible.
4. Reduction in the leaching of chemical nutrients is possible.

Select the correct answer using the code given below:

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

9. Ans: c

Explanation:

Fertigation:

It is a method of fertilizer application in which fertilizer is incorporated within the irrigation water by the drip system. In this system **fertilizer solution is distributed evenly in irrigation.** The availability of nutrients is very high therefore the efficiency is more. In this method liquid fertilizer as well as water soluble fertilizers are used. By this method, fertilizer use efficiency is increased from 80 to 90 per cent.

Advantages of fertigation:

- Nutrients and water are supplied **near the active root zone** through fertigation which results in **greater absorption by the crops and reduction in leaching of chemical nutrients.**
- As water and fertilizer are supplied evenly to all the crops through fertigation there is possibility for getting 25-50 per cent higher yield.
- Fertilizer use efficiency through fertigation ranges between 80-90 per cent, which helps to save a minimum of 25 per cent of nutrients.
- By this way, along with less amount of water and saving of fertilizer, alkalinity due to irrigation can also be controlled.

Fertilizer used in fertigation

- Urea, potash and highly water soluble fertilizers are available for applying through fertigation.
- **Application of super phosphorus through fertigation must be avoided as it makes precipitation of phosphate salts. Thus phosphoric acid is more suitable for fertigation as it is available in liquid form, but use of all other phosphatic fertilizers is not possible.**
- Special fertilisers like mono ammonium phosphate (Nitrogen and Phosphorus), poly feed (Nitrogen, Phosphorus and Potassium), Multi K (Nitrogen and Potassium), Potassium sulphate (Potassium and Sulphur) are highly suitable for fertigation0 as they are highly soluble in water. Fe, Mn, Zn, Cu, B, Mo are also supplied along with special fertilisers.

Hence statement 2 is incorrect and 1,3 and 4 are correct.

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