IASBABA

[IASBABA'S 60 DAYS PLAN-COMPILATION (GEOGRAPHY)]

Born with the vision of "Enabling a person located at the most remote destination a chance at cracking AIR 1 in IAS".

Q.1) Consider the following.

1. Himalayas
2. Peninsular Plateau
3. North Indian Plains

Arrange the following in chronological order of their formations.

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

Q.1) Solution (b)

The oldest landmass, (**the Peninsula part),** was a part of the **Gondwana land**. The Gondwana land included India, Australia, South Africa, South America and Antarctica as one single land mass.

The northward drift of **Peninsular India** resulted in the collision of the plate with the much larger **Eurasian Plate**. Due to this collision, the sedimentary rocks which were accumulated in the geosyncline known as the *Tethys* were folded to form the mountain system of western Asia and **Himalayas.**

The Himalayan uplift out of the Tethys Sea and subsidence of the northern flank of the peninsular plateau resulted in **the formation of a large basin**. In due course of time this depression, gradually got filled with deposition of sediments by the rivers flowing from the mountains in the north and the peninsular plateau in the south. A flat land of extensive **alluvial deposits led to the formation of the northern plains of India.**

Do you know?

- Geologically, the Peninsular Plateau constitutes one of the ancient landmasses on the earth's surface**. It was supposed to be one of the most stable land blocks.**

THINK!

- Eastern and Western Ghats

Q.2) Consider the following statements about Northwestern Himalayas.

1. The world-famous valley of Kashmir lies between the Karakoram Range and Ladakh Range.
2. The Kashmir Himalayas are also famous for Karewa formations.
3. Chenab in the valley of Kashmir is still in its youth stage and yet forms meanders.

Which of the above statements is/are correct?

a) 1 and 2 only
b) 2 only
c) 1 and 3 only
d) All the above.

Q.2) Solution (b)

Between the Great Himalayas and the Pir Panjal range, lies the world-famous **valley of Kashmir and the famous Dal Lake.**

The Kashmir Himalayas are also famous for Karewa formations, which are useful for the cultivation of Zafran, a local variety of saffron.

Srinagar, capital city of the state of Jammu and Kashmir is located on the **banks of Jhelum River**. Dal Lake in Srinagar presents an interesting physical feature. **Jhelum in the valley of Kashmir is still in its youth stage** and yet forms meanders – a typical feature associated with the mature stage in the evolution of fluvial land form.

Do you know?

- Karewas are the thick deposits of glacial clay and other materials embedded with moraines.

THINK!

- Molassis Basin.

Q.3) Tors, block mountains, rift valleys, spurs, bare rocky structures, series of hummocky hills and wall-like quartzite dykes are some of the important physiographic features of which of the following region?

a) Purvanchal Hill Complex.
b) Peninsular plateau.
c) North Indian Plains.
d) Indian Deserts.

Q.3) Solution (b)

Some of the important physiographic features of peninsular plateau region are tors, block mountains, rift valleys, spurs, bare rocky structures, series of hummocky hills and wall-like quartzite dykes offering natural sites for water storage. The western and northwestern part of the plateau has an emphatic presence of black soil.

Do you know?

- A tor, which is also known by geomorphologists as either a castle koppie or kopje, is a large, free-standing rock outcrop that rises abruptly from the surrounding smooth and gentle slopes of a rounded hill summit or ridge crest.

THINK!

- Ravines and gorges.

Q.4) Consider the following statements

1. The western coastal plains are an example of emergent coastal plain.
2. The western coastal plains are narrow in the middle and get broader towards north and south.
3. Because of its submerged nature, eastern coast has less number of ports and harbors.
4. The lakes and the playas have brackish water which is the main source of obtaining salt in western coasts.

Choose the correct answer using the codes given below.

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

Q.4) Solution (d)

The western coastal plains are an example of submerged coastal plain. It is believed that the city of Dwaraka which was once a part of the Indian mainland situated along the west coast is submerged under water. Because of this submergence it is a narrow belt and provides natural conditions for the development of ports and harbors.

The western coastal plains are narrow in the middle and get broader towards north and south.

As compared to the western coastal plain, the eastern coastal plain is broader and is an example of an emergent coast.

Because of its emergent nature, it has less number of ports and harbours. The continental shelf extends up to 500 km into the sea, which makes it difficult for the development of good ports and harbors.

The lakes and the playas have brackish water which is the main source of obtaining salt. These are feature of Indian Deserts.

Do you know?

- The plains along the Bay of Bengal are wide and level. In the northern part, it is referred to as the Northern Circars, while the southern part is known as the Coromandel Coast.

THINK!

- Deltas.

Q.5) Consider the following pairs

Passes	Connects
1. Banihal	Jammu and Srinagar
2. Zoji La	Srinagar and Leh
3. Shipki La	Himachal Pradesh and Tibet
4. Mana pass	Uttarakhand and Tibet

Which of the above pairs is/are correctly matched?

a) 1 only

b) 2 only
c) 1 and 3 only
d) All the above

Q.5) Solution (d)

Pass	Connects
• Aghil Pass	Ladakh – China
• Burzil Pass	Kashmir –Giligit
• Karakoram Pass	Ladakh – China
• Zojila Pass	Srinagar- Leh (J&K)
• Pensi La	Ladhak -Kashmir
• Banihal Pass	Jammu and Srinagar
• Baralacha Pass	Ladakh – Himachal Pradesh
• Rohtang Pass	Kullu valley with Lahul and spiti.
• Shipki La	Himachal Pradesh-Tibet border
• Mana Pass	Uttarakhand-Tibet border (Also known as Dungri La)
• Niti Pass	Uttarakhand-Tibet border
• Lipulekh Pass	Uttarakhand-Tibet border

Q.6) Which of the following best defines Duars?

a) The tract of land lying between two converging, or confluent, rivers.
b) The alluvial floodplains in northeastern India that lies south of the outer foothills of the Himalayas and north of the Brahmaputra River basin.
c) The land drained by the brackish water.
d) The landscape all along the foothills of Shiwaliks.

Q.6) Solution (b)

The Dooars or Duars are the alluvial floodplains in northeastern India that lie south of the outer foothills of the Himalayas and north of the Brahmaputra River basin. This region is about 30 km (19 mi) wide and stretches over about 350 km (220 mi) from the Teesta River in West Bengal to the Dhanshiri River in Assam. The region forms the gateway to Bhutan. It is part of the Terai-Duar savanna and grasslands ecoregion.

Do you know?

- The Terai-Duar savanna and grasslands is a narrow lowland ecoregion at the base of the Himalayas, about 25 km (16 mi) wide, and a continuation of the Gangetic Plain. It is colloquially called Terai in the Ganges Basin east to Nepal, then Dooars in West

Bengal, Bangladesh, Bhutan and Assam east to the Brahmaputra River. The world's tallest grasslands are found in this ecoregion, which are the most threatened and rare worldwide.

THINK!

- Bhabar

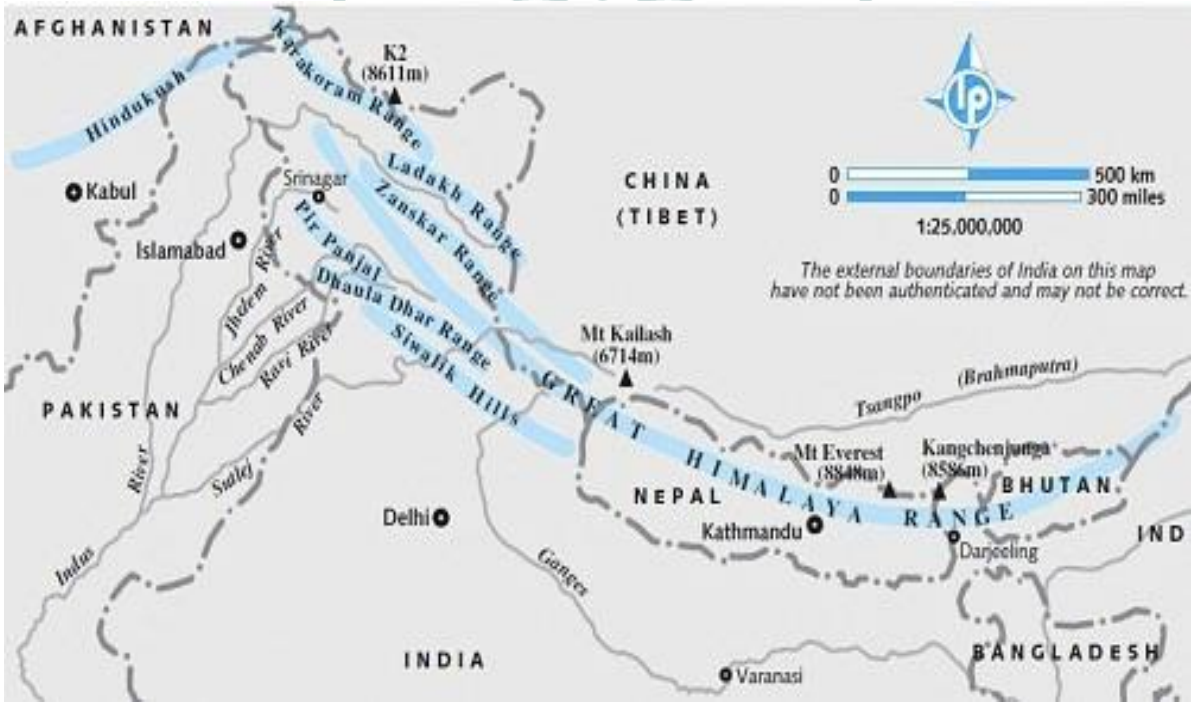
Q.7) Consider the following Himalayan ranges.

1. Karakoram range
2. Phir Panjal range
3. Ladakh range
4. Zaskar range

Arrange the above ranges from North to South.

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

Q.7) Solution (a)



Do you know?

- The longitudinal valley lying between lesser Himalaya and the Shiwaliks are known as Duns. Dehra Dun, Kotli Dun and Patli Dun are some of the well-known Duns.

THINK!

- Patlands.

Q.8) Consider the following statements:

1. The region is swampy and marshy.
2. The underground streams re – emerge in this region.
3. The region is conducive for the breeding of mosquitoes and flies.
4. The forests in this region have been cleared and intensive agriculture is being practiced.

The above statements are true for which of the following regions?

a) Bhabar
b) Bhangar
c) Khadar
d) Tarai

Q.8) Solution (d)

The Tarai Tract:

Tarai Tract

- Tarai lies South of Bhabar.
- It is 15-30km wide with its width increasing from west to east. (Note: this is opposite from the Bhabar plains).
- This is a zone of excessive dampness, thick forests, rich wild life and malarial climate.
- This zone is formed as the rivers which got submerged in Bhabar plains reemerge in this region.
- In most of the northen states, from Haryana to Bihar, the Tarai forests have been cleared and plains are used for agriculture now.
- The Tarai belt is known for the cultivation of Sugarcane, rice, wheat, maize, oil seeds, pulses and fodder.

THINK!

- Battle of Tarai
- Kankar
- Chuar

Q.9) Dandakaranya forest has been in news because of Naxalism. Which of the following statements regarding Dandakaranya are correct?

1. It is drained by the tributaries of Mahanadi and Godavari
2. It has Abujhmar hills in the west and Eastern Ghats in the East.
3. It prominently lies in the states of Jharkhand, Bihar and Madhya Pradesh.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.9) Solution (a)

Dandakaranya Forest

Dandakaranya is a physiographic region of India which spans over the central and eastern parts of India. It covers a vast area of about 35,600 square miles and encompasses the Eastern Ghats in the east and the Abujhmar Hills in the west along with parts of the Indian states Andhra Pradesh, Odisha and Chhattisgarh. It stretches to about 200 miles from north to south and 300 miles from east to west. It has been the home to the people belonging to Gond community.

Geography of Dandakaranya

Major region of Dandakaranya is a sanded-over peneplain, however the land from north to southwest has a gradual slope. Hills in the eastern part of the forest rise abruptly whereas towards the west its elevation decreases gradually. Wide plateaus are covered with dense forest. Certain extensive plains in the forest are drained by the Mahanadi River along with its tributaries including Sandul, Hatti, Udanti, Jonk and Tel as well as Godavari River along with its tributaries Sabari and Indravati. A thin veneer of loamy soils can be found over the plateaus and hillsides. Valleys and plains comprise fertile alluvial soil. Dandakaranya is the home to commercially important moist forests of Sal which spans over half of the forest area. Deposits of manganese, iron ore and bauxite are also common here.

THINK!

- Peneplain
- Moist deciduous forest
- Naxalism

Q.10) Which of the following statements regarding Meghalaya plateau are NOT correct?

1. It is an extension of Himalayan range in North Easter India.
2. It is filled with fertile alluvial soil deposited by Brahmaputra.
3. It is separated from peninsular plateau by Garo – Rajmahal gap.

Select the code from below:

a) 1 and 2
b) 3 only
c) 2 and 3
d) All of the above

Q.10) Solution (a)

Note: Incorrect statements have been asked.

Meghalaya Plateau

- The peninsular plateau extends further east beyond the Rajmahal hills to from **Meghalaya** or the **Shillong plateau**.
- **Garo-Rajmahal Gap** separates this plateau from the main block.
- This gap was formed by **down-faulting** (normal fault: a block of earth slides downwards). It was later filled by sediments deposited by the Ganga and Brahmaputa.
- The plateau is formed by Archaean quartzites, shales and schists.
- The plateau slopes down to Brahmaputra valley in the north and the Surma and Meghna valleys in the south.
- Its western boundary more or less coincides with the Bangladesh border.
- The western, central and the eastern parts of the plateau are known as the **Garo Hills** (900 m), the **Khasi-Jaintia Hills** (1,500 m) and the **Mikir Hills** (700 m).
- **Shillong (1,961 m) is the highest point of the plateau.**
- Because of excessive rainfall the soil is severely leached and barren. Laterite soil is found in the region.

THINK!

- Mawsenram
- Laterite soil

Q.11) Which of the following Islands of India are Volcanic in character?

1. Narcondam Island
2. Barren Island
3. Minicoy
4. Majauli

Select the code from following:

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

Q.11) Solution (a)

THE BARREN AND NARCONDAM ISLANDS, north of Port Blair, are **volcanic islands**
(Note: Barren Island is the only active volcano of India.)

The Andaman and Nicobar islands archipelago consists of approximately 265 small and large islands.

Andaman Islands:

The Andaman islands are divided into three main islands i.e. **North, Middle** and **South.**
Duncan passage separates Little Andaman from South Andaman.
The Andaman group of islands in the north is separated by the **Ten Degree Channel** from the Nicobar group in the south.

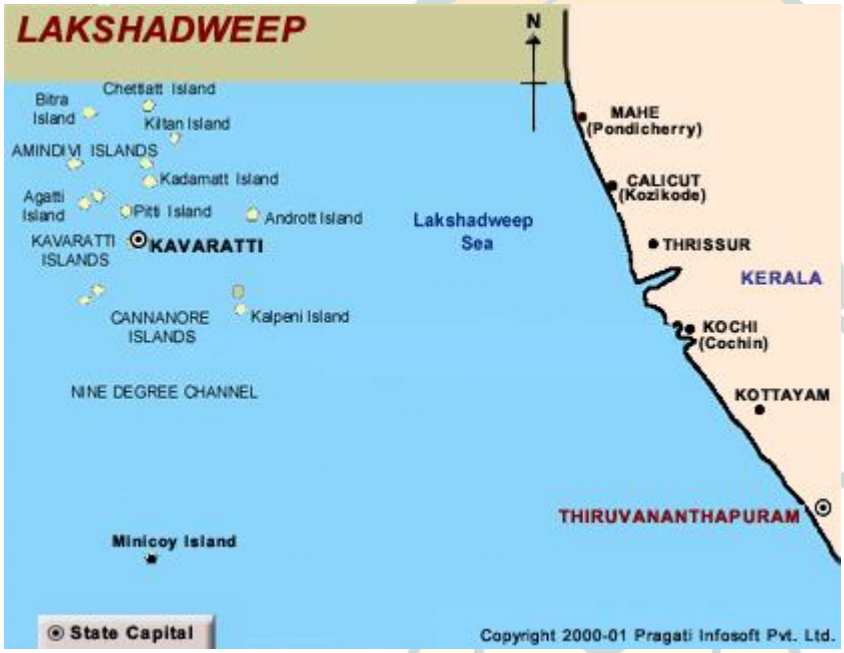
Port Blair, the capital of Andaman Nicobar Islands lies in the South Andaman.

Nicobar Islands:

- Among the Nicobar islands, the **Great Nicobar** is the largest. It is the southernmost island and is very close to Sumatra island of Indonesia. The **Car Nicobar** is the northernmost.
- Most of these islands are made of tertiary sandstone, limestone and shale resting on basic and ultrabasic volcanoes [Similar to Himalayas].
- Some of the islands are fringed with **coral reefs**. Many of them are covered with thick forests. Most of the islands are mountainous.
- **Saddle peak (737 m)** in **North Andaman** is the highest peak.

Note: In Andaman and Nicobar island group, the three type of Islands are found – the extension of continent, the Volcanic Islands and Coral Islands.

Lakshadweep Islands:



- Lakshadweep is an archipelago of **twelve atolls, three reefs and five submerged** banks, with a total of about thirty-nine islands and islets.
- The reefs are in fact also atolls, although mostly submerged, with only small unvegetated sand cays above the high-water mark. The submerged banks are sunken atolls.
- Almost all the atolls have a **northeast-southwest orientation** with the islands lying on the eastern rim, and a mostly submerged reef on the western rim, enclosing a lagoon.
- It has **10 inhabited islands**, 17 uninhabited islands, attached islets, 4 newly formed islets and 5 submerged reefs.
- The main islands are **Kavaratti, Agatti, Minicoy, and Amini**.
- Most of the islands have **low elevation** and do not rise more than five metre above sea level (Extremely Vulnerable to sea level change).

- Their topography is flat and relief features such as hills, streams, valleys, etc. are **absent.**

Q.12) Which of the following mountain ranges is/are folding mountain ranges?

1. Aravalis
2. Himalayas
3. Western Ghats
4. Eastern Ghats

Select the code from following:

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

Q.12) Solution (b)

Himalaya

Himalayas are the young fold mountains. This is the highest mountain range of the world. Himalayas act as natural barrier. The extreme cold, snow and rugged topography discourage the neighbors to enter India through Himalayas. They run from west-east direction from Indus to Brahmaputra along the northern boundary of India.

The Aravallis:

Aravallis

- It runs from North East to South West for 800 km between Delhi to Gujarat.
- It is one of the oldest folding mountain ranges of the World.
- It is highly denuded. Its highest peak is Guru Shikhar.
- The Great Boundary fault (GBF) separates Aravallis from Vindhyan mountains.

THINK!

- Folding mountains
- Block mountains

Note: Western Ghats and Eastern Ghats are examples of block mountains.

Q.13) Which of the following statements regarding Thar desert are correct?

1. It lies only in India and not in Pakistan.
2. It is drained by river Luni.
3. It doesn't get rainfall because of the presence of Aravali hills parallel to the monsoon winds.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.13) Solution (b)

The Indian Desert:

- The Indian Desert lies towards the western margin of Aravalli Hills.
- It is also called **Thar** Desert.
- It is the **ninth largest desert** in the world.
- It spreads over the states of **Gujarat and Rajasthan**.
- This region has semi-arid and arid weather conditions. It receives less than 150 mm of rainfall per year.

Indian Desert

- The vegetation cover is low with thorny bushes.
- **Luni** is the main river in this area. All other streams appear only at the time of rainfall otherwise they disappear into the sand.
- Western side of Thar Desert contains large **Sand dunes and Seifs**.
- It is believed that a large part of Indian desert is formed by recession of sea. Many saline regions are found in this region as well as saline lakes. Most important saline lake of India is **Sambhar lake** in Rajasthan.

Note: A part of desert lies in Pakistan.

Q.14) Coal formation is found in which of the following type of rocks?

a) Archean
b) Vindhayan
c) Gondwana
d) Dharwad

Q.14) Solution (c)

The rock system of the country is divided into 4 major divisions:

- **The Archean Rock System**
- **The Purana Rock System**
- **The Dravidian Rock System**
- **The Aryan Rock System**

Type	Sub-type	location	minerals
Archean	Archean system(4000-2500 million years old)	Covers 2/3 part of Indian peninsula. Found in Andhra, telangana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and parts of Meghalaya plateau.	Rich in Ferrous and non-ferrous minerals like iron ore, copper, manganese, mica, dolomite, lead, zinc, silver and gold.
	Dharwad system (2500- 1800 million years old)	The system is well developed in Dharwar-Bellary-Mysore belt of Karnataka, Jharkhand (Ranchi-Hazaribagh), MP, Chattisgarh, Odisha and Aravalli belt between Jaipur and Palanpur in Rajasthan.	Gold, Marble, Precious and semi-precious stones.
Purana Rocks (1400-600 million years)	Cuddapah System	Cuddapah and Kurnool dist. Andhra, Chattisgarh, Rajasthan and lesser Himalayas	
	Vindhyas	Vindhayan Mountain Range	Diamond, Red sandstone, Construction stone
Dravidian Rocks (600-300 million years)	Cambrian Rocks	Named after Cambria, the latin name for Wales in Great Britain. They are best developed in North-	They are fossiliferous sandstones underlain by clayey salt.

		West Himalayan region.	
	Carboniferous Rocks -upper carboniferous -middle carboniferous -lower carboniferous	Carboniferous in geology means coal bearing. Coal formation started in carboniferous age. Upper- Mount Everest Middle- Kashmir, Spiti Valley, Shimla and Himalayas Lower- Pir Panjal trap, kumaun region	Limestone and dolomite. Anthracite coal is found.
Aryan Rocks	Gondwana	Odisha, Bihar, Jharkhand, Andhra Pradesh, Chattisgarh	**Good Quality Coal (Bituminous and Anthracite), iron, kaolin, fire clay, sandstone and grits.**
	Deccan trap (Cretaceous) (146-65 million years)	During this period, enormous quantity of basaltic lava was poured out to the surface assuming great thickness. Found in Gujarat, Maharashtra, MP, Chattisgarh, Northern Andhra and North-West Karnataka.	Quartz, bauxite, Magnetite, agate and semi-precious stones
	Tertiary (60-7 million years)	Found in complete Himalayan formation. In	It has been called the age of mammals because of the

		peninsular region, they are found in the coast of Kutch, Kathiawar, Konkan, Malabar, Nilgiris and the eastern Ghats.	abundance of fossils in these deposits.
	Quaternary	It started around 12000 years ago since the withdrawal of the last glaciations. The northern plains of India came into being during this period.	Since most of the particles are loose and recent, some recent fossils are found. Oil and gas deposits are also found.

Q.15) From the below identify the correct term which is collectively applied to all kinds of saline and alkaline soils in the plains of north India, particularly in Uttar Pradesh –

a) Regolith
b) Talus
c) Usar
d) Reh

Q.15) solution (c)

Usar soil is widespread in India and it is a term collectively applied to all kinds of saline and alkaline soils in the plains of north India, particularly in Uttar Pradesh.

'Reh' is a white, grayish or ash-coloured salt that are found in low-lying plain areas in dry periods.

Regolith is simply mineral remains of decomposed rocks (no organic materials). It is soil that contains organic materials – such as roots of plants, fallen leaves, small animals such as worms, bacteria and so on.

Talus and scree are pile of rocks or collection of broken rock fragments at the base of crags, mountain cliffs, volcanoes or valley shoulders that has accumulated through periodic rockfall from adjacent cliff faces.

Q.16) Consider the following pairs and identify the correct pair/s using the code given below:

Plains : : Associated region

1. Malwa Plains : : located in central India especially Madhya Pradesh
2. Marusthali : : covers sand-dune-covered eastern portion of the Great Indian (Thar) Desert in western Rajasthan state
3. Utkal plains : : coastal plains in the Odisha state

Code:

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

Q.16) Solution (c)

Malwa Plains – are alluvial plains region in central Punjab state, northern India. It lies between the Ghaggar and Sutlej rivers south of the Bist Doab (plain). Hence, statement 1 is wrong.

Malwa Plateau is a natural region in west-central India occupying a plateau of volcanic origin. Geologically, the Malwa Plateau generally refers to the volcanic upland north of the Vindhya Range. Politically and administratively, the historical Malwa region includes districts of western Madhya Pradesh and parts of south-eastern Rajasthan.

Utkal plains are coastal plains in the Odisha state only. Marusthali is located in Western plains, covers sand-dune-covered eastern portion of the Great Indian (Thar) Desert in western Rajasthan state.

Q.17) Consider the following statements:

1. The Pamir, popularly known as the roof of the world is the connecting link between the Himalayas and the high ranges of the Central Asia.
2. Maximum development of glaciers occurs in the Karakoram range.
3. Purvachal or the Eastern hills are part of the Himalayan mountain system having their general alignment from the north to the south direction.

Which of the statements given above is/are correct?

a) 1 only
b) 1 and 2 only
c) 2 and 3 only

d) 1, 2 and 3

Q.17) Solution (d)

The Pamir Mountains, or the Pamirs, are a mountain range in Central Asia at the junction of the Himalayas with the Tian Shan, Karakoram, Kunlun, Hindu Kush, Suleman and Hindu Raj ranges. They are among the world's highest mountains.

The Pamir or popularly known as the roof of the world is the connecting link between the Himalayas and the high ranges of the Central Asia.

To the north they join the Tian Shan mountains along the Alay Valley of Kyrgyzstan. To the south they border the Hindu Kush mountains along Afghanistan's Wakhan Corridor.

Maximum development of glaciers occurs in the Karakoram range. This range accounts for about 16,000 sq km or about half of the snow bound area of the Himalayan region.

Purvachal or the Eastern hills and mountains are part of the Himalayan mountain system having their general alignment from the north to the south direction.

The *Purvachal* comprises the Patkai hills, the Naga hills, Manipur hills and the Mizo hills.

Q.18) Consider the following ports. Which of the following is correct order as we traverse from south to north?

a) Kochi – Managlore – JNPT – Marmagao - Kandla
b) Kochi – Mangalore – Marmagao – JNPT – Kandla
c) Mangalore – Kochi – Marmagao – JNPT – Kandla
d) Kochi – JNPT – Marmagao – Managalore – Kandla

Q.18) Solution (b)

Q.19) Which of the statements given below is/are not true in regard to western coastal plain?

a) It is a narrow belt.
b) Eastern coastal plain receives comparatively low rainfall but the Western coastal plain receives heavy rainfall.
c) West Coast Plain is infertile and agriculturally not prosperous except in the Malabar Coast.
d) It is an example of emergent coastal plain.

Q.19) Solution (d)

Western coastal plain is an example of submerged coastal plain (not emergent). It provides natural conditions for development of ports.

Q.20) Which of the statements given below is/are correct about Terai region?

1. Terai is an ill-drained, damp (marshy) and thickly forested narrow tract to the south of Bhabar running parallel to it.
2. It is a swampy lowland with silty soils.
3. Terai soils are rich in phosphate and organic matter but are deficient in nitrogen.

Choose the correct answer from the code given below:

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

Q.20) Solution (b)

Terai is an ill-drained, damp (marshy) and thickly forested narrow tract (15-30 km wide) to the south of Bhabar running parallel to it.

The underground streams of the Bhabar belt re-emerge in this belt. It is a swampy lowland with silty soils.

The terai soils are rich in nitrogen and organic matter but are deficient in phosphate.

These soils are generally covered by tall grasses and forests but are suitable for a number of crops such as wheat, rice, sugarcane, jute etc.. This thickly forested region provides shelter to a variety of wild life.

Q.21) Consider the below statements with regard to Western Ghats and Eastern Ghats:

1. The mean height of the Western Ghats is more than that of Eastern Ghats.
2. The Eastern Ghats do not form a continuous chain like the Western Ghats.
3. The Eastern Ghats average width is less than that of Western Ghats.

Which of the statements given above is/are correct?

a) 1 and 2 only
b) 2 and 3 only
c) 1, 2 and 3
d) None

Q.21) Solution (a)

Statement (3) is incorrect as the Western Ghat's average width is 50 to 80 km. But Eastern Ghats width varying from 100 to 200 km.

Western Ghats is continuous and can be crossed through passes only. But Eastern Ghats has been divided into several parts by large rivers.

Western Ghats average elevation is 900 to 1,100 meters above sea-level. But the average elevation of Eastern Ghats is about 600 metres above sea level.

Q.22) What type of drainage pattern the Ganga river system forms?

a) Trellis pattern
b) Dendric pattern
c) Rectangular pattern
d) Radial pattern

Q.22) Solution (b)

The dendritic pattern develops where the river channel follows the slope of the terrain. The stream with its tributaries resembles the branches of a tree, thus the name dendritic

Dendritic or tree-shaped drainage pattern is the most common and widespread pattern to be found on the earth's surface. The pattern is called dendritic on the ground that the network of tributaries of various orders and magnitudes of the trunk or master stream resembles the branches and roots and rootlets of a tree.

This pattern develops in a variety of structural and lithological environments such as in the mountainous and hilly areas (e.g., **dendritic pattern is one of the dominant patterns in the Himalayas**), on extensive plateau surfaces (e.g., Deccan plateau), on peneplain surfaces (e.g., the Peninsular peneplains of India, mostly in the basins of the Mahanadi, the Godavari, the Krishna, the Cauvery, the Domodar etc.), in the alleviated plains (e.g., Great Plains of North India), in the desert plains (e.g., Rajasthan desert), in the glaciated lowland regions (e.g., North European plains and northern lowlands of North America) etc.

Do you know?

- Hazaribagh plateau, Parasnath hill, Panchet hill and Dalma lava upland (all in Jharkhand) have issued radial drainage pattern.

THINK!

- Centripetal drainage pattern.

Q.23) Consider the following statements about Brahmaputra River:

1. It flows eastwards parallel to the Himalayas.

2. On reaching the Nanga Parbat, it takes a 'U' turn and enters India in Arunachal Pradesh through a gorge.
3. The Brahmaputra has a braided channel in its entire length in Assam and forms many riverine islands.
4. Teesta river is its right bank tributary.

Select the correct answers using the codes given below.

a) 1 and 3 only
b) 1, 3 and 4 only
c) 2, 3 and 4 only
d) All the above

Q.23) Solution (b)

The Brahmaputra rises in Tibet east of Mansarowar lake very close to the sources of the Indus and the Satluj. It is slightly longer than the Indus, and most of its course lies outside India. It flows eastwards parallel to the Himalayas. On reaching the **Namcha Barwa** (7757m), it takes a 'U' turn and enters India in Arunachal Pradesh through a gorge.

The Brahmaputra has a braided channel in its entire length in Assam and forms many riverine islands.

Right bank tributaries of Brahmaputra are Kameng River, Manasarover, Beki River, Raidak River, Jaldhaka River, Teesta River, Subansiri River.

Do you know?

- Guwahati, Dibrugarh, Tezpur are the main cities developed on the banks of Brahmaputra river.

THINK!

- Indus river system.

Q.24) Consider the following statements about Mahadayi/Mandovi river:

1. The famous Dudhsagar falls is located on this river.
2. Kalasa and Banduri are its tributaries.
3. It is the west flowing river.
4. Mahadayi river water dispute is between Madhya Pradesh and Maharashtra.

Select the correct answers using the codes given below.

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

d) All the above

Q.24) Solution (a)

The Mahadayi/Mandovi River also known as Mahadayi or Mhadei river, is described as the lifeline of the Indian state of Goa. The river has a length of 77 kilometres (48 miles), 29 kilometres (18 miles) in Karnataka and 52 kilometres (32 miles) in Goa. It originates from a cluster of 30 springs **at Bhimgad in the Western Ghats** in the Belagavi district of Karnataka.

Dudhsagar falls and Vajrpoha falls located on this river. The **Kalasa-Banduri Nala** is a project undertaken by the Government of Karnataka to improve drinking water supply to the Districts of Belagavi, Dharwad and Gadag. It involves building across Kalasa and Banduri, two tributaries of the Mahadayi river to divert 7.56 TMC of water to the Malaprabha river, which supplies the drinking water needs of the said 3 districts, i.e., Dharwad, Belagavi and Gadag. Mahadayi river water dispute is between **Goa, Karnataka and Maharashtra**

Do you know?

- Mahadayi river rises in the Western Ghats, from the **Bhimgad Wildlife Sanctuary** in Khanapur taluk of Karnataka's Belagavi district.
- Allahabad city is located at the confluence of Ganga, Yamuna and Sarasvati.

THINK!

- Cities located on the banks of Kaveri River.

Q.25) Consider the following rivers and cities located on their banks.

Cities	River
1. Cuttack	Mahanadi
2. Agra	Yamuna
3. Jabalpur	Narmada
4. Lucknow	Gomti

Which of the above pairs is/are correctly matched?

a) 1,2 and 3 only
b) 1, 3 and 4 only
c) 2, 3 and 4 only
d) All the above

Q.25) Solution (d)

City	River	State
Agra	**Yamuna**	**Western Uttar Pradesh**
Ahmedabad	Sabarmati	Gujarat
Allahabad	At the confluence of Ganga and Yamuna	Uttar Pradesh
Ayodhya	Saryu	Uttar Pradesh
Cuttack	**Mahanadi**	**Odisha**
New Delhi	Yamuna	Delhi
Hyderabad	Musi	Telangana
Jabalpur	**Narmada**	**Madhya Pradesh**
Srinagar	Jhelum	Jammu & Kashmir
Surat	Tapi	Gujarat
Varanasi	Ganges	Uttar Pradesh
Vijayawada	Krishna	Andhra Pradesh
Lucknow	**Gomti**	**Uttar Pradesh**

Do you know?

- The Indus Waters Treaty is a water-distribution treaty between India and Pakistan, brokered by the World Bank (then the International Bank for Reconstruction and Development) The treaty was signed in Karachi on September 19, 1960 by then Prime Minister of India and then President of Pakistan Ayub Khan.

THINK!

- Sutlej Yamuna link canal

Q.26) West flowing rivers of peninsular India do not form deltas but form only estuaries. Which of the following reasons can be attributed to this phenomenon?

1. Seasonal dependent on monsoon rainfall.
2. Smaller, fixed course with well-adjusted valleys.
3. Old rivers with graded profile and have almost reached their base levels.
4. Passage through hard rocks.

Select the correct answers using the codes given below.

a) 1 and 3 only
b) 1 and 4 only
c) 4 only
d) All the above

Q.26) Solution (c)

Options 1, 2 and 3 are all the features of peninsular rivers in general. The west flowing rivers of India do not form delta because they pass through hard rocks. This means that these are devoid of sediments which are essential for formation of delta. Moreover they are still in their youth stage when they meet the Arabian Sea. So even when there are some sediments, they are not deposited.

Do you know?

- Luni is the largest river system of Rajasthan, west of Aravali. It originates near Pushkar in two branches.

THINK!

- The Evolution of Peninsular Drainage System.

Q.27) Mangrove forests are present in which of the following river deltas?

1. Cauvery
2. Krishna-Godavari
3. Mahanadi
4. Ganga-Brahmaputra

Select the correct answers using the codes given below.

a) 1,2 and 3 only
b) 2, 3 and 4 only
c) 2 and 3 only
d) All the above

Q.27) Solution (d)

Mangroves forest comes under littoral and swamp forests. They support saline resistant vegetation like sundari tree. They are found in the deltas of: Ganga-Brahamaputra, Mahanadi, Godavari and Krishna etc. Apart from these deltas, they are found in Andaman and Nicobar and Gujarat.

Do you know?

- The mangroves of Sundarbans are the largest single block of tidal halophytic mangroves of the world.

THINK!

- Catchment areas
- Drainage basin

Q.28) Consider the following statements regarding River Regime

1. It represents the pattern of flow of water in a river channel over a year.
2. The river regime of Peninsular rivers witnesses greater fluctuations than Himalayan 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

Q.28) Solution (c)

The pattern of flow of water in a river channel over a year is known as its regime. The north Indian rivers originating from the Himalayas are perennial as they are fed by glaciers through snow melt and also receive rainfall water during rainy season. The rivers of South India do not originate from glaciers and their flow pattern witness's fluctuations. The flow increases considerably during monsoon rains. Thus, the regime of the rivers of South India is controlled by rainfall which also varies from one part of the Peninsular plateau to the other.

Do you know?

- Since the upper catchment area receives rainfall during the southwest monsoon season (summer) and the lower part during the northeast monsoon season (winter), **the Cauvery river carries** water throughout the year **with comparatively less fluctuation than the other Peninsular rivers.**

THINK!

- Pattiseema project
- Polavaram project

Q.29) Which of the following rivers in India cuts the Tropic of Cancer twice?

a) Sabarmati
b) Mahi
c) Narmada
d) Tapi

Q.29) Solution (b)

Mahi

Mahi river cut the Tropic of Cancer twice It originates in the Mahi Kanta hills, from the northern slopes of Vindhyas in Dhar district of Madhya Pradesh.

Think!

- Rivers which cross Equator twice

Q.30) Arrange the following rivers according to their drainage basin in India from highest to lowest:

1. Indus
2. Godavari
3. Krishna
4. Brahmaputra

Select the code from following:

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

Q.30) Solution (a)

On the basis of the size of catchment area, the river basins of India have been classified into three categories.

I. Large river basins: River basins with a catchment area of more than 20,000 sq km are known as large river basins.
II. Medium River basins: River basins with a catchment area between 20,000 sq km to 2000 sq km are known as medium river basin.
III. Minor river basin: River basins with a catchment area of less than 2000 sq km are known as minor river basin.

Details of Major river basins of India are as follows:

River Basin	Basin Area (km^2)	Percentage area	Annual discharge (m^3/km^2)
Ganga	861404	26.2	468700
Indus	321284	9.8	79500
Godavari	312812	9.5	118000
Krishna	258,948	7.9	62,800
Brahmaputra	258008	7.8	627000
Mahanadi	141589	4.3	66640
Narmada	98795	3.0	54600
Kaveri	87900	2.7	20950

Tapi	65150	2.0	17982
Pennar	55213	1.7	3238
Brahmani	39033	1.2	18310
Mahi	34481	1.0	11800
Subarnarekha	21895	0.7	7940
Sabarmati	19296	0.6	3800
Medium and minor rivers	711833	23.6	-

Q.31) Which of the following statements correctly defines an Endorheic drainage basins?

a) These are underground drainage basins responsible for making Karst topography
b) These are the drainage basins which finally drain in the open sea.
c) These are inland drainage basins which do not drain to an ocean.
d) This is the name given to large drainage basins with area over 20,000 sq km.

Q.31) Solution (c)

Endorheic drainage basins

Endorheic drainage basins are inland basins that do not drain to an ocean. Around 18% of all land drains to endorheic lakes or seas or sinks.

The largest of these consists of much of the interior of Asia, which drains into the Caspian Sea, the Aral Sea, and numerous smaller lakes. Other endorheic regions include the Great Basin in the United States, much of the Sahara Desert, the drainage basin of the Okavango River (Kalahari Basin), highlands near the African Great Lakes, the interiors of Australia and the Arabian Peninsula, and parts in Mexico and the Andes. Some of these, such as the Great Basin, are not single drainage basins but collections of separate, adjacent closed basins.

Endorheic Drainage basin in Central Asia

In endorheic bodies of standing water where evaporation is the primary means of water loss, the water is typically more saline than the oceans. An extreme example of this is the Dead Sea.

In India lakes of Rajasthan, Bhopal, Bangalore acts as inland sink are area around them act as endorheic drainage basin.

Q.32) Which of the following 'Panch Prayag's' are correctly matched?

1. Vishnuprayag – Dhauliganga and Alaknanda
2. Nandaprayag – Nandakini and Alaknanda
3. Karna Prayag – Pindar and Alaknanda
4. Rudraprayag – Mandakini and Alaknanda

Select the code from following:

a) 1 and 3
b) 2 and 4
c) 1,3 and 4
d) All of the above

Q.32) Solution (d)

Panch Prayag

The five confluences, known as the Panch Prayag, are all along the Alaknanda. They are, in downstream order,

- Vishnuprayag, where the Dhauliganga joins the Alaknanda;

- Nandprayag, where the Nandakini joins;
- Karnaprayag, where the Pindar joins,
- Rudraprayag, where the Mandakini joins;
- Devprayag, where the Bhagirathi joins the Alaknanda to form the Ganges River proper.

Panch Prayag

Q.33) Which of the following is not a tributary of River Godavari?

a) Wainganga
b) Penganga
c) Panchaganga
d) Wardha

Q.33) Solution (c)

Godavari:

- The Godavari basin is the largest river system in the peninsula and second only to the Ganga system in India.
- It rises in the Nasik district of Maharashtra, and drains and area of 3, 12,812 square kilometres, half of which lies in Maharashtra.
- Besides Maharashtra, the basin is shared by Madhya Pradesh, Karnataka, Orissa and Andhra Pradesh.
- The Godavari flows for a length of 1,465 km and is often referred to as Vridha Ganga or Dakshina Ganga because of its large size and extent.
- The major tributaries of the Godavari are the Pravara, Purna, Manjra, Penganga, Wainganga, Wardha, Pranhita, Indravati, Maner and Sabari.

Krishna:

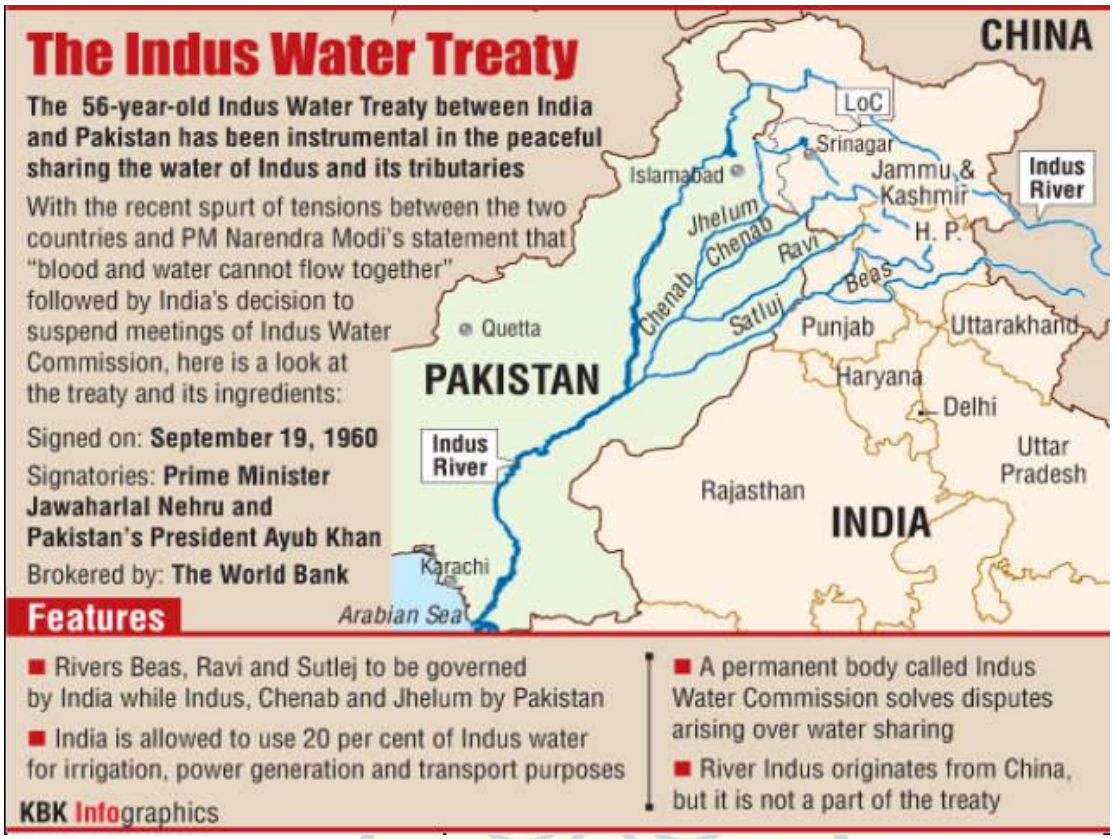
- The Krishna is the second largest east flowing Peninsular River.
- It rises from a spring near Mahabaleshwar. Its total length of 1,400 km and drainage basin area of 2, 58,948 is shared by Maharashtra (27%), Karnataka (44%) and Andhra Pradesh (29%) states.
- The Koyna, Yerla, Varna, Panchaganga, Dudhganga, Ghatprabha, Malprabha, Bhima, Tungabhadraand Musi are the main tributaries of the Krishna.
- The Tungabhadra consists of the Tunga and Bhadra rivers which originate in the western Karnataka and join just below Shimoga. Similarly the Tungabhadra meets the Krishna river near Kurnool town. It has a total length of 640 km with drainage area of 71,417 sq. km. Another tributary Bhima commands a catchment area of 76,614 sq. km.

Q.34) Under Indus Water treaty which of the following rivers are governed by India?

a) Beas, Ravi and Sutlej
b) Indus, Chenab and Jhelum
c) Indus, Chenab and Sutlej
d) Beas Ravi and Chenab

Q.34) Solution (a)

Indus Water Treaty:



The six rivers of the Indus basin originate in Tibet and flow across the Himalayan ranges to end in the Arabian sea south of Karachi. Preceding partition, it was one common network for both India and Pakistan. However, while partition managed to draw terrestrial borders, the question of how to divide the Indus waters was something that needed to be worked out. Since the rivers flowed from India to Pakistan, the latter was unsurprisingly threatened by the prospect of being fed by the former.

In 1960, the two countries reached a decisive step with the intervention of the World Bank wherein precise details were laid out regarding the way in which the waters would be distributed. The components of the treaty were fairly simple.

The three western rivers (Jhelum, Chenab and Indus) were allocated to Pakistan while India was given control over the three eastern rivers (Ravi, Beas and Sutlej).

While India could use the western rivers for consumption purpose, restrictions were placed on building of storage systems. The treaty states that aside of certain specific cases, no storage and irrigation systems can be built by India on the western rivers.

For more information kindly go through the following link:

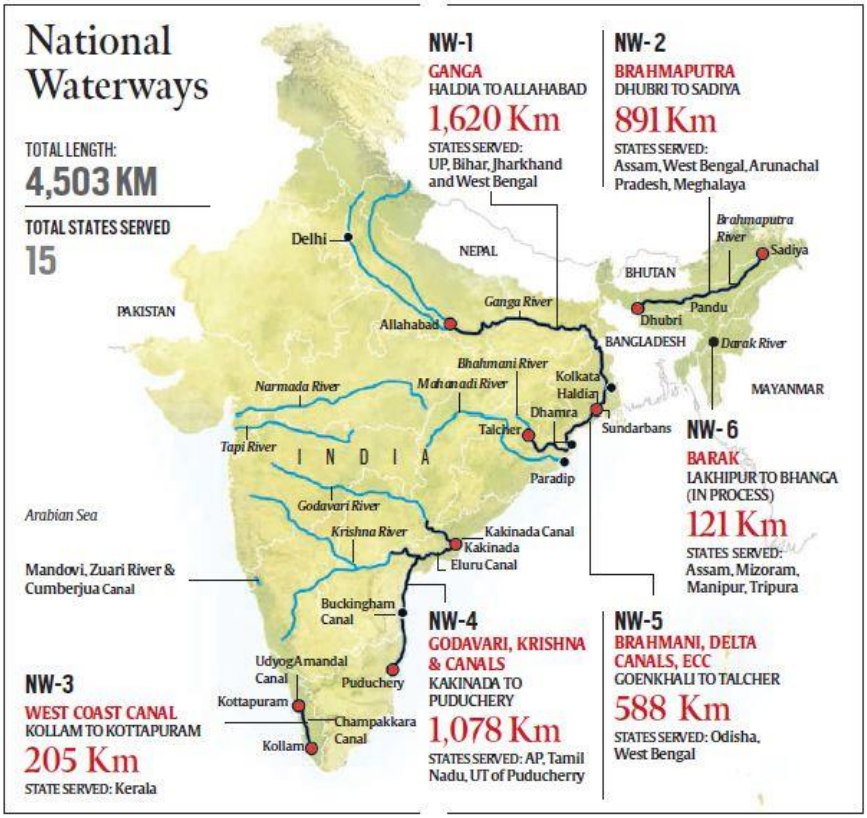
http://mea.gov.in/bilateral-documents.htm?dtl/6439/Indus

Q.35) National Waterway 6 is being developed on which of the following Rivers?

a) Banas
b) Brahmani
c) Brahmaputra
d) Barak

Q.35) Solution (d)

National Waterways of India:



National Waterways	Extent	Kilometer	River
NW 1	Allahabad-Haldia stretch	1620km	Ganga-Bhagirathi-Hoogly
NW 2	Sadiya-Dhubri stretch	891km	Brahmaputra
NW3	Kottapuram-Kollam stretch	205km	West Coast Canal

NW 4	Kakinada Puducherry Canal + Godavari + Krishna	1995km	Krishna, Godavari
NW 5	TalcherDhamra	585km	Brahmani
NW 6 (Proposed)	Lakhipur to Bhanga	121km	Barak

Q.36) Which among the following type of rivers/streams can be classified under Concordant Drainage?

1. Consequent streams
2. Subsequent streams
3. Resequent streams
4. Obsequent streams
5. Superimposed streams

Choose the correct answer:

a) 1 and 2 only
b) 1, 2 and 4 only
c) 1, 2, 3 and 4 only
d) All of the above

Q.36) Solution (c)

Concordant drainage pattern

A drainage pattern is described as concordant if it correlates to the topology and geology of the area.

In other words, the pattern of drainage which arises from and closely follows the trends of the underlying strata is called concordant drainage.

Concordant drainage patterns are the most commonly found drainage patterns and are classified into many types.

Consequent Rivers

- The rivers which follow the general direction of slope are known as the consequent rivers.
- Most of the rivers of peninsular India are consequent rivers.

- For example, rivers like Godavari, Krishna and Cauvery, descending from the Western Ghats and flowing into the Bay of Bengal, are some of the consequent rivers of Peninsular India.

Subsequent Rivers

- A tributary stream that is eroded along an underlying belt of non-resistant rock after the main drainage pattern (Consequent River) has been established is known as a subsequent river.
- The Chambal, Sind, Ken, Betwa, Tons and Son meet the Yamuna and the Ganga at right angles. They are the subsequent drainage of the Ganga drainage system.
- These streams have generally developed after the original stream.

Obsequent Rivers

- These flow in opposite direction to the master consequent.

Resequent Rivers

- A resequent river flows in the same direction as that of the initial consequent stream, but which develops in response to a new base level formed due to inversion of relief.

Discordant drainage patterns

Antecedent rivers and super imposed rivers are part of Discordant drainage patterns, as the drainage pattern does not correlate to the topology (surface relief features) and geology (geological features based on both Endogenetic movements and exogenetic movements) of the area.

In other words, in a discordant drainage pattern, the river follows its initial path irrespective of the changes in topography.

Think!

- Examples of antecedent rivers and super imposed rivers and definition of both.

Q.37) Consider the following pairs and identify the correct pair/s from the code given below:

1. Bari Doab : : R. Beas and R. Chenab
2. Bist Doab : : R. Beas and R. Sutlej
3. Gandhi Sagar Dam : : R. Chambal
4. Maithon Dam : : R. Barak

Code:

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

Q.37) Solution (b)

Doab is a term used in India and Pakistan for the "tongue," or tract of land lying between two converging, or confluent, rivers. It is similar to an interfluve. In simple words, a region lying between and reaching to the confluence of two rivers.

- Bist Doab is the region of Punjab, India that lies between the Beas River and the Sutlej River.
- The Bari Doab lies between the Ravi and the Beas rivers.

The Maithon Dam located at Maithon, 48 km from Dhanbad, in the state of Jharkhand - is constructed on the Barakar River. **(Not Barak River)**

The Gandhi Sagar Dam is one of the four major dams built on India's Chambal River. The dam is located in the Mandsaur Neemuch district of the state of Madhya Pradesh.

Do you know?

- Gandhi Sagar dam, Rana Pratap Sagar dam, Jawahar Sagar Dam and Kota barrage are the four major dams built on India's Chambal River.
- The Barakar River is the main tributary of the Damodar River in eastern India. Whereas, the Barak River is one of the major rivers of South Assam and is a part of the Surma-Meghna River System. It rises in the hill country of Manipur State, where it is the biggest and the most important of the hill country rivers.

Think!

- Try to identify other important reservoirs, dams and associated rivers.

Q.38) Consider the below statements with respect to Mahadayi River, which has become the bone of contention between Goa and Karnataka:

1. The river originates in Western Ghats and flows in Karnataka and Goa.
2. Goa capital Panaji is on the banks of this river.
3. Dudhsagar Falls (literally Sea of Milk) is located on this river.

Which of the statements given above is/are true?

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

Q.38) Solution (d)

Mahadayi River is also known as Mandovi River is described as the lifeline of the Indian state of Goa. The river originates from a cluster of 30 springs at Bhimgad in the Western Ghats in the Belagavi district of Karnataka.

The river has catchment area in Karnataka and Goa. It is one of India's smallest rivers. Goa capital Panaji is on the banks of Mandovi river.

Dudhsagar Falls and Varapoha Falls are located on this river.

Do you know?

- Mahadayi riverwater dispute has become a major bone of contention between Goa and Karnataka and in news often.

Think!

- Locate in your atlas other rivers of Goa state.

Q.39) Which of the following peninsular rivers flow in the north-easterly direction?

1. Son
2. Betwa
3. Ken
4. Narmada
5. Tapi

Choose the correct answer:

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

Q.39) Solution (b)

Although the general direction of flow of the Peninsular rivers is from west to east, a careful study reveals at least three man directions of flow:

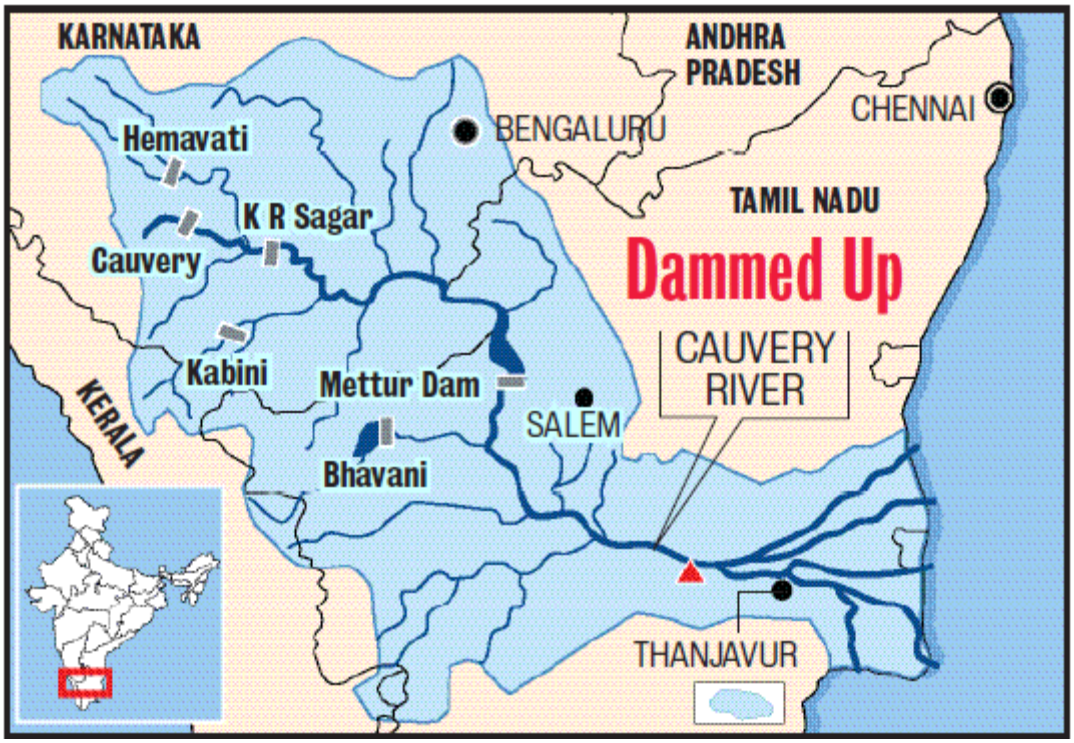
1. The Mahanadi, Godavari, Krishna, Cauvery and several smaller rivers drains south-east into the Bay of Bengal.
2. The Narmada and the Tapi flows west and even several other small streams originating from the Western Ghats flow westwards into the Arabian Sea.
3. Tributaries of Ganaga and Yamuna such as Chambal, Betwa, Ken, Son and Damodar flow in the north-easterly direction.

Q.40) Shimsha, Hemavati, Arkavati, Bhavani are tributaries of –

a) R. Narmada
b) R. Krishna
c) R. Kaveri
d) R. Godavari

Q.40) Solution (c)

R. Kaveri or Cauvery's major tributaries include - the Shimsha, the Hemavati, the Arkavati, Honnuhole, Lakshmana Tirtha, Kabini, Bhavani River, the Lokapavani, the Noyyal and the Amaravati River.



Q.41) Which of the below given are conditions that favour the formation of deltas?

1. Shallow sea, adjoining the delta
2. Strong current at the river mouth which leads to formation of tides
3. Active vertical and lateral erosion in the lower course of the river to supply large amount of sediments

Choose the correct answer from the code below:

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

Q.41) Solution (a)

The following conditions favour the formation of deltas:

1. active vertical and lateral erosion in the upper course of the river to supply large amount of sediments;
2. tideless, sheltered coast;
3. shallow sea, adjoining the delta;
4. no strong current at the river mouth which may wash away the sediments.

Q.42) The prerequisite condition for the formation of artesian well are -

1. Layer of permeable rock lying between two impermeable rock layers so that water does not get escape.
2. The permeable rock should be exposed somewhere at the ground surface, so that rock can soak rainwater.
3. Structure of rock strata must be synclinal.

Select the correct code:

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

Q.42) Solution (d)

The geologic conditions necessary for an artesian well are an inclined aquifer sandwiched between impervious rock layers above and below that trap water in it. Water enters the exposed edge of the aquifer at a high elevation and percolates downward through interconnected pore spaces.

Q.43) Consider the following statements.

1. The western cyclonic disturbances are weather phenomena of the winter months brought in by the easterly flow from the Mediterranean region.
2. Western cyclonic disturbances usually influence the weather of the north and north western regions of India.
3. Tropical cyclones occur during the monsoon as well as in October-November and are part of the westerly flow.
4. Tropical cyclones disturbances affect the coastal regions of the country.

Which of the above statements is/are correct?

a) 2 and 4 only
b) 1, 2 and 3 only
c) 1 and 3 only
d) All the above

Q.43) Solution (a)

The western cyclonic disturbances are weather phenomena of the winter months brought in by the **westerly flow** from the Mediterranean region. They usually influence the weather of the north and north-western regions of India. Tropical cyclones occur during the monsoon as well as in October -November and **are part of the easterly flow**. These disturbances affect the coastal regions of the country.

Do you know?

- An easterly jet stream, called the sub-tropical easterly Jetstream blows over peninsular India, approximately over 14°N during the summer months.

THINK!

- Subtropical westerly jet.

Q.44) Consider the following statements about Cold Weather Season (winter):

1. During this season, the northeast trade winds prevail over the country.

2. The weather is normally marked by clear sky, low temperatures and low humidity.

Choose the correct answer using the codes given below.

a) 1 only
b) 2 only
c) Both 1 and 2
d) None of the above

Q.44) Solution (c)

The cold weather season begins from mid-November in northern India and stays till February. December and January are the coldest months in the northern part of India. **The temperature decreases from south to the north**. Days are warm, and nights are cold. Frost is common in the north and the higher slopes of the Himalayas experience snowfall.

During this season, the northeast trade winds prevail over the country. They blow from land to sea and hence, for most part of the country, it is a dry season. **Some amount of rainfall occurs on the Tamil Nadu coast** from these winds as, here they blow from sea to land. (In northwestern India, some weak temperate cyclones from the Mediterranean Sea cause rainfall in Punjab, Haryana, Delhi and western Uttar Pradesh.)

In the northern part of the country, a feeble high-pressure region develops, with light winds moving outwards from this area. Influenced by the relief, these winds blow through the Ganga
valley from the west and the northwest. **The weather is normally marked by clear sky, low temperatures and low humidity.**

Do you know?

- The peninsular region does not have a well-defined cold season. There is hardly any noticeable seasonal change in temperature pattern during winters due to the moderating influence of the sea.

THINK!

- Hot weather season.

Q.45) Which of the following is/are the implications of the shift of monsoon trough closer to Himalayas?

1. There are longer dry spells in the plains.
2. The situation of drought establishes in the plains.

3. Widespread rain occurs in the mountainous catchment areas of the Himalayan rivers.

Choose the correct answer using the codes given below.

a) 1 and 3 only
b) 1 and 2 only
c) 1 only
d) All the above

Q.45) Solution (a)

The Unique phenomenon associated with the monsoon is its **tendency to have 'breaks' in rainfall.** Thus, it has wet and dry spells. In other words, the monsoon rains take place only for a few days at a time. They are interspersed with rainless intervals. **These breaks in monsoon are related to the movement of the monsoon trough.** For various reasons, the trough and its axis keep on moving northward or southward, which determines the spatial distribution of rainfall. When the axis of the monsoon trough lies over the plains, rainfall is good in these parts. On the other hand, **whenever the axis shifts closer to the Himalayas there are longer dry spells in the plains**, and **widespread rain occur in the mountainous catchment areas** of the Himalayan rivers. These heavy rains bring in their wake, **devastating floods causing damage to life and property in the plains.**

Do you know?

- The **frequency and intensity** of **tropical depressions** too, determine the amount and duration of monsoon rains.

THINK!

- October Heat.

Q.46) Consider the Climatic Regions of India According to Koeppen's Scheme.

Type of climate	Areas
1. Amw- Monsoon with short dry season	Most of the Peninsular plateaus, south of the Tropic of Cancer
2. Aw – Tropical savannah	West coast of India south of Goa
3. Dfc – Cold humid winter with short summer	Arunachal Pradesh

4. Bwhw – Semi-arid steppe climate	North-western Gujarat, some parts of western Rajasthan and Punjab

Which of the above pairs is/are correctly matched?

a) 1 and 2 only
b) 1 and 3 only
c) 3 and 4 only
d) All the above

Q.46) Solution (c)

Climatic Regions of India According to Koeppen's Scheme

Type of Climate	**Areas**
Amw- Monsoon with short dry season	West coast of India south of Goa
As – Monsoon with dry summer	Coromandel coast of Tamil Nadu
Aw – Tropical savannah	Most of the Peninsular plateaus, south of the Tropic of Cancer
Bwhw – Semi-arid steppe climate	North-western Gujarat, some parts of western Rajasthan and Punjab
Bwhw – Hot desert	Extreme western Rajasthan
Cwg – Monsoon with dry winter	Ganga plain, eastern Rajasthan, northern Madhya Pradesh, most of North-east India

Dfc – Cold humid winter with short summer	Arunachal Pradesh
E – Polar type	Jammu and Kashmir, Himachal Pradesh and Uttaranchal

Do you know?

- Except Himalayas all the parts of the country have temperature above the threshold level to grow the crops or plants throughout the year.

THINK!

- Annual rainfall variability of India.

Q.47) Consider the following about statements about 'Coal' found in India.

1. The coal blocks found in northeastern India are much older than that found in Damodar valley (West Bengal-Jharkhand), Jharia, Raniganj, Bokaro.
2. The coal blocks found in Damodar valley (West Bengal-Jharkhand), Jharia, Raniganj, Bokaro are much superior in quality than the coal found in northeastern India.

Which of the above statement is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.47) Solution (b)

In India coal occurs in rock series of two main geological ages, namely Gondwana, a little over 200 million years in age and in tertiary deposits which are only about 55 million years old. Gondwana (200 million years old) coal forms India's metallurgical grade as well as superior quality coal.

The major resources of Gondwana coal, which are metallurgical coal, are located in Damodar valley (West Bengal-Jharkhand). Jharia, Raniganj, Bokaro are important coalfields. The Godavari, Mahanadi, Son and Wardha valleys also contain coal deposits.

Tertiary coal 55 million years old. **Carbon content is very low**. Coal generally has low carbon and high percentage of moisture and Sulphur. [It takes few hundred million years for the carbon content to improve]

Tertiary coals occur in the north eastern states of Meghalaya, Assam, Arunachal Pradesh and Nagaland.

Do you know?

- First coal mine was opened in 1774 at Raniganj in West Bengal. India is now the third largest coal producer in the world after China and the USA.

THINK!

- Privatization of coal mining.

Q.48) Consider the following statements

1. Dolomite, mica and gypsum are some of minor minerals as per Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act 1957).
2. Major minerals are those minerals which are defined in Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act 1957).

Which of the above statement is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.48) Solution (a)

In India, the minerals are classified as **minor minerals and major minerals**.

According to section 3(e) of the **Mines and Minerals (Development and Regulation) Act, 1957** "Minor Minerals" means building stones, gravel, ordinary clay, ordinary sand other than sand used for prescribed purposes, and any other mineral which the Central Government may, by notification in the Official Gazette, declare to be a minor mineral. (For the purposes of this Act, the word "minerals" includes all minerals except mineral oils-natural gas and petroleum).

Major minerals are those specified in the first schedule appended in the Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act 1957) and the common major minerals are Lignite, Coal, Uranium, iron ore, gold etc. **It may be noted that there is**

no official definition for "major minerals" in the MMDR Act. Hence, whatever is not declared as a "minor mineral" may be treated as the major mineral.

Ministry of Mines, on 10 February 2015, notified 31 additional minerals, hitherto under the list of major minerals, as minor minerals. These 31 minerals account for over 55% of the total number of leases and nearly 60% of total leased area. **This was done with the intention to "devolve more power to the States,** and consequently, expedite the process of mineral development in the country". The 31 additional minerals notified as minor minerals are:

Agate; Ball Clay; Barytes; Calcareous Sand; Calcite; Chalk; China Clay; Clay (Others); Corundum; Diaspore; **Dolomite**; Dunite/pyroxenite; Felsite; **Felspar;** Fireclay; Fuschite Quartzite; **Gypsum**; Jasper; Kaolin; Laterite; Limekankar; **Mica;** Ochre; Pyrophyllite; Quartz; Quartzite; Sand (Others); Shale; Silica Sand; Slate; Steatite/Talc/Soapstone.

Do you know?

- The power to frame policy and legislation relating to minor minerals is entirely delegated to the State Governments while policy and legislation relating to the major minerals are dealt by the **Ministry of Mines under Union /Central Government**.

THINK!

- District Mineral foundation.

Q.49) Arrange the following in increasing order of their petroleum production.

1. Mumbai High
2. Gujarat
3. Assam

Choose the correct answer using the codes given below.

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

Q.49) Solution (a)

About **63 per cent of India's petroleum production is from Mumbai High**, **18 per cent from Gujarat** and **16 per cent from Assam**. Ankeleshwar is the most important field of

Gujarat. Assam is the oldest oil producing state of India. Digboi, Naharkatiya and Moran-Hugrijan are the important oil fields in the state.

Do you know?

- The plants using cattle dung are known **as 'Gobar gas plants'** in rural India. These provide twin benefits to the farmer in the form of energy and improved quality of manure.

THINK!

- Tidal energy.
- Geothermal energy.

Q.50) India's third stage Nuclear Program will use Thorium – Uranium cycle. Which of the following statements is/are correct regarding availability of Thorium in India?

1. Thorium is found in Monazite ore.
2. The largest quantity of Thorium in India ore is found in Kerala.
3. Thorium is not found on the East Coast of India.

Select the code from following:

a) 1 only
b) 2 and 3
c) 1 and 2
d) All of the above

Q.50) Solution (a)

Thorium

India has reserves of thorium in sufficient quantity as compared to other parts of world.

The Atomic Minerals Directorate for Exploration and Research (AMD), a constituent unit of Department of Atomic Energy (DAE), has so far established 11.93 million tonnes of in situ resources Monazite (Thorium bearing mineral) in the country, which contains about 1.07 million tonnes of thorium. The state-wise resources of in situ monazite established by AMD as of September 2014 are as follows:

State	Monazite (Million tonnes)

Odisha	2.41
Andhra Pradesh	3.72
Tamil Nadu	2.46
Kerala	1.90
West Bengal	1.22
Jharkhand	0.22
Total	11.93

Do you know?

Uranium and Thorium have got distinctive characteristics governing their utilisation in nuclear reactors. Unlike uranium, thorium alone cannot be directly used as nuclear fuel in a reactor. Utilisation of Thorium with either uranium or plutonium, without going through the second stage of Fast Breeder Reactors, to build sufficient inventory of plutonium first, will be counter-productive by limiting thorium utilisation to a very small fraction of the total available resources in the country. Utilisation of Thorium in the third stage makes it available as a sustainable energy resource for centuries. With this mode of utilisation, Thorium offers not only a sustainable energy resource, but also excellent fuel performance characteristic in a reactor, better than Uranium with respect to lower inventory of long lived nuclear waste.

THINK!

- Three stage nuclear program of India

Q.51) Consider the following statements:

1. Anthracite is the purest and metamorphosed form of Coal.
2. It is found only in Jammu and Kashmir in India.
3. Generally it is used in Iron and steel plants and thermal power plants.

Which of the above statements are correct?

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.51) Solution (a)

Anthracite Coal

This is the best quality of coal and contains over 85 per cent carbon. It is very hard, compact, jet black coal having semi-metallic luster.

Anthracite coal ignites slowly and burns with a nice short blue flame. In India, it is found only in Jammu and Kashmir and that too in small quantity.

Do you know?

Depending upon its grade from highest to lowest following, The coal found in India can be classified as Anthracite Coal, Bituminous Coal, Lignite (Brown Coal) and Peat.

Bituminous Coal

This is the most widely used coal and contains 50 to 85 per cent carbon. It is dense, compact, and brittle and is usually of black colour.

A good bituminous coal is composed of alternate dull and bright bands. Its calorific value is very high due to high proportion of carbon and low moisture content. Most of the bituminous coal is found in Jharkhand, Orissa, West Bengal, Chattisgarh and Madhya Pradesh.

Bituminous is generally used for industrial purposes.

Q.52) Consider the following statements about Easterly jet streams:

1. They are formed over Indian Subcontinent during winter.
2. They are thermally formed.
3. They are helpful in pushing South East monsoon branch over India.

Which of the above statements are correct?

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.52) Solution (b)

Jet Streams:

Jet streams are high speed winds that occur in narrow bands of upper air westerlies. The width of this air band can be 160-480km wide and 900-2150m thick, with core speed exceeding 300km/hr. such is their strength that aircraft routes which run counter to jet movements are generally avoided. Jets are coincident with major breaks in the tropopause.

Jet streams can be classified as follows:

1) **Polar front jet stream:** this is a thermally induced jet stream and it flows parallel to surface fronts. They flows west to east in a sinusoidal fashion. It is strongest at 200-300mb level and swings between 40^{o}-60^{o} latitude. It is found in both the hemispheres. Its band is non continuous but flows all round the year. It can reach up to 160-200 km/hr.
2) **Tropical westerly jet streams:** they also flow all round the year. They flow to conserve the angular momentum in upper atmosphere. They are found at the poleward limit of Hadley cell around 30^{o}N and S latitude. It follows a more fixed pattern than polar jet stream. It is strongest on Indian sub continent. The maximum speed can reach upto 300km/hr. the subtropical westerly jet do not seem to affect surface weather as much as the polar fronts jets do.
3) **Tropical easterly jet:** they are seasonal jet streams flowing east to west. These are only found in northern hemisphere and generates only in summer season. These are also thermally induced.

THINK!

Indian Monsoon

Q.53) Which of the following is/ are responsible to cause winter rainfall in South Eastern coast of India?

1. Westerlies
2. Retreating monsoon
3. South west Monsoon
4. Tropical Cyclone

Select the code from following:

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

Q.53) Solution (b)

Note: The question is specifically asking about Tamil Nadu coast .

There are two phenomenon responsible for winter rainfall in India – Western Disturbances and Retreating monsoon.

Westerlies – these are a branch of Temperate cyclone forming over East Atlatic during winter. These winds capture moisture from Mediterranean sea and cause rainfall in Punjab, Haryana and western UP.

Retreating Monson – As ITCZ shifts towards south in the winter season, the monsoon starts retreating. Retreating monsoon winds capture some moisture from Bay of Bengal and cause rainfall on Tamil Nadu coast.

Q.54) Which of the following statements is/are correct regarding Madden Julian Oscillation?

1. It is an eastward moving disturbance of clouds, rainfall and changing pressure which encircles the tropical area.
2. It has two phases of enhanced rainfall and suppressed rainfall.

Select the code from below:

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

Q.54) Solution (c)

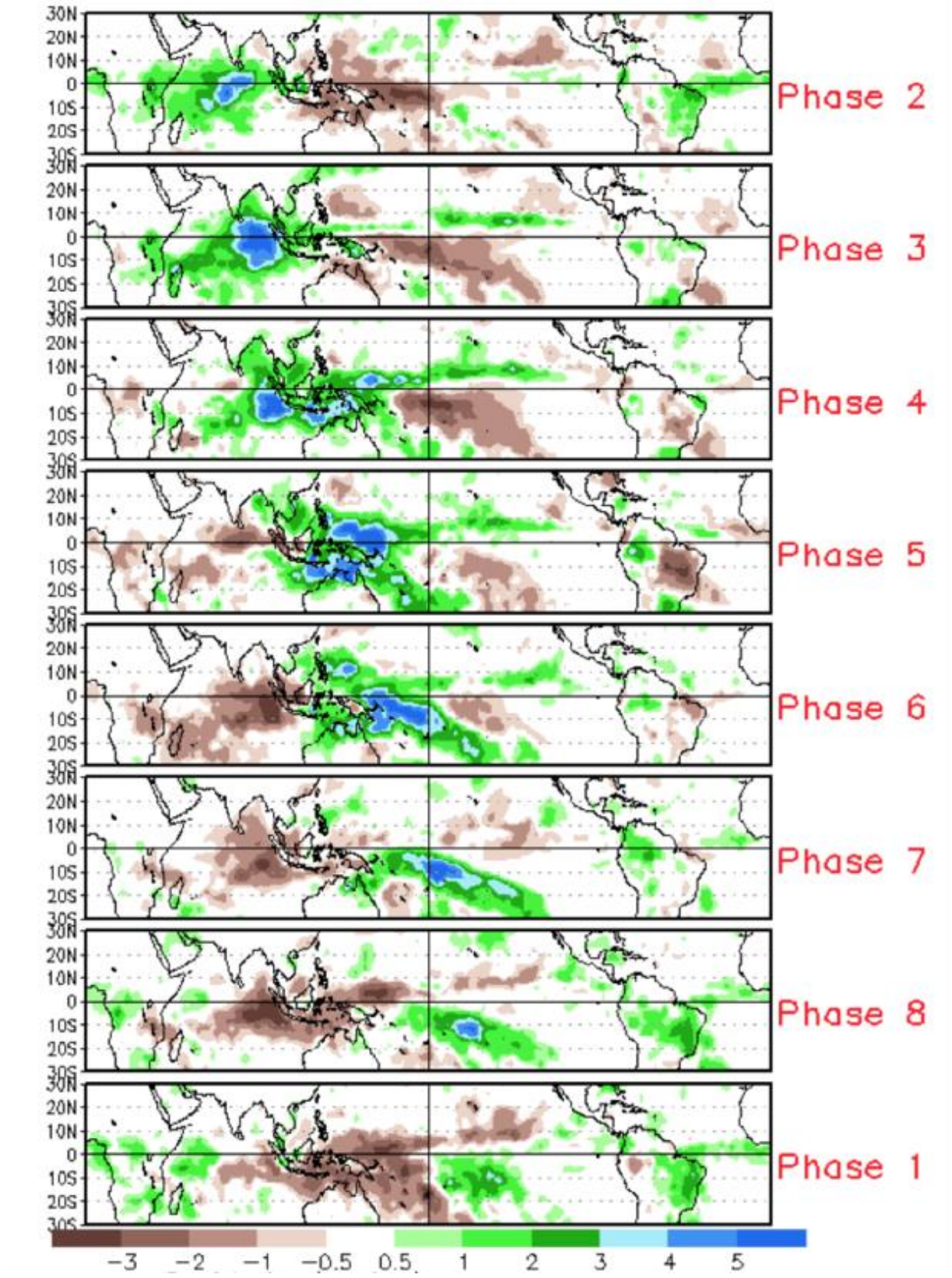
Madden-Julian Oscillation

While the MJO is a lesser-known phenomenon, it can have dramatic impacts in the mid-latitudes.

Unlike ENSO, which is stationary, the MJO is an *eastward moving* disturbance of clouds, rainfall, winds, and pressure that traverses the planet in the tropics and returns to its initial starting point in 30 to 60 days, on average. This atmospheric disturbance is distinct from ENSO, which once established, is associated with persistent features that last several seasons or longer over the Pacific Ocean basin. There can be multiple MJO events within a

season, and so the MJO is best described as ***intraseasonal*** tropical climate variability (i.e. varies on a week-to-week basis).

The MJO consists of two parts, or **phases**: one is the enhanced rainfall (or **convective**) phase and the other is the suppressed rainfall phase. Strong MJO activity often dissects the planet into halves: one half within the enhanced convective phase and the other half in the suppressed convective phase. These two phases produce opposite changes in clouds and rainfall and this entire **dipole** (i.e., having two main opposing centers of action) propagates eastward. The location of the convective phases are often grouped into geographically based stages that climate scientists number 1-8 as shown in Figure below.



Difference from average rainfall for all MJO events from 1979-2012 for November-March for the eight phases described in the text. The green shading denotes above-average rainfall, and the brown shading shows below-average rainfall. To first order, the green shading areas

correspond to the extent of the enhanced convective phase of the MJO and the brown shading areas correspond to the extent of the suppressed convective phase of the MJO. Note eastward shifting of shaded areas with each successive numbered phase as you view the figure from top to bottom.

Q.55) Which of the following phenomenon is responsible for excessive pollution and smog in Delhi in winters?

a) Loo
b) Low pressure over Delhi
c) Temperature inversion
d) Monsoon winds

Q.55) Solution (c)

Temperature Inversion:

Usually as we move up in troposphere from the surface, the temperature decreases with increase in altitude. But sometimes due to local conditions, the temperature, instead of decreasing, increases with height. This phenomenon is called temperature inversion. This is also known as negative lapse rate. The different types of inversions may be classified as –

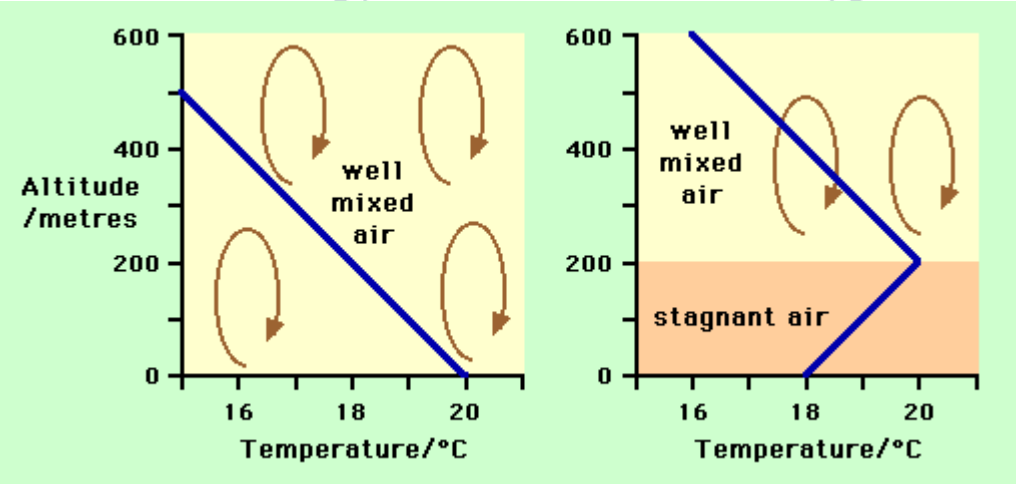


Fig: graphs comparing normal condition and condition of temperature inversion.

1) **Low level or ground surface inversion:** this is the condition where temperature near the ground increases, rather than decreasing with elevation. This type of inversion occurs generally in tropical and sub- tropical regions during the period of long winter nights.

This inversion however, disappears with sunrise. The duration and height of surface inversion increases pole wards. Following conditions are required for ground surface inversion:

- Long winter nights
- Cloudless calm skies
- Dry air and low relative humidity
- Calm atmosphere or slow movement of air
- Snow covered surface

2) **Upper air inversion:** it occurs when the warm air is transported upwards into the cold air due to eddies. It may be caused due to compression of the descending air as it happens in the case of subtropical high pressure belts.
3) **Frontal inversion:** it is caused by horizontal and vertical movement of air. The temperate cyclones are formed by convergence of warm westerlies and cold polar air, and thus the warm air overlies the cold air. The presence of warm air above and cold air below reverses the normal lapse rate and inversion of temperature occurs.

Social relevance of temperature inversion:

The inversion of temperature and its duration affects adversely the society and economy of the region of its occurrence. Some of the important consequences of temperature inversion are-

1) **Occurance of fog:** there develops clouds in contact with the ground(fog) with visibility usually restricted less than 1km. in the urban areas, the fog mixed with smoke takes the shape of smog. While fog is injurious to crops, the smog is considered as a health hazard. In 1952, about 4000 people died of smog in London. Breathing problems, asthma and bronchitis etc are common problem in Delhi and big cities of the northern india during the winter season.
2) **Road accidents:** the frequency of road, railways and air accidents increases during foggy conditions due to low visibility. The trains and flights are often delayed.
3) **Damage of crops:** the winter crops like wheat, barley, mustard, vegetables, chilies, potato etc are seriously damaged. The sugarcane crop in the northern plains of India. Especially in UP, Punjab and Haryana develops the disease of red rod which reduces the sugar content.
4) **Vegetation:** Orchards are closely influenced by the inversion of temperature. The lower valleys of alps mountains are almost without settlements, while the upper slopes are inhabited.

Q.56) Which of the following mines are NOT correctly matched with the mineral?

1. Khetri – Zinc
2. Zawar – Copper
3. Kudremukh – Aluminium
4. Hazaribagh – Mica

Select the code from below:

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

Q.56) Solution (a)

Note: Incorrect options have been asked.

India is the largest producer of Mica in the world. The biggest mine of mica in India is at Hazaribagh

Khetri mine – Copper

Zawar Mine – Zinc

Kudremukh – Iron

THINK!

Locations of mineral should be practiced by marking them on a map of India.

Q.57) Which among the following statements is true with regard to monsoons?

1. Southwest monsoon brings rain during summer whereas Northeast monsoon brings rain during winter.
2. During Southwest monsoon, Indian Subcontinent has high pressure and the direction of air movement is from Australia to Indian subcontinent.
3. Direction of Northeast monsoon is land to sea so it doesn't contains moisture and brings dryness and coldness after blowing through Bay of Bengal and brings rainfall only in Tamil Nadu.

Choose the appropriate code:

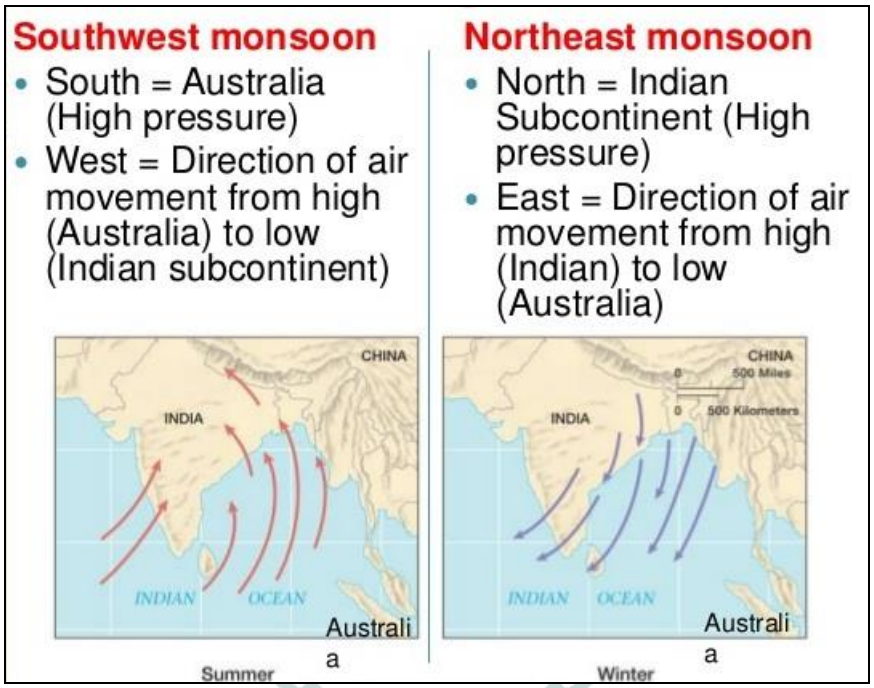
a) 1 only
b) 2 only

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

Q.57) Solution (a)

During Southwest monsoon, Indian Subcontinent has low pressure and the direction of air movement is from Australia(high) to Indian subcontinent(low)

Third statement is wrong as Northeast monsoon also brings rainfall in Andhra Pradesh, Puducherry apart from Tamil Nadu.



Q.58) Consider the following statements in regard to Aluminium:

1. Aluminium production starts with the raw material bauxite.
2. Three different raw materials are needed to make aluminium - aluminium oxide, electricity and carbon.
3. Aluminium is known for its ductile nature and can be recycled over and over again with 100 percent efficiency.

Which of the statements given above is/are correct?

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

Q.58) Solution (d)

Aluminium production starts with the raw material bauxite, a clay like soil type found in a belt around the equator.

Alumina is separated from the bauxite by using a hot solution of caustic soda and lime.

Three different raw materials are needed to make aluminium, they are – aluminium oxide, electricity and carbon.

Aluminium is known for its ductile nature and can be recycled over and over again with 100 percent efficiency.

Q.59) Consider the following statements:

1. Peneplains are associated with humid conditions, whereas Pediplains are associated with arid and semi-arid conditions
2. Dissected plateaux are associated with humid areas, whereas Mesas and Buttas are associated with arid areas

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

Q.59) Solution (c)

Both the statements are correct.

Peneplains are associated with humid conditions, whereas Pediplains are associated with arid and semi-arid conditions.

Dissected plateaux are associated with humid areas, whereas Mesas and Buttas are associated with arid areas.

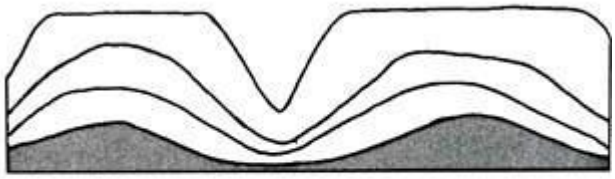


Fig. 24 Peneplain
In the formation of a peneplain in humid conditions the hills are both lowered and worn back to give an undulating lowland

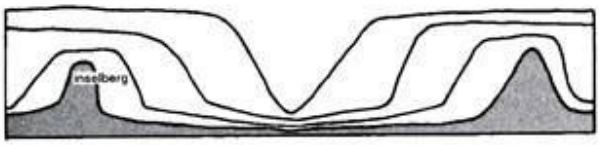


Fig. 25 Pediplain
In the formation of a pediplain in arid or semi-arid conditions the hills are worn back to form a gently sloping plain but some steep hills remain. These are called inselbergs

Q.60) Sikkim and Darjeeling Himalayas are best suitable for tea plantations due to –

1. Moderate slope
2. Thick soil cover with high organic content
3. Well distributed rainfall throughout the year
4. Mild winters

Choose the correct answer from the code given below:

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

Q.60) Solution (d)

Sikkim and Darjeeling Himalayas physical conditions such as moderate slope, thick soil cover with high organic content, well distributed rainfall throughout the year and mild winters makes it very much suitable for tea plantations. The British took advantage of these physical conditions and introduced tea plantations.

Q.61) Consider the following statements about Mica:

1. India secures the world's top position both in reserve and production of mica.
2. It is found only in igneous and metamorphic regions.
3. It is chemically inert, stable and does not absorb water.

Which of the statements given above is/are correct?

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

Q.61) Solution (c)

Mica is widely distributed and occurs in igneous, metamorphic and sedimentary regimes. India secures the world's top position both in reserve and production of mica.

It has a unique combination of elasticity, toughness, flexibility and transparency. It possesses resistance to heat and sudden change in temperature and high dielectric strength. It is chemically inert, stable and does not absorb water.

For over hundred years, India has enjoyed the monopoly in the production and export of sheet mica in the world. Of late, there has been a steady downfall in the production of mica. This declining trend could be attributed to fall in the demand of natural mica in the world market due to technological improvements that facilitate use of reconstituted mica and emergence of mica substitutes. However, there are sufficient resources in the country to meet the domestic requirement and export demand.

Andhra Pradesh leads with 41% share in country's total resources followed by Rajasthan (21%), Odisha (20%), Maharashtra (15%), Bihar (2%) and the remaining 1% is in Jharkhand and Telangana together.

Q.62) Consider the below statements:

1. It does not occur free in nature and is found in association with copper, uranium and other metals.
2. It is used as an important alloying material and when alloyed with iron, rust proof stainless steel of superior quality is obtained.
3. It is used for manufacturing armoured plates, bullet jackets and in naval construction.

Identify the correct mineral resource from below which has the above characteristics:

a) Lead
b) Pyrite
c) Chromite
d) Nickel

Q.62) Solution (c)

Nickel does not occur free in nature and is found in association with copper, uranium and other metals.

It is used as an important alloying material and when alloyed with iron, rust proof stainless steel of superior quality is obtained, from which utensils are made. Because of its greater

hardness and tensile strength nickel steel is used for manufacturing armoured plates, motor cars, bullet jackets and naval construction.

When alloyed with copper or silver, it is used for making coins. Nickel-aluminium alloys are used for manufacturing aeroplanes and internal combustion engines.

Most of the reserves are found in Orissa, Jharkhand, Rajasthan, Karnataka, Nagaland, Jammu and Kashmir and Kerala.

Q.63) Lignite coal reserves in India can be found in which among the following state/s:

1. Tamil Nadu
2. Rajasthan
3. Gujarat
4. Jammu and Kashmir

Choose appropriate answer from the codes given below:

a) 1 only
b) 1 and 3 only
c) 1 and 2 only
d) All of the above

Q.63) Solution (d)

Lignite, which is also known as brown coal, is a lower grade coal. It contains about 45 to 55 per cent carbon.

Lignite coal is mainly produced in two states – Tamil Nadu and Gujarat. Small lignite coal fields are also found in Rajasthan and Jammu and Kashmir. Neyveli is the lignite field in Tamil Nadu which is located in South Arcol district. Neyveli is the largest lignite coal mine of India. This field supplies fuel for thermal power generation in Tamil Nadu.

Q.64) Which of the following soils found in India are poor in nitrogen, phosphorous and humus?

1. Red and Yellow Soil
2. Black Soil
3. Laterite Soil
4. Peaty Soil

Select the correct answer using the codes given below:

a) 1, 2 and 3 only

b) 2, 3 and 4 only
c) 1, 3 and 4 only
d) All the above

Q.64) Solution (a)

The fine-grained **red and yellow soils** are normally fertile, whereas coarse-grained soils found in dry upland areas are poor in fertility. **They are generally poor in nitrogen, phosphorous and humus.**

Chemically, the **black soils are rich in lime, iron, magnesia and alumina**. They also contain potash. **But they lack in phosphorous, nitrogen and organic matter**. The color of the soil ranges from deep black to grey.

Humus content of the laterite soil is removed fast by bacteria that thrives well in high temperature. **These soils are poor in organic matter, nitrogen, phosphate and calcium**, while iron oxide and potash are in excess.

Peaty soils are found in the areas of heavy rainfall and high humidity, where there is a good growth of vegetation. Thus**, large quantity of dead organic matter accumulates in these areas, and this gives a rich humus and organic content to the soil.**

Do you know?

- In ancient times, soils used to be classified into two main groups – Urvara and Usara, which were fertile and sterile, respectively.

THINK!

- Soil amendment.

Q.65) Consider the following statements about soil erosion:

1. Sheet erosion takes place on level lands after a heavy shower and the soil removal is not easily noticeable.
2. Gully erosion is common on steep slopes. Gullies deepen with rainfall, cut the agricultural lands into small fragments and make them unfit for cultivation.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.65) Solution (c)

Water erosion which is more serious and occurs extensively in different parts of India, takes place mainly in the form **of sheet and gully erosion.**

Sheet erosion takes place on **level lands after a heavy shower** and the soil removal is not easily noticeable. But it is harmful since it removes the finer and more fertile top soil.

Gully erosion is **common on steep slopes**. Gullies deepen with rainfall, cut the agricultural lands into small fragments and make them unfit for cultivation.

Do you know?

- Soil erosion is a serious problem for Indian agriculture and its negative effects are seen in other spheres also. Eroded materials are carried down to rivers and they lower down their carrying capacity and cause frequent floods and damage to agricultural lands.

THINK!

- Soil Conservation.

Q.66) Which of the following methods are best suitable to prevent gully erosion?

1. Finger gullies can be eliminated by terracing.
2. In bigger gullies, the erosive velocity of water may be reduced by constructing a series of check dams.
3. Head ward extension of gullies can be controlled planting cover vegetation.

Select the correct answer using the codes given below:

a) 1 and 3 only
b) 2 and 3 only
c) 3 only
d) All the above

Q.66) Solution (d)

The Efforts should be made to prevent gully erosion and control their formation are as follows. Finger gullies can be eliminated **by terracing**. In bigger gullies, the erosive velocity of water may be reduced by **constructing a series of check dams**. Special attention should be made to control head ward extension of gullies. This can be done by **gully plugging, terracing or by planting cover vegetation**.

Do you know?

- Contour bunding, Contour terracing, regulated forestry, controlled grazing, cover cropping, mixed farming and crop rotation are some of the remedial measures which are often adopted to reduce soil erosion.

Q.67) Government of India had launched Soil Health card Scheme for farmers. Which of the following statements regarding Soil Health Card Scheme are correct?

1. It will contain the status of his soil with respect to Macro-nutrients, Secondary-nutrient, Micro - nutrients and Physical parameters.
2. The SHC will indicate fertilizer recommendations and soil amendment required for the farm.
3. It is mandatory for the farmer to follow the recommendations of SHC.

Select the code from below:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.67) Solution (a)

Soil Health Card (SHC) is a Government of India's scheme promoted by the Department of Agriculture & Co-operation under the Ministry of Agriculture and Farmers' Welfare. It is being implemented through the Department of Agriculture of all the State and Union Territory Governments.

Soil Health Card

SHC is a printed report that a farmer will be handed over for each of his holdings. It will contain the status of his soil with respect to 12 parameters, namely N,P,K (Macro-nutrients) ; S (Secondary- nutrient) ; Zn, Fe, Cu, Mn, Bo (Micro - nutrients) ; and pH, EC, OC (Physical parameters). Based on this, the SHC will also indicate fertilizer recommendations and soil amendment required for the farm.

The card will contain an advisory based on the soil nutrient status of a farmer's holding. It will show recommendations on dosage of different nutrients needed. Further, it will advise the farmer on the fertilizers and their quantities he should apply, and also the soil amendments that he should undertake, so as to realize optimal yields.

It will be made available once in a cycle of 3 years, which will indicate the status of soil health of a farmer's holding for that particular period. The SHC given in the next cycle of 3 years will be able to record the changes in the soil health for that subsequent period.

Q.68) Which of the following factors controls the soil formation?

1. Climate
2. Parent material
3. Topography
4. Biological factors

Select the correct answer using the codes given below.

a) 1, 2 and 3 only
b) 2, 3 and 4 only
c) 2 and 4 only
d) All the above

Q.68) Solution (d)

FACTORS RESPONSIBLE FOR SOIL FORMATION

Soil formation is the combined effect of physical, chemical, biological, and anthropogenic processes on soil parent material.

Parent material

This is the material from which the soil has developed.

The parent material can influence the soil in a number of ways: colour; texture; structure; mineral composition and permeability/drainage.

Climate

The absorption of the solar radiation at the soil surface is affected by many variables such as soil color, vegetation cover, and aspect. In general, the darker the soil color, the more radiation is absorbed and the lower the albedo. The absorption differs in areas with deciduous trees (soil surface is shaded by trees most of the year) and arable land (soil surface is not shaded throughout the year).

Biological processes are intensified by rising temperatures. Reaction rates are roughly doubled for each 10°C rise in temperature, although enzyme-catalyzed reactions are sensitive to high temperatures and usually attain a maximum between 30 and 35°C.

Biological Factors

The soil and the organisms living on and in it comprise an ecosystem. The active components of the soil ecosystem are the vegetation, fauna, including microorganisms, and man.

Earthworms are the most important of the soil forming fauna in temperate regions, being supported to a variable extent by the small arthropods and the larger burrowing animals (rabbits, moles).

Time

Time is a factor in the interactions of all the above factors as they develop soil.

Topography/Relief

Relief is not static; it is a dynamic system (its study is called geomorphology). Relief influences soil formation in several ways.

- It influences soil profile thickness i.e. as angle of slope increases so does the erosion hazard.
- It has an effect on climate which is also a soil forming factor.
- Gradient affects run-off, percolation and mass movement.
- It influences aspect which creates microclimatic conditions.

Do you know?

- The soils of the Extra-Peninsula are formed due to the depositional work of rivers and wind. They are very deep. They are often referred to as **transported or azonal soils**.

THINK!

- Sedentary soils.

Q.69) Which of the following methods can be useful in soil conservation?

1. Use of Early Maturing Varieties of crops.
2. Contour Ploughing
3. Strip cropping
4. Crop rotation

Select the correct answer using the codes given below.

a) 1, 2 and 3 only
b) 2, 3 and 4 only
c) 1, 3 and 4 only
d) All the above

Q.69) Solution (d)

Soil conservation is the prevention of soil from erosion or reduced fertility caused by overuse, acidification, salinization or other chemical soil contamination.

Use of Early Maturing Varieties

Early maturing varieties of crops take less time to mature and thus put lesser pressure on the soil. In this way it can help in reducing the soil erosion.

Contour Ploughing

If ploughing is done at right angles to the hill slope, the ridges and furrows break the flow of water down the hill.

This prevents excessive soil loss as gullies are less likely to develop and also reduce run-off so that plants receive more water.

Strip Cropping

Crops may be cultivated in alternate strips, parallel to one another. Some strips may be allowed to lie fallow while in others different crops may be sown.

Various crops are harvested at different intervals. This ensures that at no time of the year the entire area is left bare or exposed.

The tall growing crops act as wind breaks and the strips which are often parallel to the contours help in increasing water absorption by the soil by slowing down run off.

Crop Rotation

Adopting sustainable agricultural practices is the most important measure to conserve soil.

In many parts of India, a particular crop is sown in the same field year after year. This practice leads to exhaustion of certain nutrients in the soil making it infertile.

Crop rotation is a practice in which a different crop is cultivated on a piece of land each year.

This helps to conserve soil fertility as different crops require different nutrients from the soil. Crop rotation will provide enough time to restore lost nutrients.

For example, potatoes require much potash, but wheat requires nitrate. Thus, it is best to alternate crops in the field.

Legumes such as peas, beans, and many other plants, add nitrates to the soil by converting free nitrogen in the air into nitrogenous nodules on their roots. Thus, if they are included in the crop rotation nitrogenous fertilizers can be dispensed with.

Do you know?

- Overgrazing accentuates erosion. During the dry period, there is shortage of fodder and the grass is grazed to the ground and torn out to the roots by animals. Soil is pulverized (reduce to fine particles) by the hoofs of animals. All this leads to weak top layer.
- So overgrazing needs to be checked to prevent soil erosion.
- This can be done by creating separate grazing grounds and producing larger quantities of fodder.

THINK!

- Sand fences.

Q.70) Which of the following schemes of the union government helps to conserve the soil?

1. National Mission for Sustainable Agriculture.
2. Pradhan Mantri Krishi Sinchayee Yojana.
3. Paramparagat Krishi Vikas Yojna.
4. Pradhan Mantri Fasal Bima Yojana

Select the correct answer using the codes given below.

a) 1, 2 and 3 only
b) 2, 3 and 4 only
c) 1, 3 and 4 only
d) All the above

Q.70) Solution (a)

National Mission for Sustainable Agriculture

Aims at making agriculture more productive, sustainable and remunerative and climate resilient by promoting location specific integrated/composite farming systems; **soil and moisture conservation measures**; **comprehensive soil health management**; efficient water management practices and mainstreaming rainfed technologies.

PMKSY (Watershed Development)

Effective management of runoff water and improved **soil & moisture conservation activities** such as ridge area treatment, drainage line treatment, rain water harvesting, in - situ moisture conservation and other allied activities on watershed basis.

Paramparagat Krishi Vikas Yojna (PKVY)

Aim of the project is to maximize the utilization of natural resources through **eco-friendly cultivation.**

Organic farming is a method of farming system which primarily aimed at cultivating the land and raising crops in such a way, **as to keep the soil alive and in good health by use of organic wastes** (crop, animal and farm wastes, aquatic wastes) and other biological materials along with beneficial microbes (bio-fertilizers) to release nutrients to crops for increased **sustainable production in an eco-friendly pollution free environment.**

Pradhan Mantri Fasal Bima Yojana

Pradhan Mantri Fasal Bima Yojana was launched in January 2016. This scheme replaced the existing two crop insurance schemes viz. National Agricultural Insurance Scheme (NAIS) and Modified NAIS and is being implemented since Kharif season of 2016 (June 2016).

The scheme covers Kharif, Rabi, annual commercial as well as horticultural crops

- For Kharif crops, the farmer's part of premium is 2% of sum assured.
- For Rabi crops, the farmer's part of premium is 1.5% of the sum assured.
- For annual commercial and horticultural crops, the farmer's part of premium is 5%.

The remaining part of premium is paid equally by the central and respective state governments.

Do you know?

Mera Gaon, Mera Gaurav

- This scheme is being launched involving agricultural experts of agricultural universities and ICAR institutes for effective and deeper reach of scientific farming to the villages.
- A group of experts will be associated with one particular village to create awareness and adoption of new technologies including farm investment, loans, availability of inputs and marketing.
- All the scientists from ICAR and agricultural universities will participate in this initiative.

THINK!

- Krishi Dak.

Q.71) Which of the following statements are correct regarding the process of Crop rotation?

1. It is the process of growing different crops in a field simultaneously.
2. It helps in natural pest control
3. It prevents depletion of a particular nutrient from soil and helps in maintaining soil fertility for a longer time.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.71) Solution (b)

Crop Rotation

This system is the practice of growing several dissimilar or different crop types (or no crop at all) in the same area and in sequential seasons.

Historians believe that farmers in the Middle East already practiced crop rotation as early as 6,000 B.C, although they didn't fully understand the science behind it. The logic behind crop rotation is when the same crop is grown at the same place for several years the soil is depleted of certain nutrients.

Doing rotation, a crop that draws one kind of nutrient from the soil is followed during the consequent season by a crop that returns the nutrient to the soil or draws a distinct ratio of nutrients.


9 Environmental benefits of crop rotation
The crop rotation is a thousand years old technique that has been proven to help the environment, improve the soil and many other things. It refers to the practice of growing different types of crops or none at all, in the same area over a sequence of seasons.
1
Automatic Pests Control
The diversification of cropping sequences takes away the host organism and causes a disruption in the annual life cycle of insects, diseases, and weeds. This results in better soil fertility and carbon storage.
Right Nitrogen Management
2
The use of this in large amounts, increases the nitrogen within the soil profile of certain farms. The system improves the availability of soil nitrogen and reduces use of the nitrogen fertilizer.
3
Fallow Fields Periods Shorten
Crop rotation helps to increase productivity by replacing fallow periods with growing different crops that replenish soil nutrients.
Against Soil Erosion
4
Rotating crops helps to improve soil stability by alternating between crops with deep roots and those with shallow roots. Also, enhanced water infiltration and minimized surface runoff.
Improvement in soil tilth and microbial communities will help bring down soil erosion due to more stable soil structure.
5
Minimize Greenhouse Gas Emissions
The implementation of crop rotation cuts the nitrogen fertilizer use and drastically reduces the greenhouse gas emissions. Reduced synthetic fertilizer also reduces the greenhouse gas emissions from manufacture and transportation of the fertilizer.
Treats Water Pollution
6
The rotations with a high share of crops and lesser dependence on pesticides bring down the use of pesticides as well as runoff into groundwater.
7
Increased Ability to Store Carbon
Crop rotation practices can result in increased soil carbon content through high crop cover periods. Also, it reduces the frequency and tillage intensity.
CO2
Better Soil Structure
8
The diversity in the root structure will enhance the chemical, physical and biological structure of the soil. Better soil structure creates several macrospores and enables new root growth of the next crops. Improving the soil organic matter and nutrient pools is also a benefit of crop rotation that results in increasing water-holding capacity of the soil.
9
Increased Ability to Store Carbon
Crop rotation systems are one cropping system alternative. This can cut agriculture's dependence on external inputs through internal nutrient recycling. By choosing the crop rotation systems you can have a massive impact on soil quality and fertility, environmental quality, and farm profitability.
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St. Vincent
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www.richmondvale.org

Q.72) Which of the following statements is/are correct regarding 'E' horizon of soil?

1. It is a permanent horizon found under the regolith.
2. It is formed by horizontal loss of minerals.

Select the code from below:

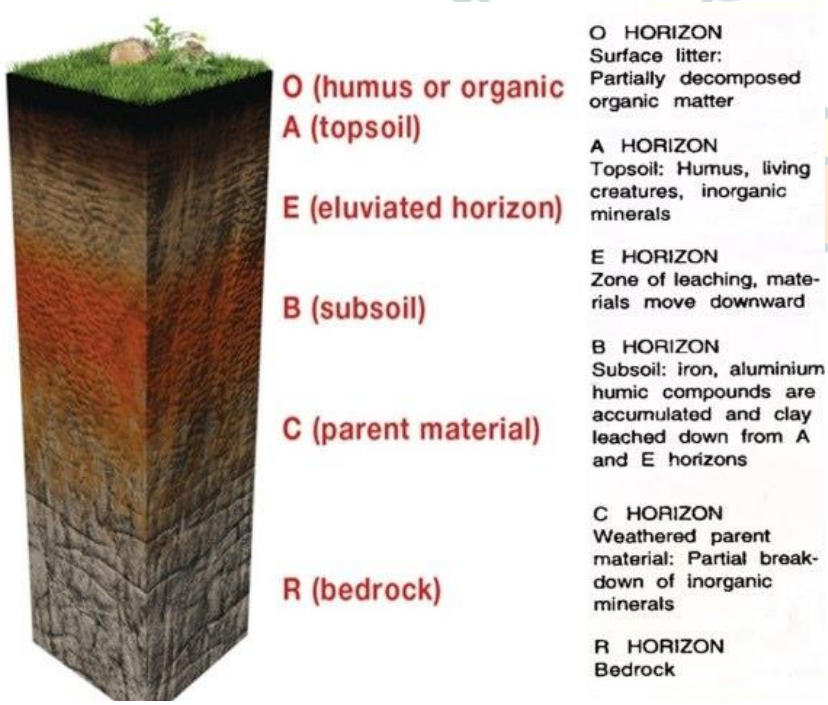
a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q.72) Solution (b)

Soil Profile:

If you look in a soil pit or on a roadside cut, you will see various layers in the soil. These layers are called **soil horizons**. The arrangement of these horizons in a soil is known as a **soil profile**. Soil scientists, who are also called pedologists, observe and describe soil profiles and soil horizons to classify and interpret the soil for various uses.

Soil horizons differ in a number of easily seen soil properties such as color, texture, structure, and thickness. Other properties are less visible. Properties, such as chemical and mineral content, consistence, and reaction require special laboratory tests. All these properties are used to define types of soil horizons.



Soil scientists use the capital letters **O**, **A**, **B**, **C**, and **E** to identify the master horizons, and lowercase letters for distinctions of these horizons. Most soils have three major horizons -- the surface horizon (**A**), the subsoil (**B**), and the substratum (**C**). Some soils have an organic horizon (**O**) on the surface, but this horizon can also be buried. The master horizon, **E**, is used for subsurface horizons that have a significant loss of minerals (eluviation). Hard bedrock, which is not soil, uses the letter **R**.

Q.73) What is the correct sequence of the processes of soil erosion?

1. Splash erosion
2. Sheet erosion
3. Ril erosion
4. Gully erosion

Select the code from following:

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

Q.73) Solution (a)

Soil Erosion

Soil erosion refers to the removal of Top soil by an external agent.

Water erosion takes place in following states:

Splash erosion:

The impact of raindrops on the soil surface can break down soil aggregates and disperse the aggregate material. Lighter aggregate materials such as very fine sand, silt, clay and organic matter are easily removed by the raindrop splash and runoff water; greater raindrop energy or runoff amounts are required to move larger sand and gravel particles.

Soil movement by rainfall (raindrop splash) is usually greatest and most noticeable during short-duration, high-intensity thunderstorms.

Sheet Erosion

Sheet erosion is the movement of soil from raindrop splash and runoff water. It typically occurs evenly over a uniform slope and goes unnoticed until most of the productive topsoil has been lost. Deposition of the eroded soil occurs at the bottom of the slope or in low areas.

Rill Erosion

Rill erosion results when surface water runoff concentrates, forming small yet well-defined channels. These distinct channels where the soil has been washed away are called rills when they are small enough to not interfere with field machinery operations. In many cases, rills are filled in each year as part of tillage operations.

Gully Erosion

Gully erosion is an advanced stage of rill erosion where surface channels are eroded to the point where they become a nuisance factor in normal tillage operations

Q.74) Soil structure refers to the way soil particles are grouped together into larger masses called peds. Which of the following statements regarding soil structure is/are correct?

1. It determines the workability of soil i.e. how easily it can be ploughed.
2. Peds are bound by soil colloids.

Select the code from below:

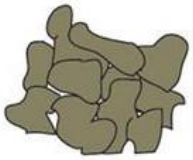
a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q.74) Solution (c)

Soil Structure:

Granular (high permeability)

Aggregated (high permeability)



Blocky (moderate permeability)

Columnar/prismatic (moderate permeability)

Platey (low permeability)

Massive (low permeability)

Soil Structure

It refers to the way soil particles are grouped together into larger masses called peds. These are bound by soil colloids.

This defines the workability of the soil. i.e. How easily one can plough/turn it.

Q.75) Which of the following soils can be cut and directly used as a brick in construction?

a) Black soil
b) Alluvial Soil
c) Laterite Soil
d) Red Soil

Q.75) Solution (c)

Laterite Brick Soil

Laterite soil is primarily found in the tropical regions which receive heavy seasonal rainfall. High rainfall encourages the leaching of soil where lime and silica are leached away and a soil rich in oxides of aluminium predominate and abundance laterite is called bauxite. Due to the presence of iron oxides the colour of laterite soil is basically red. This soil is poor in lime content and hence it is acidic. Laterite soils are found on the high level plateau and hilly areas that receive high rainfall and are specifically well developed on the Eastern Ghats in Orissa. It is also found in the southern regions of the Western Ghats including the adjoining coastal regions in Ratnagiri District and Malabar.

Because of intense rainfall the soil becomes hard and can be directly cut into bricks.

Q.76) Consider the following statements regarding Coconut crop:

1. It is a tropical crop which can be grown only in sandy soil.
2. Coconut requires saline water to grow.
3. There are two major varieties of coconut – tall and dwarf.

Which of the above statements are NOT correct?

a) 1 and 2
b) 3 only
c) 1 and 3
d) None of the above

Q.76) Solution (a)

Coconut Palm

The coconut palm (Cocos nucifera linn.) is the most useful palm in the world. Every part of the tree is useful to human life for some purpose or the other.

The copra obtained by drying the kernel of coconut is the richest source of vegetable oil containing 65 to 70 per cent oil.

The coconut palm is found to grow under varying climatic and soil conditions. It is essentially a tropical plant growing mostly between 20^{o}N 20^{o}S latitudes. However, a rainfall of about 2000 mm per year, well distributed throughout, is ideal for proper growth and maximum production.

Coconut is grown under different soil types such as loamy, laterite, coastal sandy, alluvial, clayey and reclaimed soils of the marshy low lands. The ideal soil conditions for better growth and performance of the palm are proper drainage, good water-holding capacity, presence of water table within 3m and absence of rock or any hard substratum within 2m of the surface.

Note: Coconut requires fresh water. In coastal areas it is dependent on underground fresh water. And it is found above littoral zone.

There are only two distinct varieties of coconut, the tall and the dwarf.

The tall cultivars that are extensively grown are the West Coast Tall and East Coast Tall. The dwarf variety is shorter in stature and its life span is short as compared to the tall. Tall x Dwarf (TxD), Dwarf x Tall (DxT) are the two important hybrids.

Coconut is propagated through seedlings raised from selected seednuts. Generally 9 to 12 month old seedlings are used for planting. Select seedlings, which have 6-8 leaves and 10-12 cm collar girth when they are 9-12 month old. Early splitting of leaves is another criteria in the selection of coconut seedling.

THINK!

Mangroves

Q.77) Consider the following about Laterite Soils:

1. These soils are found in hot and humid areas.
2. High temperature and heavy rainfall with alternate wet and dry periods are important conditions for the formation of these soils.
3. These soils are rich in nutrients and fertile.

Which of the statements given above is/are correct?

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

Q.77) Solution (c)

Laterite Soils are formed under conditions of high temperature and heavy rainfall with alternate wet and dry periods (especially monsoonal regions).

Laterite soils are found in regions of very high rainfall. Due to rains the minerals get leached to lower horizons. These soils are found in hot and humid areas.

Heavy rainfall promotes leaching (nutrients gets washed away by water) of soil whereby lime and silica are leached away and a soil rich in oxides of iron and aluminium compounds is left behind. They lack fertility due to intensive leaching. Hence, statement (3) is incorrect.

Q.78) Which among the following statements are true in regard to Arecanut in India?

1. It is one of the major plantation crops, well grown in clay loamy soils
2. India is the world's largest producer of arecanut
3. Largely grown in the Western Ghats, Eastern Ghats and North Eastern region
4. Arecanut flourishes well in tracts with high rainfall and with a wide range of temperature, from a minimum of 4°C to maximum of 40°C

Choose the appropriate code:

a) 3 and 4 only
b) 1, 2 and 3 only
c) 1, 3 and 4 only
d) All of the above

Q.78) Solution (d)

Arecanut

- India is the world's largest producer of arecanut contributing nearly 74 % towards world production.
- Arecanuts/Betel Nuts are largely grown in the Western Ghats, Eastern Ghats and North Eastern region.

- Arecanut flourishes well in tracts with high rainfall and with a wide range of temperature, from a minimum of 4°C to maximum of 40°C.
- Arecanuts can grow and thrive best in well drained soils with good organic matter. The largest area under the crop is found in gravelly laterite soils of red clay type. It can also be grown on fertile clay loam soils. Sticky clay, sandy, alluvial, brackish and calcareous soils are not suitable for arecanut cultivation.

Q.79) Thick deposits of glacial clay and other materials embedded with moraines, are called as –

a) Kankars
b) Pats
c) Karewas
d) Regurs

Q.79) Solution (c)

Karewas are lacustrine deposits (deposits in lake) in the Valley of Kashmir and in Bhadarwah Valley of the Jammu Division. These are the flat topped mounds that border the Kashmir Valley on all sides. They are characterized with fossils of mammals and at places by peat.

Karewas are thick deposits of glacial clay and other material embedded with moraine. It is found only in Kashmir region and very suitable for saffron cultivation.

Karewas were formed during the Pleistocene Period (1 million years ago), when the entire Valley of Kashmir was under water. Due to the rise of Pirpanjal, the drainage was impounded and a lake of about 5000 sq. km area was developed and thus a basin was formed. Subsequently, the lake was drained through Bramulla gorge. The deposits left in the process are known as karewas. The thickness of karewas is about 1400 m.

Q.80) Which of the statements given below is/are correct in regard to Jute, considered as the golden fibre of India?

1. Jute cultivation requires a warm and humid climate with acidic to neutral soils.
2. Jute grows well on the new alluvial soils having higher silt content.
3. Jute cultivation is mainly concentrated in the eastern and north eastern India.

Choose the correct answer from the code given below:

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

Q.80) Solution (d)

Jute is considered as the golden fibre of India. It is the commercially available natural fibre which is utilized mostly as packaging material, nowadays facing a steep competition from cheap synthetics in packaging sector. Besides the traditional packaging sector, jute has been used in both textile and non-textile sectors in large and small industries.

Jute is eco-friendly, biodegradable and has much higher CO_2 assimilation rate which is creating an opportunity for the survival and growth of jute industry in the era of environmental concern. Global production of jute and allied fibres is around 3.0 million tonnes, 92.5% of which comes from India and Bangladesh alone. India ranks first in area and production of jute followed by Bangladesh and earns approximately Rs. 1400 crores/annum through export of jute goods mainly Jute diversified products (JDPs).

Climatic requirement and soil

Jute requires a warm and humid climate and can be grown within a temperature range of 24 to 37^{o}C and a relative humidity of 57 to 97%. Jute crop thrives well with alternate rains and sunshine. The crop can grown in both moisture stress and water stagnating condition.

The amount of rainfall and its distribution have marked effects on the growth of crop and ultimately yield of fibre. In the ideal situation, 120-150 mm pre monsoon rain followed by a dry period of 30-40 days and 1200 to 1500 mm of precipitation over last 75-80 days is considered to be the most ambient condition for growth of jute crop.

Jute grows well on the new alluvial soils having higher silt content but can also grow on various other types of soil. In India, it is grown in mainly colluviums, red and lateritic, calcareous soils. Acidic to neutral soils are suitable for jute cultivation. Jute cultivation is mainly concentrated in the eastern and north eastern India.

Q.81) Consider the below statements:

1. Peaty – Marshy Soils are soils with large amount of organic matter and considerable amount of soluble salts.
2. The most humid regions have this type of soil.
3. Since they are not acidic, this type of soil is good for paddy cultivation.

Which of the statements given above are correct?

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

Q.81) Solution (a)

Peaty – Marshy Soils are soils with large amount of organic matter and considerable amount of soluble salts. The most humid regions have this type of soil. They are black, heavy and highly acidic. Hence statement (3) is incorrect. They are deficient in potash and phosphate.

Most of the peaty soils are under water during the rainy season but as soon the rains cease, they are put under paddy cultivation.

Q.82) Consider the following statements:

1. The soils are covered with a thick brown mantle which inhibits soil growth.
2. They are coarse and alkaline, rich in soluble salts.
3. They are poor in organic matter and have a varying percentage of lime.
4. These soils are derived from the adjoining rocks and the coastal regions.

Which of the soil possess the above characteristics?

a) Laterite soil
b) Peaty soil
c) Desert soil
d) Loamy soils

Q.82) Solution (c)

Desert soils posses all the characteristics provided in the statements. Hence (c) is correct answer.

Desert soils are grey in colour in temperate region and red in hot deserts of the tropics. The soils are unleached and alkaline but very much lacking in humus because of little vegetation found.

Q.83) In which of the following areas ravines are present in India?

1. Along the banks of Narmada
2. Along the foothills of Shivalik
3. Chambal
4. Chota Nagpur region

Select the correct code:

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

Q.83) Solution (d)

A ravine is generally a fluvial slope landform of relatively steep (cross-sectional) sides, on the order of twenty to seventy percent in gradient.

Ravines may or may not have active streams flowing along the downslope channel which originally formed them; moreover, often they are characterized by intermittent streams, since their geographic scale may not be sufficiently large to support a perennial watercourse. A ravine is a deep valley which is formed due to linear/dendritic fluvial erosion of loose unconsolidated and bare soils byes.

In all the given areas - along the banks of Narmada and foothills of Shivalik, Chambal and Chota Nagpur region – Ravines are found.

Q.84) 'Dree Festival' is concerned with which of the following tribes?

a) Nyishi
b) Apatanis
c) Shompen
d) Onge

Q.84) Solution (b)

The Apatani tribe, which is located in a small Ziro valley town in Arunachal Pradesh, celebrates the three-day Dree Festival in July every year for good harvest season.

The Apatani tribe is known for their colourful culture, festivals, intricate handloom designs, skills in cane, bamboo crafts, and vibrant traditional village councils called bulyañ. The Apatani tribe is located in Arunachal Pradesh's small town named Ziro valley.

The tribe practices their own religion, which is known as Donyi-Polo. They pray to the Sun (Donyi) and the Moon (Polo).

The tribe has four major festivals namely Dree, Yapung, Myoko and Murung. While Dree festival is celebrated in July, Yapung is celebrated in September or October, Myoko is celebrated in March and Murung is celebrated in January.

These festivals are celebrated to ensure better cultivation, protection of the grains from hailstone, storms, insects and wild animals.

Q.85) Consider the following statements about 'Plantation agriculture':

1. In this type of farming, multiple crops are grown on a large area.
2. The plantation has an interface of agriculture and industry.
3. It is both capital intensive and labor intensive.

Which of the above statements is/are correct?

a) 1 and 3 only
b) 2 and 3 only
c) 1 and 2 only
d) All the above

Q.85) Solution (b)

Plantation agriculture is a form of commercial farming where crops are grown for profit. Large land areas are needed for this type of agriculture. Countries that have plantation agriculture usually experience high annual temperatures and receive high annual rainfall. Plantation agriculture as mentioned above was introduced by the Europeans in colonies situated in the tropics. Some of the important plantation crops are tea, coffee, cocoa, rubber, cotton, oil palm, sugarcane, bananas and pineapples.

The plantation has an interface of agriculture and industry. Plantations cover large tracts of land, using capital intensive inputs, with the help of migrant labourers. All the produce is used as raw material in respective industries.

PURPOSE

-Plantation agriculture is a form of commercial farming where crops are grown for sale. Some crops are sold as raw materials to manufacturing industries.

INPUTS:

Land: Plantations are huge and can extend from a few hectares to a few thousand hectares. For example, in Malaysia, an oil palm plantation is usually at least 40 hectares in size.

Capital: A large amount of capital is put into building roads, buying machinery and building factories to process the crops harvested from the plantations.

Plantation owners also invest large amounts of their capital on fertilizers and pesticides. Fertilizers are applied to plantation crops as frequently as these crops use up nutrients from the land quickly. Since plantations usually grow one type of crop, pest attacks can cause total destruction of the plantations. Pesticides are therefore used in huge quantities to prevent crops from being entirely destroyed by pests.

Labour: Due to the large size of a plantation, a lot of labour is needed to tend to the crops and work in the nearby processing factories. For example in Malaysia's large rubber plantations, many workers are hired to tap latex from rubber trees.

PRODUCE:

- The total output of a plantation is usually high. However, as a plantation covers a wide area of land, **its output per unit is usually low.**
- Usually, only one type p crop is grown in a plantation. Common examples include rubber, coffee, tea, bananas, sugar cane, oil palm, cocoa and tobacco.

Do you know?

- Plantation agriculture is a form of commercial farming where crops are grown for profit. Large land areas are needed for this type of agriculture. **Countries that have plantation agriculture usually experience high annual temperatures and receive high annual rainfall.** Plantations are mainly found in countries that have a tropical climate.

THINK!

- Distribution of plantation crops in India.

Q.86) Consider the following statements about Seed Replacement Rate?

1. Seed Replacement Rate (SSR) is a measure of how much of the total cropped area was sown with farm saved seeds in comparison to certified seeds.
2. Seed Replacement Rate is directly proportional to productivity.

3. Seed Replacement Ratio denotes actual quality seed distributed to farmers

Which of the above statements is/are correct?

a) 1 and 2 only
b) 1 and 3 only
c) 2 and 3 only
d) All the above

Q.86) Solution (c)

Seed Replacement Rate (SSR) or Seed Replacement Ratio is a measure of how much of the total cropped area was **sown with certified seeds in comparison to farm saved seeds.** However, since every farmer is aware of the benefits of certified seeds; he would want to sow certified seeds, provided he is supplied with required quantity of certified seeds. Thus, **Seed Replacement Ratio also denotes actual quality seed distributed to farmers vis-a-vis actual seed required for cultivation of crops.**

Since certified seeds are better in productivity**, the Seed Replacement Rate is directly proportional to productivity.** Thus, higher the Seed Replacement Ratio, higher is production as well as productivity and higher are chances of achieving nutritional security, food security and containing food price inflation.

Do you know?

Supply of quality seeds is not a onetime affair; they need to be produced every new season continuously. The hybrid seeds (those produced by cross pollinating of plants) can be sown only once because the seed from their first generation does not reliably produce the same copies of their parents. Thus, **every new crop season requires purchase of new seeds. Producing certified seeds from breeder seeds takes at least three years efforts.**

THINK!

- Breeder seeds.
- Foundation seeds
- Registered seeds

Q.87) Consider the following statements about the objectives of Open Market Sale Scheme (Domestic) [OMSS (D)].

1. To enhance the supply of food grains during the lean season and deficit regions
2. To moderate the open market prices.
3. To offload the excess stocks.

4. To augment the revenue for the functioning of Food Corporation of India.

Select the correct answer using the codes given below.

a) 1, 2 and 3 only
b) 1, 3 and 4 only
c) 2, 3 and 4 only
d) All the above

Q.87) Solution (a)

In addition to maintaining buffer stocks and for making a provision for meeting the requirement of the Targeted Public Distribution System (TPDS) and Other Welfare Schemes (OWS), **FCI on the instructions from the Government sells excess stocks out of Central Pool** through Open Market Sale Scheme (Domestic) [OMSS (D)] in the open market from time to time at predetermined prices to achieve the following objectives:

- To enhance the supply of food grains during the lean season and deficit regions
- To moderate the open market prices
- To offload the excess stocks
- To reduce the carrying cost of food grains

Do you know?

- The Economic Cost of food grains consists of three components, namely, **pooled cost of grains, procurement incidentals and the cost of distribution**.
- Pooled cost of food grains is the weighted MSP of the stock of food grains available with FCI at the time of calculating the economic cost.

THINK!

- Interest Subvention Scheme (ISS).

Source: Economic Survey-2018.

Q.88) Consider the following statements about Unified Package Insurance Scheme (UPIS).

1. Life insurance protection to the farmer and his/her family members.
2. The policy will be issued for a period up to 1 year.
3. It covers both the personal assets and livelihood assets.

Which of the above statements is/are correct regarding UPIS?

a) 1 and 2 only
b) 2 and 3 only

c) 1 only
d) All the above

Q.88) Solution (d)

Unified Package Insurance Scheme (UPIS) aims at **providing financial protection to citizens associated in agriculture sector,** thereby ensuring food security, crop diversification and enhancing growth and competitiveness of agriculture sector besides protecting farmers from financial risks. **The UPIS will be implemented in 45 selected districts on Pilot basis from Kharif 2016 season.**

- This policy is designed to take care of the insurance needs of farmers associated with agriculture activities. This policy provides yield-based crop insurance to the farmer based on his ownership rights of land and sown crop.
- **It covers both the personal assets of the farmer like the dwelling & its contents** (Fire), the **other assets which help him in earning his livelihood** such as Agricultural Pump Sets, and Agriculture Tractor owned by farmer.
- The policy also provides protection to farmer and his/her family members in case of the Accidental Death / Disablement, accidental insurance protection of farmer's school/college going children and provisioning of education fee to the students in case of death of parent.
- Life insurance protection to the farmer and his/her family members.
- The policy will be issued for a period up to 1 year.

Do you know?

- The cover will be for one full year except for Crop Insurance (which will be bi-annual separately for Kharif and Rabi seasons) renewable from year to year. The Loanee farmers will be covered through Banks/Financial Institutions whereas **non-loanee farmer shall be covered through banks and/or insurance intermediaries.**

THINK!

- Pradhan Mantri Fasal Bima Yojan

Source: India -2018(Year Book).

Q.89) Which of the following best defines Mridaparikshak?

a) The device which measures the water table in agriculture fields.
b) Mini lab for soil testing and fertilizer recommendation.

c) Indigenous Ecological niche modelling (ENM) system.
d) Indigenous geophysical survey technology.

Q.89) Solution (b)

ICAR, Indian Institute of Soil Science, Bhopal, a research institute under the Natural Resource Management (NRM) Division of Indian Council of Agricultural Research (ICAR), has developed ***'Mridaparikshak', a MINILAB that can determine soil health.***

The Features of MRIDAPARIKSHAK include:

- Mridaparikshak is a digital mobile quantitative minilab/soil test kit to provide soil testing service at farmers' doorsteps.
- Mridaparikshak determines all the important soil parameters i.e. soil pH, EC, organic carbon, available nitrogen, phosphorus, potassium, Sulphur and micronutrients like zinc, boron and iron.
- It also provides crop and soil specific fertilizer recommendations directly to farmer's mobile through SMS.
- It is highly compatible with soil health card.
- Mridaparikshak comes with soil sampling tools, GPS, balance, shaker, hot plate, and a Smart Soil Pro, an instrument for determining the soil parameters and displaying of fertilizer nutrient recommendations.
- It can be operated by young educated farmers/rural youths (11-12 Pass) with short training.

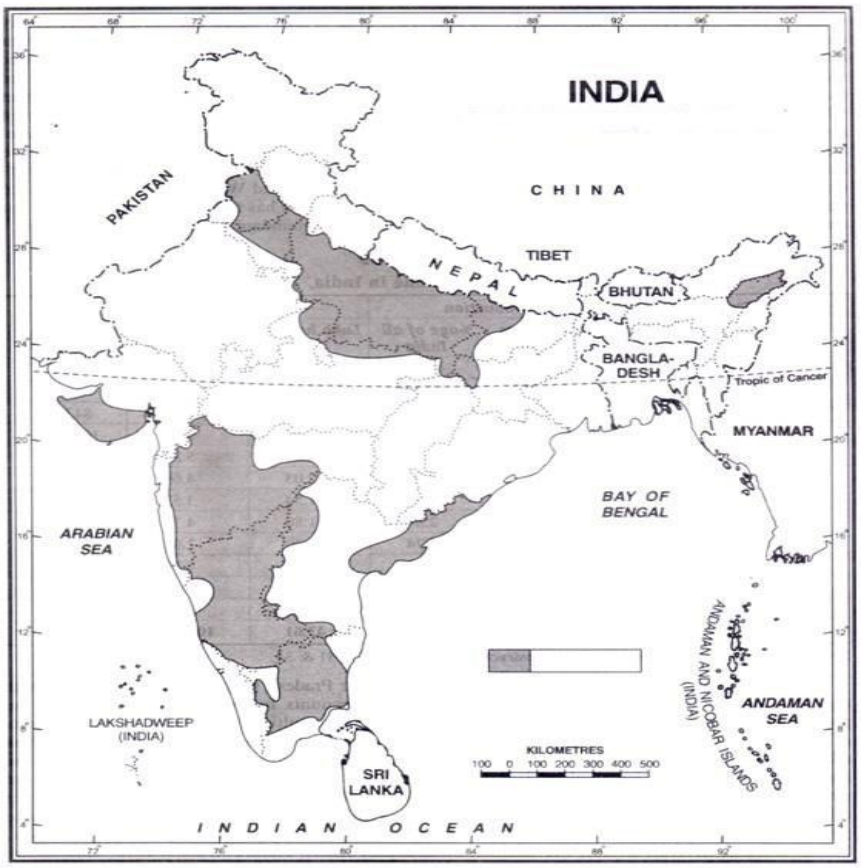
Do you know?

- Forecasting studies of rice yields using **DSSAT (Decision Support System for Agrotechnology Transfer)** rice model predicted that, all states in the eastern region are likely to experience reduced yields of below or equal to 10% during mid-century climate change scenarios except Bihar.
- The Decision Support System for Agrotechnology Transfer (DSSAT**) is a set of computer programs for simulating agricultural crop growth.** It has been used in over 100 countries by agronomists for evaluating farming methods. One application has been assessing the possible impacts on agriculture of climate change and testing adaptation methods.

THINK!

- Soil Health Card.

Q.90) The map shown below indicates distribution of which of the following crop?



a) Cotton
b) Groundnut
c) Sugarcane
d) Pulses

Q.90) Solution (c)

Sugarcane belongs to bamboo family of plants and is indigenous to India. It is the main source of sugar, gur and khandsari. About two-thirds of the total sugarcane produced in India is consumed for making gur and khandsari and only one third of it goes to sugar factories. It also provides raw material for manufacturing alcohol.

Conditions of Growth:

It is a long duration crop and requires 10 to 15 and even 18 months to mature, depending upon the geographical conditions**. It requires hot and humid climate with average temperature of 21°-27°C and 75-150 cm rainfall.**

Following three distinct belts of sugarcane cultivation can be identified.

- The Satluj-Ganga plain from Punjab to Bihar containing 51 per cent of the total area and 60 per cent of the country's total production.
- The black soil belt from Maharashtra to Tamil Nadu along the eastern slopes of the Western Ghats.
- Coastal Andhra and the Krishna Valley.

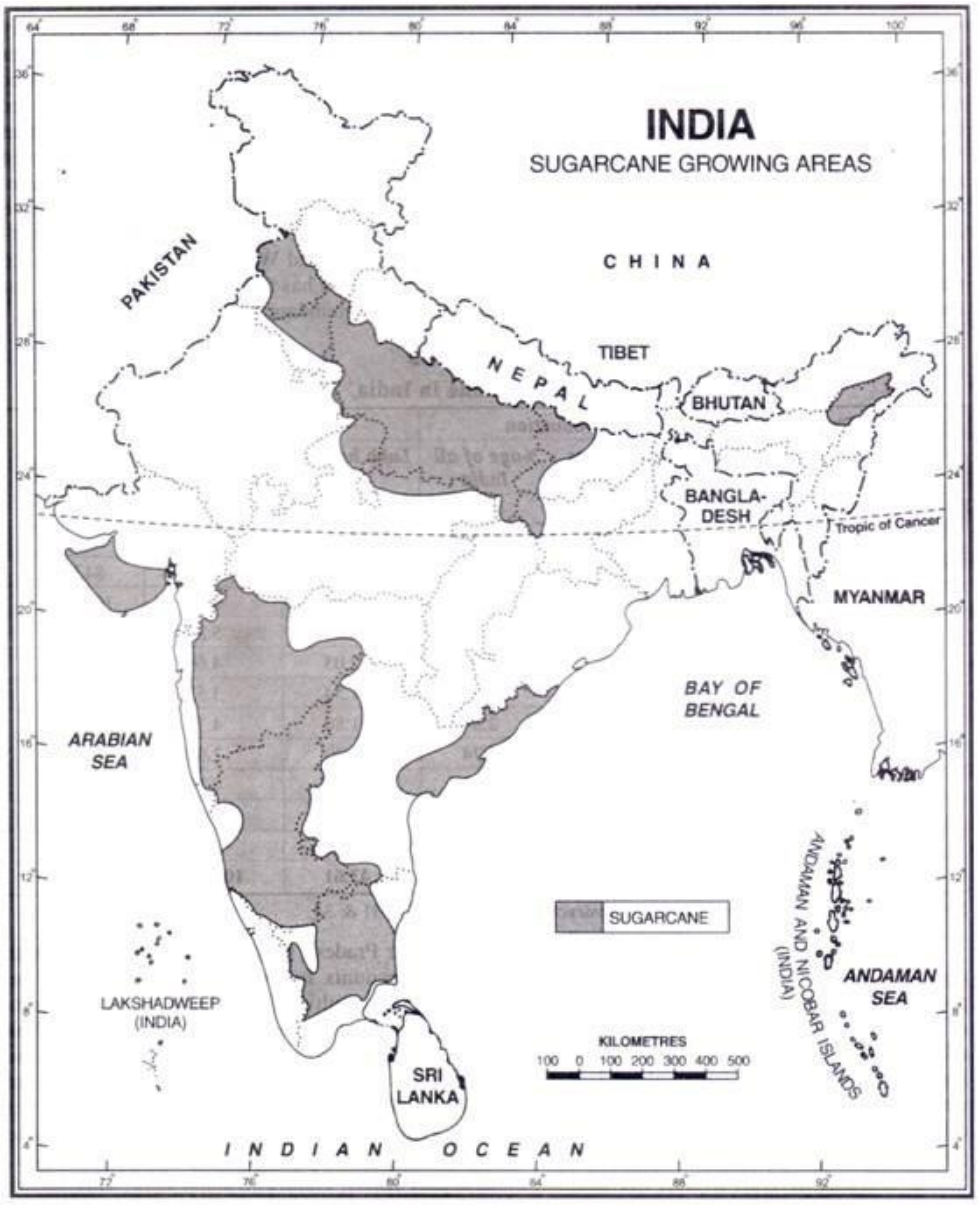


FIG. 24.4. India : Sugarcane Growing Areas

Do you know?

- **Ratoon crop is the second or any other successive crop obtained from the roots left over in the field from the first crop.** This is widely practiced in different parts of the country due to its low cost of production and relatively shorter maturation period because cost inputs and time are saved as there is no need for fresh sowing and growing of roots. However, productivity decreases with each passing year and Ratooning becomes uncommercial after one or two years.

THINK!

- Distribution map of major crops of India.

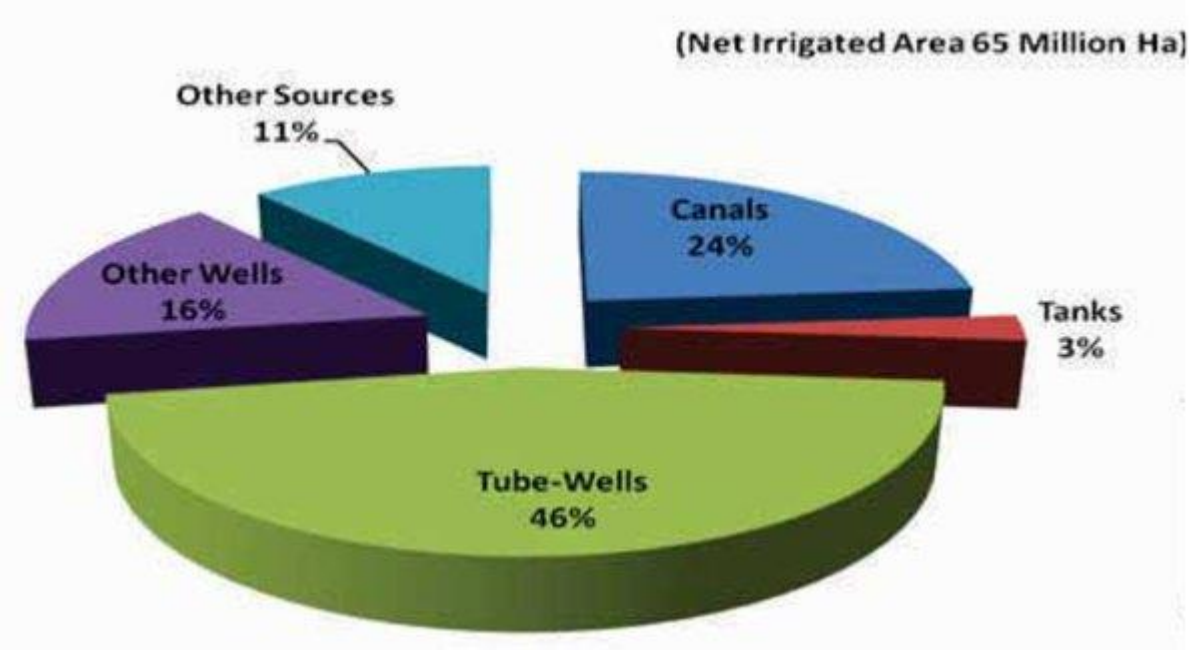
Q.91) Arrange the following in increasing order of their share in irrigation in India.

1. Canals
2. Wells
3. Tube wells
4. Tanks

Select the correct answer using the codes given below.

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

Q.91) Solution (b)



Since 1950-51, the government had given considerable importance to the development of command area under canals. In 1950-51, the Canal irrigated area was 8.3 million hectares and it currently stands at 17 million hectares. Despite that, the relative importance of Canals has come down from 40% in 1951 to 26% in 2010-11. On the other hand, the well (16%)

and tube well (46%) accounted for 29% total irrigated area and now they share 64% of the total irrigated area.

This implies **that "despite of heavy public expenditure on canals, our governments have not been able to reduce the groundwater depletion"** done by the remarkable progress of the tube wells in last many decades. The key reason is widening gap between irrigation potential created and actually utilized.

Do you know?

India accounts for around 4% of world's renewable water resources. The average annual precipitation in India is around 4000 BCM (Billion Cubic Meter). Of this, around half (1869 BCM) water runs off from rivers to oceans. What is left from that only 690 BCM is utilizable surface water. This along with 430 BCM groundwater makes India's total annual utilizable water resources to be close to 1120 BCM.

THINK!

- Various irrigation distribution map of India.

Q.92) Which of the following are the characteristics of Indian Agriculture?

1. Intensive subsistence agriculture
2. Small landholdings
3. Small gross area under agriculture
4. High productivity

Select the code from following:

a) 1 and 2
b) 3 and 4
c) 1,2 and 4
d) All of the above

Q.92) Solution (a)

Characteristics of Indian farming

Subsistence agriculture:

Most parts of India have subsistence agriculture. The farmer owns a small piece of land, grows crops with the help of his family members and consumes almost the entire farm produce with little surplus to sell in the market.

Pressure of population on agriculture:

The population in India is increasing at a rapid pace and exerts heavy pressure on agriculture. Agriculture has to provide employment to a large section of work force and has to feed the teeming millions.

Importance of animals:

Animal force has always played a significant role in agricultural operations such as ploughing, irrigation, threshing and transporting the agricultural products. Complete mechanisation of Indian agriculture is still a distant goal and animals will continue to dominate the agricultural scene in India for several years to come.

Dependent upon Monsoon:

Indian agriculture is mainly dependent upon monsoon which is uncertain, unreliable and irregular. In spite of the large scale expansion of irrigation facilities since Independence, only one-third of the cropped area is provided by perennial irrigation and the remaining two-third of the cropped area has to bear the brunt of the vagaries of the monsoons.

Predominance of food crops:

Since Indian agriculture has to feed a large population, production of food crops is the first priority of the farmers almost everywhere in the country. More than two-thirds of the total cropped area is devoted to the cultivation of food crops.

Insignificant place to given fodder crops:

Although India has the largest population of livestock in the world, fodder crops are given a very insignificant place in our cropping pattern. Only four per cent of the reporting area is devoted to permanent pastures and other grazing lands. This is due to pressing demand of land for food crops. The result is that the domestic animals are not properly fed and their productivity is very low compared to international standards.

Seasonal pattern:

India has three major crop seasons.

(i) Kharif season starts with the onset of monsoons and continues till the beginning of winter. Major crops of this season are rice, maize, jowar, bajra, cotton, sesamum, groundnut and pulses such as moong, urad, etc.

(ii) Rabi season starts at the beginning of winter and continues till the end of winter or beginning of summer. Major crops of this season are wheat, barley, jowar, gram and oil seeds such as linseed, rape and mustard.

(iii) Zaid is summer cropping season in which crops like rice, maize, groundnut, vegetables and fruits are grown. Now some varieties of pulses have been evolved which can be successfully grown in summer.

Small Landholdings

More than 80% of India's farmers are small and marginalized with less than 1 hectare of land.

Note: Gross area under agriculture in India is one of the highest in India in terms of percentage. More than 50% of India's area is under agriculture.

Q.93) Which of the following statements correctly defines Mixed cropping?

a) Animal rearing and cultivation of crops in the same field
b) Growing different crops one after other in the same field
c) Growing different crops in the same field at the same time
d) Growing different crops in different fields at the same time

Q.93) Solution (c)

Mixed cropping, also known as polyculture, inter-cropping, or co-cultivation, is a type of agriculture that involves planting two or more plants simultaneously in the same field, interdigitating the crops so that they grow together. In general, the theory is that planting multiple crops at once saves space since crops in the same field might ripen at different seasons, and provides a wealth of environmental benefits.

Documented benefits of mixed cropping include the balance of input and outgo of soil nutrients, the suppression of weeds and insect pests, the resistance of climate extremes (wet, dry, hot, cold), the suppression of plant diseases, the increase in overall productivity, and the management of scarce resources (land) to the fullest degree.

Mixed cropping is done to maintain the soil quality. It is also done in areas which are prone to climatic changes so that atleast one of the crop survives.

Think

Difference between mixed farming and mixed cropping

Q.94) Which of the following places are known as the Shrimp capital of India?

a) Hyderabad
b) Nellore
c) Thiruvanthapuram
d) Calicut

Q.94) Solution (b)

Shrimp production in India

Brackish-water aquaculture in India is concentrated around the giant tiger prawn (P. monodon) as the single most important species. Recently, the culture of exotic, white-leg shrimp, L. vannamei, however, has attracted the farmers' attention because of its fast growth, low incidence of native diseases, availability of Specific Pathogen Free (SPF) domesticated strains and culture feasibility in wide salinity range.

With the production levels of 10–12 tonnes/ha/crop of three to four months' duration, the production of this species has reached to a level of 406,044 tonnes during 2015–16. Very recently, L. vannamei culture is also started in freshwater ponds particularly in Telangana State and some other states in India by the stocking of PLs acclimatising to zero ppt salinity at hatchery level. The culture and production level is encouraging.

Brackish water aquaculture is mainly concentrated on the coasts of Andhra Pradesh, Tamil Nadu, Orissa and West Bengal in India. With regards to the market, while the main areas of consumption for freshwater fish are in West Bengal, Bihar, Orissa and northeastern India. Cultured brackish water shrimps are destined mainly for export.

Among the coastal states, West Bengal and Andhra Pradesh is the largest producer of P. monodon and L. vannamei shrimp respectively in the country during the year 2015-16. Today L. vannamei is the largest cultured shrimp in terms of production and productivity in India.

Andhra Pradesh tops in area under culture and production followed by Tamil Nadu way behind.

Nellore in Andhra Pradesh is called the Shrimp capital of India.

Think

- Difference between shrimp and prawns
- Pink Revolution

Q.95) Consider the following:

1. Yellow Revolution – Oil seeds
2. Silver Revolution – Egg production
3. Golden Revolution – Horticulture
4. Grey Revolution – Leather

Which of the above revolutions are correctly matched?

a) 1,2 and 3
b) 2,3 and 4
c) 1,3 and 4
d) All of the above

Q.95) Solution (a)

List of Revolutions in India

Black Revolution	Related with Petroleum Production
Blue Revolution	Related with Fish Production
Brown Revolution	Related with Leather, Cocoa
Golden Fibre Revolution	Related with Jute Production
Golden Revolution	Related with Overall Horticulture, Honey, Fruit Production
Green Revolution	Related with Agriculture Production
Grey Revolution	Related with Fertilizers
Pink Revolution	Related with Onions, Prawn
Red Revolution	Related with Meat, Tomato Production
Evergreen Revolution	Intended for overall agriculture production growth
Round Revolution	Related with Potato Production
Silver Fibre Revolution	Related with Cotton Production
Silver Revolution	Related with Egg Production
White Revolution	Related with Dairy, Milk Production
Yellow Revolution	Related with Oil Seed Production
Round Revolution	Related with Potato

Q.96) Which of the following statements are correct regarding Bamboo and cane?

1. Bamboo is a grass while cane is tree.
2. Bamboo is hollow while cane has mass
3. Cane is flexible when wet and can be shaped easily while bamboo is brittle.

Select the code from below:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.96) Solution (b)

Differences between Bamboo and Cane

Both bamboo and cane belong to the grass family of Poaceae because of which their appearance seems quite similar. However, there are several distinct characteristics to both these species that can be used to set them apart.

- Bamboo belongs to the subfamily Bambusoideae, tribe Bambuseae of the grass family of Poaceae. Cane can be either of the two genera of perennial grasses of the family Poaceae.
- In general use, the word cane is also used for rattan a climbing or trailing plant in the palm family, primarily of the genus Calamus.
- Cane is a flexible material that is often used for a myriad of purposes such as the making of walking sticks, crutches as well as for weaving into baskets, boats, etc. bamboo is more brittle than cane and can only be used as flooring and roofing material. Bamboo cannot be weaved.

Think

- National Bamboo Mission

Q.97) Crop rotation is done by growing different crops in the same field one after the other. Which of the following are benefits of crop rotation?

1. Maintains the soil fertility
2. Helps in pest control
3. Prevents soil depletion

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.97) Solution (d)

Crop rotation

Crop rotation is one of the oldest and most effective cultural control strategies. It means the planned order of specific crops planted on the same field. It also means that the succeeding crop belongs to a different family than the previous one. The planned rotation may vary from 2 or 3 year or longer period.

Some insect pests and disease-causing organisms are hosts' specific. For example, rice stem borer feeds mostly on rice. If you don't rotate rice with other crops belonging to a different family, the problem continues as food is always available to the pest. However, if you plant legume as the next crop, then corn, then beans, then bulbs, the insect pest will likely die due to absence of food.

Advantages of crop rotation

- Prevents soil depletion
- Maintains soil fertility
- Reduces soil erosion
- Controls insect/mite pests. Crop rotation as a means to control to insect pests is most effective when the pests are present before the crop is planted have no wide range of host crops; attack only annual/biennial crops; and do not have the ability to fly from one field to another.
- Reduces reliance on synthetic chemicals
- Reduces the pests' build-up
- Prevents diseases
- Helps control weeds

Think

- Why is it wise to rotate staple crops with leguminous crops?

Q.98) Considering the benefits of organic farming, it is being promoted in India. Which of the following statements are correct regarding Organic Farming?

1. Organic farming refers to the use of traditional methods for farming without using artificial fertilizers and pesticides.

2. Organic farming produces much lower yield than conventional farming.
3. It helps in maintaining fertility of soil by encouraging soil biological activity.

Select the code from below:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.98) Solution (c)

Organic Farming in India

Organic farming system in India is not new and is being followed from ancient time. It is a method of farming system which primarily aimed at cultivating the land and raising crops in such a way, as to keep the soil alive and in good health by use of organic wastes (crop, animal and farm wastes, aquatic wastes) and other biological materials along with beneficial microbes (biofertilizers) to release nutrients to crops for increased sustainable production in an eco friendly pollution free environment.

Need of organic farming

With the increase in population our compulsion would be not only to stabilize agricultural production but to increase it further in sustainable manner. The scientists have realized that the 'Green Revolution' with high input use has reached a plateau and is now sustained with diminishing return of falling dividends. Thus, a natural balance needs to be maintained at all cost for existence of life and property. The obvious choice for that would be more relevant in the present era, when these agrochemicals which are produced from fossil fuel and are not renewable and are diminishing in availability. It may also cost heavily on our foreign exchange in future.

The key characteristics of organic farming include

- Protecting the long term fertility of soils by maintaining organic matter levels, encouraging soil biological activity, and careful mechanical intervention
- Providing crop nutrients indirectly using relatively insoluble nutrient sources which are made available to the plant by the action of soil micro-organisms
- Nitrogen self-sufficiency through the use of legumes and biological nitrogen fixation, as well as effective recycling of organic materials including crop residues and livestock manures

- Weed, disease and pest control relying primarily on crop rotations, natural predators, diversity, organic manuring, resistant varieties and limited (preferably minimal) thermal, biological and chemical intervention
- The extensive management of livestock, paying full regard to their evolutionary adaptations, behavioural needs and animal welfare issues with respect to nutrition, housing, health, breeding and rearing
- Careful attention to the impact of the farming system on the wider environment and the conservation of wildlife and natural habitats

Note: There is no scientific basis to prove that yield in organic farming is less than conventional farming.

Q.99) Consider the following statements with regard to Millets:

1. Millets are short duration (3-4 months) warm weather grasses grown in those areas where the main crops like rice and wheat cannot be grown successfully.
2. Year 2017 was declared as the 'national year of millets'.
3. Millets are cultivated in low-fertile land, mountainous, tribal and rain-fed areas.

Which of the statements given above is/are correct?

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

Q.99) Solution (c)

Nutrient-rich millets got a boost with the Union government declaring 2018 as the 'national year of millets'. This decision has been taken following a request by Karnataka, which is the country's leader in the millet sector.

In case of an emergency, the cultivation of millets is very suitable for small and marginal farmers. In order to promote millets, their prescribed purchases in MSP and inclusion in Mid-day Meal are being done.

Millets include Jowar, Bajra, Ragi, little millets include Kutki, Kodo, Sawa, Kangni and Cheena.

Millets are known for their nutrients. They are tolerant to drought, are photo insensitive and are resistant to climate change. The cultivation of millets requires less water than the cultivation of rice and wheat.

Do you know?

Millets are short duration (3-4 months) warm weather grasses grown in those areas where the main crops like rice and wheat cannot be grown successfully.

Millets are cultivated in low-fertile land, mountainous, tribal and rain-fed areas. These areas include Andhra Pradesh, Chhattisgarh, Gujarat, Haryana, Madhya Pradesh, Rajasthan, Maharashtra, Karnataka, **Uttar Pradesh, Tamil Nadu and Telangana.**

THINK!

- International year of millets.

Q.100) Which of the statements given below are true about Black soil?

1. Black Soils are highly argillaceous.
2. Black soil is highly retentive of moisture.
3. It is a soil group typical to the wet and hot regions of the Peninsula.
4. These soils are best suited for cotton crop, tobacco, castor, sunflower and millets.

Choose the appropriate answer:

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

Q.100) Solution (b)

Black soils:

- The parent material for most of the black soil are the volcanic rocks that were formed in the Deccan Plateau (Deccan and the Rajmahal trap).
- In Tamil Nadu, gneisses and schists form the parent material. The former are sufficiently deep while the later are generally shallow.
- These are the region of high temperature and low rainfall. It is, therefore, a soil group typical to the dry **(not wet)** and hot regions of the Peninsula.
- A typical black soil is highly argillaceous (consisting of or containing clay)

- The black soil is highly retentive of moisture. It swells greatly on accumulating moisture. Strenuous effort is required to work on such soil in rainy season as it gets very sticky.

Q.101) Consider the below statements about Wheat and choose the incorrect statement:

a) It can be grown in the temperate zone and the cold tracts of the far north, beyond even the 60 degree north altitude.
b) It requires a fairly warm temperature, damp climate and the period of heat should be comparatively long.
c) Soils with a clay loam or loam texture, good structure and moderate water holding capacity are ideal for wheat cultivation.
d) It can be cultivated from sea level to as high as 3300 meters.

Q.101) Solution (b)

Climate requirement:

Wheat is the main cereal crop in India. Wheat crop has wide adaptability. It can be grown not only in the tropical and sub-tropical zones, but also in the temperate zone and the cold tracts of the far north, beyond even the 60 degree north altitude.

Wheat can tolerate severe cold and snow and resume growth with the setting in of warm weather in spring. It can be cultivated from sea level to as high as 3300 meters. The best wheat are produced in areas favoured with cool, moist weather during the major portion of the growing period followed by dry, warm weather to enable the grain to ripen properly.

The optimum temperature range for ideal germination of wheat seed is 20-25 C though the seeds can germinate in the temperature range 3.5 to 35 C. Rains just after sowing hamper germination and encourage seedling blight. **Areas with a warm and damp climate are not suited for wheat growing.**

Wheat requires a fairly warm temperature, but the period of heat should not be long as grains can ripen quickly. When temperatures are high, too much energy is lost through the process of transpiration by the plants and the reduced residual energy results in poorer grain formation and lower yields. Wheat is mainly a rabi (winter) season crop in India.

Soil requirement:

Wheat is grown in a variety of soils of India. Soils with a clay loam or loam texture, good structure and moderate water holding capacity are ideal for wheat cultivation. Care should be taken to avoid very porous and excessively drained soils. Soil should be neutral in its reaction. Heavy soil with good drainage are suitable for wheat cultivation under dry

conditions. These soils absorb and retain rain water well. Heavy soils with poor structure and poor drainage are not suitable as wheat is sensitive to water logging. Wheat can be successfully grown on lighter soils provided their water and nutrient holding capacity are improved.

Q.102) Consider the following about Agroforestry:

1. It is a dynamic, ecologically based, natural resource management system that, diversifies and sustains production and builds social institutions.
2. Its objective is to Encourage and expand tree plantation in complementarity and integrated manner with crops and livestock to improve productivity, employment, income and livelihoods of rural households, especially the small holder farmers.
3. Agroforestry has a lot in common with intercropping. Both have two or more plant species (such as nitrogen-fixing plants) in close interaction, both provide multiple outputs.
4. National Agroforestry Policy is under the nodal ministry of Environment Forests and Climate Change.

Which of the following are correct about Agroforestry

a) 2, 3 and 4 only
b) 1 and 4 only
c) 1, 2 and 3 only
d) All of the above

Q.102) Solution (c)

With the Budget giving emphasis on agriculture, a conceptual question is expected.

Agroforestry is defined as a land use system which integrates trees and shrubs on farmlands and rural landscapes to enhance productivity, profitability, diversity and ecosystem sustainability. It is a dynamic, ecologically based, natural resource management system that, through integration of woody perennials on farms and in the agricultural landscape, diversifies and sustains production and builds social institutions.

Do you know?

Major policy initiatives, including the National Forest Policy 1988, the National Agriculture Policy 2000, Planning Commission Task Force on Greening India 2001, National Bamboo Mission 2002, National Policy on Farmers, 2007 and Green India Mission 2010, emphasize the role of agroforestry for efficient nutrient cycling, organic matter addition for sustainable

agriculture and for improving vegetation cover. However, agroforestry has not gained the desired importance as a resource development tool due to various factors.

Q.103) Tillage is the agricultural preparation of the soil by mechanical agitation of various types, such as digging, stirring and overturning. What are the benefits of practicing conservation tillage on a farm?

1. Less soil erosion
2. Fewer trips across the field, thereby saving fuel and machinery costs
3. Less groundwater contamination by pesticides

Select the correct code:

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

Q.103) Solution (a)

Conservation tillage is any method of soil cultivation that leaves the previous year's crop residue (such as corn stalks or wheat stubble) on fields before and after planting the next crop, to reduce soil erosion and runoff.

Conservation tillage systems also benefit farmers by reducing fuel consumption and soil compaction. By reducing the number of times the farmer travels over the field, farmers realize significant savings in fuel and labor. There are some concerns about it, particularly concerning impacts on water quality and on pests.

Q.104) Which among the following crops are Kharif crops?

1. Rice
2. Wheat
3. chickpea/gram
4. millet/ragi
5. soya bean

Choose the appropriate code from below:

a) 1, 4 and 5 only
b) 2 and 3 only

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

Q.104) Solution (a)

Kharif Crops

- The Kharif crop is the summer crop or monsoon crop in India.
- Sown in : beginning of the first rains in July
- Harvested : during the rainy (monsoon) season , between April and October
- Major Kharif crops: rice, maize, sorghum, pearl millet/bajra, finger millet/ragi (cereals), arhar (pulses), soyabean, groundnut (oilseeds), cotton etc.

Rabi Crops

- The Rabi crop is the spring harvest or winter crop in India .
- Sown in: Winter (Last of October)
- Harvested in : Spring (March, April)
- Major Rabi crops: wheat, barley, oats (cereals), chickpea/gram (pulses), linseed, mustard (oilseeds) etc.

Zaid Crop

- This crop is grown in some parts of country during March to June.
- Major Zaid crops in India are Watermelon, Muskmelon, bitter gourd, pumpkin, cucumber etc.

Q.105) Which of the statements provided below with regard to Cotton cultivation in India is/are correct?

1. In the raw material consumption basket of the Indian textile industry, the proportion of cotton is around 59%.
2. India has the distinction of having the largest area under cotton cultivation in the world.
3. India is the 1st largest producer and exporter of cotton in the World.

Choose appropriate answer from the codes given below:

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

Q.105) Solution (b)

Cotton is one of the most important cash crops and accounts for around 25% of the total global fibre production. Cotton is also one of the most important commercial crops cultivated in India. In the raw material consumption basket of the Indian textile industry, the proportion of cotton is around 59%. It plays a major role in sustaining the livelihood of an estimated 5.8 million cotton farmers and 40- 50 million people engaged in related activities such as cotton processing and trade. India also has the distinction of having the largest area under cotton cultivation in the world i.e. about 11 million hectares.

India is the country to grow all four species of cultivated cotton Gossypium arboreum and herbaceum (Asian cotton), G.barbadense (Egyptian cotton) and G. hirsutum (American Upland cotton).

Production and productivity of cotton in India have improved significantly during the past decades. India is the largest producer and 2nd largest exporter of cotton in the World. India is also leading consumer of cotton. Hence statement (3) is incorrect.

Q.106) Consider the following statements.

1. On the wetter margins, it has a transition to the moist deciduous, while on the drier margins to thorn forests.
2. In the higher rainfall regions of the Peninsular plateau and the northern Indian plain, these forests have a parkland landscape.
3. They are the most extensive kind of forest and covers large part of country.

The above statements depict the features of which of the following type of forest?

a) Tropical semi-evergreen forest.
b) Tropical dry deciduous forest.
c) Tropical Thorn forest
d) Littoral and swamp forest.

Q.106) Solution (b)

Dry deciduous forest covers vast areas of the country, where rainfall ranges between 70 - 100 cm. On the wetter margins, **it has a transition to the moist deciduous, while on the drier margins to thorn forests**. These forests are found in rainier areas of the Peninsula and the plains of Uttar Pradesh and Bihar. In the higher rainfall regions of the Peninsular plateau and the northern Indian plain, **these forests have a parkland landscape with open stretches**

in which teak and other trees interspersed with patches of grass are common. As the dry season begins, the trees shed their leaves completely and the forest appears like a vast grassland with naked trees all around. **Tendu, palas, amaltas, bel, khair, axlewood,** etc. are the common trees of these forests. **In the western and southern part of Rajasthan, vegetation cover is very scanty due to low rainfall and overgrazing.**

The most extensive kind of forest is tropical dry deciduous and second is tropical moist deciduous.

Do you know?

- Tropical thorn forests occur in the areas which receive rainfall less than 50 cm. These consist of a variety of grasses and shrubs.
- In these forests, plants remain leafless for most part of the year and give an expression of scrub vegetation.
- Tussocky grass grows upto a height of 2 m as the under growth.

THINK!

- Ecological services provided by Tropical forests.

Q.107) Consider the following vegetations.

1. Teak and sal
2. Blue pine and spruce
3. Chinar and walnut
4. Mosses and lichens

Which of the below mentioned code best depicts the succession (with respect to increase in altitude) of vegetation in northern montane forest of India?

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

Q.107) Solution (c)

The Himalayan ranges show a succession of vegetation from the tropical to the tundra, which change in with the altitude. **Deciduous forests (teak and sal) are found in the foothills of the Himalayas.**

It is succeeded by the wet temperate type of forests between an altitude of 1,000-2,000 m. In the higher hill ranges of northeastern India, hilly areas of West Bengal and Uttaranchal, evergreen broad leaf trees such as oak and chestnut are predominant. Similarly, the **chinar and the walnut, which sustain the famous Kashmir handicrafts, belong to this zone.**

Blue pine and spruce appear at altitudes of 2,225-3,048 m. **At many places in this zone, temperate grasslands are also found.**

Silver firs, junipers, pines, birch and rhododendrons, etc. occur between 3,000-4,000 m. However, these pastures are used extensively for transhumance by tribes like the Gujjars, the Bakarwals, the Bhotiyas and the Gaddis.

At higher altitudes, mosses and lichens form part of the tundra vegetation.

Do you know?

- Sholas are the local name for patches of **stunted temperate montane forest** found in valleys amid **rolling grassland in the higher montane regions of South India**. These patches of shola forest are found mainly in the valleys and are usually separated from one another by undulating montane grassland. **The shola and grassland together form the shola-grassland complex or mosaic.**

THINK!

- Sacred groves.

Q.108) Which of the following are the objectives of the social forestry?

1. Increasing Forest Area and Restoring Ecological Balance
2. To release cow-dung as manure for increasing agricultural production
3. Social forestry helps achieve a balanced and viable land use by checking soil erosion
4. Generation of Employment

Select the correct answer using the codes given below.

a) 1, 3 and 4 only
b) 1 and 3 only
c) 1 and 4 only
d) All the above

Q.108) Solution (d)

Increasing Forest Area and Restoring Ecological Balance:

- Moisture conservation—trees take water from the lower soil strata and bring it to the upper layers through long tap root system and, also, trees check evaporation of water;
- Soil conservation—trees help in checking erosion by wind and water;

- Natural habitat conservation—trees provide habitat to many birds and animals, some of which are agro-friendly.

Meeting Basic Rural Needs:

- Social forestry satisfies the basic rural needs referred to as 'five Fs'—food, fuel, fodder, fertilizer (green manure) and fiber. The large-scale depletion of easily accessible forests has resulted in acute scarcity of fuel-wood and fodder.
- What is disturbing is that the deficit in fuel wood is met by using cow-dung cakes, thus wasting a rich and cheap source of manure. So, the social forestry aims to release cow-dung as manure for increasing agricultural production.
- Trees also supply the raw material for various small and village industries through small timber and minor forest produce.

Ensuring Better Land Use:

- Social forestry helps achieve a balanced and viable land use by checking soil erosion, facilitating reclamation of marginal lands, checking waterlogging and by bringing about monolithic integration of forestry, agriculture and animal husbandry.

Generation of Employment:

- Social forestry operations have the potential of improving the employment situation in rural areas especially during the lean agricultural season. This helps in stabilizing incomes of weaker sections of Society.

Controlling Pollution:

- Trees are known to absorb harmful gases and release oxygen. This way they help reduce air pollution especially in urban areas.

Do you know?

Effect of Social Forestry in India

- **Participation of local people:** Indifferent village people become very active when they are involved in this type of development projects, e.g., Arabari Project in West Bengal where local people have developed wonderful, sustainable afforestation project.
- **Multiple Production:** Besides afforestation, fodder, vegetables and other agro-products become lucrative in the domestic market.
- **Variation:** The age-old monotonous agro-practice failed to inspire cultivators while this type of creative, experimental activities draw tremendous enthusiasm.
- **All-round Economic Development:** A sustainable economic independence may be achieved by rural units that, in turn, may lead to integrated village development by the villagers themselves.

THINK!

- Farm forestry.

Q.109) Consider the following pairs

Biosphere reserve	National parks/wild life sanctuary
1. Nilgiri	Nagarhole national park
2. Pachmarhi	Satpura national park
3. Amarkantak	Achanakmar Wildlife Sanctuary

Which of the above pairs is/are correctly matched?

a) 1 only
b) 2 and 3 only
c) 1 and 3 only
d) All the above

Q.109) Solution (d)

The Nilgiri Biosphere Reserve is an International Biosphere Reserve in the Western Ghats and Nilgiri Hills ranges of South India. The Nilgiri Sub-Cluster is a part of the Western Ghats, which was declared a World Heritage Site by UNESCO in 2012. **It includes the Aralam, Mudumalai, Mukurthi, Nagarhole, Bandipur and Silent Valley national parks,** as well as the **Wayanad and Sathyamangalam wildlife sanctuaries.**

The Pachmarhi Biosphere Reserve is a non-use conservation area and biosphere reserve in the Satpura Range of Madhya Pradesh state in central India. The biosphere reserve's total area is 4,926.28 square kilometres (1,217,310 acres). It includes three wildlife conservation units:

- Bori Sanctuary
- Pachmarhi Sanctuary
- **Satpura National Park**

Satpura National Park is designated as the core zone and the remaining area including the Bori and Pachmarhi sanctuaries, serves as the buffer zone.

The Achanakmar-Amarkantak Biosphere Reserve is a biosphere reserve in India that extends across the states of Madhya Pradesh and Chhattisgarh. The protected area of **the**

Achanakmar Wildlife Sanctuary is located in the Bilaspur district within the Biosphere Reserve.

Do you know?

- **Simlipal National Park** is a national park and a tiger reserve in the Mayurbhanj district in the Indian state of Odisha. It is part of the **Similipal-Kuldiha-Hadgarh Elephant Reserve** popularly known as Mayurbhanj Elephant Reserve, which includes three protected areas — Similipal Tiger Reserve, Hadgarh Wildlife Sanctuary and Kuldiha Wildlife Sanctuary.
- This reserve is part of the UNESCO World Network of Biosphere Reserves since 2009.

THINK!

- Biosphere reserves which are also tiger reserves and National parks.

Q.110) Consider the following statements about 'Mangrove for Future'.

1. It is being coordinated by UNESCO and International Union for the Conservation of Nature (IUCN).
2. The initiative is exclusively only for the protection and conservation of mangroves.

Which of the above statements is/are correct?

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

Q.110) Solution (d)

Mangroves for the Future (MFF) is a unique partner-led initiative **to promote investment in coastal ecosystem conservation** for sustainable development. **Co-chaired by IUCN and UNDP,** MFF provides a platform for collaboration among the many different agencies, sectors and countries which are addressing challenges to coastal ecosystem and livelihood issues. **The goal is to promote an integrated ocean-wide approach to coastal management and to building the resilience of ecosystem-dependent coastal communities.** MFF builds on a history of coastal management interventions before and after the 2004 Indian Ocean tsunami. It initially focused on the countries that were worst affected by the tsunami -- India, Indonesia, Maldives, Seychelles, Sri Lanka and Thailand. More recently it has expanded to include Bangladesh, Cambodia, Myanmar, Pakistan and Viet Nam.

Mangroves are the flagship of the initiative, **but MFF is inclusive of all types of coastal ecosystem,** such as coral reefs, estuaries, lagoons, sandy beaches, seagrasses and wetlands.

Do you know?

- Mangroves have been reported to be able **to help buffer against tsunami, cyclones, and other storms.** One village in Tamil Nadu was protected from tsunami destruction—**the villagers in Naluvedapathy planted 80,244 saplings to get into the Guinness Book of World** Records. This created a kilometre-wide belt of trees of various varieties. When the tsunami struck, much of the land around the village was flooded, but the village itself suffered minimal damage.

THINK!

- Mangrove map of India.

Q.111) Consider the following statements about Apatani tribe.

1. They are one of the major ethnic groups of south-western Himalayas.
2. The community has evolved a unique skill of rice-fish cultivation where along with paddy, fish is also reared on the fields.
3. Apatani Tribal Cultural Landscape is one of the UNESCO World Heritage Sites for 'extremely high productivity' and 'unique; ways of preserving ecology.

Which of the above statements is/are correct?

a) 1 and 2 only
b) 2 only
c) 3 only
d) All the above

Q.111) Solution (b)

Apatani tribe

They are one of the major ethnic groups of **eastern Himalayas.**

The tribe is known for their colorful culture with various festivals, intricate handloom designs, skills in cane and bamboo crafts, **and vibrant traditional village councils called bulyañ.**

The community has evolved a **unique skill of rice-fish cultivation** where along with paddy, fish is also reared on the fields.

Apatani Tribal Cultural Landscape is **in tentative list of UNESCO World Heritage Sites** for 'extremely high productivity' and 'unique; ways of preserving ecology.

Do you know?

- The Apatanis, the tribe inhabiting Ziro valley (Arunachal Pradesh) are known for their effective traditional village council called bulyañ, which supervises, guides and have legal oversight over the activities of individuals that affect the community as a whole. They work by addressing to the conscience of the people rather than by instilling fear of the law, and by promoting prevention of unlawful activities rather than by punitive actions. Preservation of such an effective socio-legal system is of special value when the formal justice systems of modern times have often come up for criticism.

THINK!

- Major tribes of India.

(Source: http://whc.unesco.org/en/tentativelists/5893/)

Q.112) Consider the following statements.

1. The National Tiger Conservation Authority is a statutory body.
2. It was constituted under enabling provisions of the Environment (Protection) Act, 1972.
3. 'Project Tiger' is a Centrally Sponsored Scheme for both in-situ and ex-situ conservation of tigers in designated tiger reserves.

Which of the above statements is/are correct?

a) 1 only
b) 2 and 3 only
c) 1 and 3 only
d) All the above

Q.112) Solution (a)

The National Tiger Conservation Authority is a **statutory body under the Ministry of Environment, Forests and Climate Change** constituted under enabling provisions of the **Wildlife (Protection) Act, 1972,** as amended in 2006, for strengthening tiger conservation, as per powers and functions assigned to it under the said Act.

The National Tiger Conservation Authority has been fulfilling its mandate within the ambit of the Wildlife (Protection) Act, 1972 for strengthening tiger conservation in the country by retaining an oversight through advisories/normative guidelines, based on appraisal of tiger status, ongoing conservation initiatives and recommendations of specially constituted Committees. '**Project Tiger' is a Centrally Sponsored Scheme of** the Environment, Forests and Climate Change, providing funding support to tiger range States**, for in-situ conservation of tigers in designated tiger reserves,** and has put the endangered tiger on an assured path of recovery by saving it from extinction, as revealed by the recent findings of the All India tiger estimation using the refined methodology.

Do you know?

- The **Global Tiger Initiative (GTI)** was launched in 2008 as a global alliance of governments, international organizations, civil society, the conservation and scientific communities and the private sector, with the aim of working together to save wild tigers from extinction. **In 2013, the scope was broadened to include Snow Leopards.**

THINK!

- Project elephant.

Q.113) Which of the following statements are correct regarding Shola Forest of India?

1. They are mountain forest found in Upper reaches of Himalayas.
2. They are evergreen forests with Coniferous vegetation.
3. They are found 2000 m above sea level.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 3 only
d) All of the above

Q.113) Solution (c)

Shola Forest

Shola forests are tropical Montane forests found in the valleys separated by rolling grasslands only in the higher elevations. They are found only in South India in the Southern Western Ghats. The shola forests are patches of forests that occur only in the valleys where

there is least reach of the fog and mist. Other parts of the mountains are covered in grasslands. The trees never grow on the mountain tops. This is such a unique landscape formation that is native only to the southern Western Ghats. The word Shola is derived from the Tamil language word □ □ □ □(pronunciation: cÕlai) meaning grove.

The Shola forests are generally said to be found in altitudes above 2000 metres of sea-level. Although they are found from altitudes higher than 1600 metres. Shola forests are a native only to the Southern Western Ghats. They are found only in the high altitude mountains of the states Karnataka, Kerala and Tamilnadu. Nowhere else in the world exist such a kind of forests.

The Shola forests are very rich in bio-diversity when it comes to plants. There are at least 25 types of trees that dominate these forests in the Nilgiri Hills. Due to high isolation and unique climatic conditions, the Shola forests are characterised by high endemism. The species of plants and animals found here are native to this region (this climatic region to be more specific) and such species cannot be found anywhere else in the world.

Think

- Western Ghats
- Tropical Evergreen Forests in India

Q.114) India is currently in 3rd stage of demographic transition according to Demographic Transition Theory. Which of the following factors are considered in the theory to predict the change in population?

1. Crude Birth Rate
2. Crude Death Rate
3. Migration

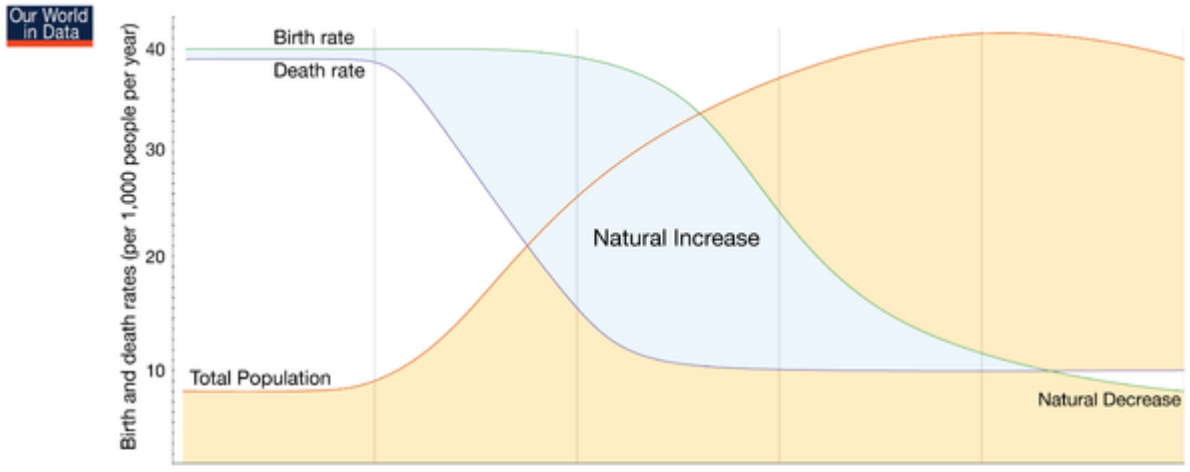
Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.114) Solution (a)

Demographic Transition Theory

Demographic transition (DT) is the transition from high birth and death rates to lower birth and death rates as a country or region develops from a pre-industrial to an industrialized economic system. The theory was proposed in 1929 by the American demographer Warren Thompson, who observed changes, or transitions, in birth and death rates in industrialized societies over the previous 200 years.



	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Birth rate	*High*	*High*	*Falling*	*Low*	*Very low*
Death rate	*High*	*Falls rapidly*	*Falls more slowly*	*Low*	*Low*
Natural increase	*Stable or slow increase*	*Very rapid increase*	*Increase slows down*	*Stable or slow increase*	*Stable or slow decrease*

The transition involves four stages, or possibly five.

- In stage one, pre-industrial society, death rates and birth rates are high and roughly in balance. All human populations are believed to have had this balance until the late 18th century, when this balance ended in Western Europe. In fact, growth rates were less than 0.05% at least since the Agricultural Revolution over 10,000 years ago. Population growth is typically very slow in this stage, because the society is constrained by the available food supply; therefore, unless the society develops new technologies to increase food production (e.g. discovers new sources of food or achieves higher crop yields), any fluctuations in birth rates are soon matched by death rates.
- In stage two, that of a developing country, the death rates drop quickly due to improvements in food supply and sanitation, which increase life expectancies and reduce disease. The improvements specific to food supply typically include selective breeding and crop rotation and farming techniques. Other improvements generally include access to ovens, baking, and television. For example, numerous improvements in public health reduce mortality, especially childhood mortality. Prior

to the mid-20th century, these improvements in public health were primarily in the areas of food handling, water supply, sewage, and personal hygiene. One of the variables often cited is the increase in female literacy combined with public health education programs which emerged in the late 19th and early 20th centuries. In Europe, the death rate decline started in the late 18th century in northwestern Europe and spread to the south and east over approximately the next 100 years. Without a corresponding fall in birth rates this produces an imbalance, and the countries in this stage experience a large increase in population.

- In stage three, birth rates fall due to various fertility factors such as access to contraception, increases in wages, urbanization, a reduction in subsistence agriculture, an increase in the status and education of women, a reduction in the value of children's work, an increase in parental investment in the education of children and other social changes. Population growth begins to level off. The birth rate decline in developed countries started in the late 19th century in northern Europe. While improvements in contraception do play a role in birth rate decline, it should be noted that contraceptives were not generally available or widely used in the 19th century and as a result likely did not play a significant role in the decline then. It is important to note that birth rate decline is caused also by a transition in values; not just because of the availability of contraceptives.
- During stage four there are both low birth rates and low death rates. Birth rates may drop to well below replacement level as has happened in countries like Germany, Italy, and Japan, leading to a shrinking population, a threat to many industries that rely on population growth. As the large group born during stage two ages, it creates an economic burden on the shrinking working population. Death rates may remain consistently low or increase slightly due to increases in lifestyle diseases due to low exercise levels and high obesity and an aging population in developed countries. By the late 20th century, birth rates and death rates in developed countries leveled off at lower rates.
- Some scholars break out, from stage four, a "stage five" of below-replacement fertility levels. Others hypothesize a different "stage five" involving an increase in fertility.

As with all models, this is an idealized picture of population change in these countries. The model is a generalization that applies to these countries as a group and may not accurately describe all individual cases. The extent to which it applies to less-developed societies today remains to be seen. Many countries such as China, Brazil and Thailand have passed through the Demographic Transition Model (DTM) very quickly due to fast social and economic change. Some countries, particularly African countries, appear to be stalled in the second stage due to stagnant development and the effect of AIDS.

Q.115) The scale of a map defines the details of a map. Consider the following statements regarding the Scale of map:

1. Smaller the scale smaller area it covers
2. Smaller the scale, larger area it covers
3. Larger the scale, more details it represents.
4. Larger the scale, more generalized it is.

Which of the above statements are correct?

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

Q.115) Solution (b)

Scale of Maps

A map is classified as small scale or large scale or sometimes medium scale. Small scale refers to world maps or maps of large regions such as continents or large nations. In other words, they show large areas of land on a small space. They are called small scale because the representative fraction is relatively small.

Large scale maps show smaller areas in more detail, such as county maps or town plans might. Such maps are called large scale because the representative fraction is relatively large. For instance a town plan, which is a large scale map, might be on a scale of 1:10,000, whereas the world map, which is a small scale map, might be on a scale of 1:100,000,000.

The following table describes typical ranges for these scales but should not be considered authoritative because there is no standard:

Classification	Range	Examples
large scale	1:0 – 1:600,000	1:0.00001 for map of virus; 1:5,000 for walking map of town
medium scale	1:600,000 – 1:2,000,000	Map of a country
small scale	1:2,000,000 – 1:∞	1:50,000,000 for world map; 1:1021 for map of galaxy

The terms are sometimes used in the absolute sense of the table, but other times in a relative sense. For example, a map reader whose work refers solely to large-scale maps (as tabulated above) might refer to a map at 1:500,000 as small-scale.

In the English language, the word large-scale is often used to mean "extensive". However, as explained above, cartographers use the term "large scale" to refer to less extensive maps – those that show a smaller area. Maps that show an extensive area are "small scale" maps. This can be a cause of confusion.

Q.116) Which of the following statements are correct regarding Nucleated Settlements in India?

1. They are generally found in arid and less fertile regions.
2. The main reason behind nucleated settlements is defence from wild animals and other communities as well as to use the agricultural land to the maximum.
3. Population density in nucleated settlement is low.

Select the code from below:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.116) Solution (b)

On the basis of number of villages, hamlets and number of occupancy units, settlements are classified as

1. compact,
2. semi-compact,
3. hamleted and
4. dispersed or scattered type.

Compact settlements:

If the number of villages equals the number of hamlets in an area unit, the settlement is designated as compact. Such settlements are found throughout the plateau region of Malwa, in the Narmada Valley, Nimar upland, large parts of Rajasthan, paddy lands in Bihar, Uttar Pradesh, Vindhyan Plateau and several other cultivated parts of India.

In such villages all the dwellings are concentrated in one central site. The inhabitants of the village live together and enjoy the benefits of community life. Such settlements range from a cluster of about thirty to hundreds of dwellings of different forms, sizes and functions. Their size varies from 500 to 2,500 persons in sparsely populated parts like Rajasthan to more than 10,000 in the Ganga plain.

Compact settlements developed by communities to protect themselves from attack of wild animals and other communities. They also got developed to utilise the agricultural land to the maximum.

Q.117) Consider the following statements regarding population density according to 2011 census:

1. Bihar has the highest population density amongst all states.
2. Chandigarh has the highest population density amongst all UTs.

Which of the above statements are correct?

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

Q.117) Solution (a)

Note: Delhi has highest population density amongst UTS.

The table given below will provide a clear idea about the population density of India, its different states, and union territories:

Population Density of India

Serial No.	India/ States/UT	2001	2011
-	INDIA	324	382
1	Jammu and Kashmir	99	56
2	Himachal Pradesh	109	123
3	Punjab	482	550
4	Chandigarh (UT)	7903	9252
5	Uttaranchal	159	189
6	Haryana	477	573

7	Delhi (UT)	9294	9340
8	Rajasthan	165	201
9	Uttar Pradesh	689	828
10	Bihar	880	1102
11	Sikkim	76	86
12	Arunachal Pradesh	13	17
13	Nagaland	120	119
14	Manipur	107	122
15	Mizoram	42	52
16	Tripura	304	350
17	Meghalaya	103	132
18	Assam	340	397
19	West Bengal	904	1030
20	Jharkhand	338	414
21	Orissa	236	269
22	Chhatisgarh	154	189
23	Madhya Pradesh	196	236
24	Gujarat	258	308
25	Daman & Diu (UT)	1411	112
26	Dadra & Nagar Haveli (UT)	449	491
27	Maharashtra	314	365
28	Andhra Pradesh	275	308
29	Karnataka	275	319
30	Goa	363	394
31	Lakshadweep(UT)	1894	2013
32	Kerala	819	859
33	Tamil Nadu	478	555
34	Pondicherry (UT)	2029	2598
35	Andaman and Nicobar Islands(UT)	43	46

Q.118) Which of the following information is given by population pyramid?

1. Distribution of population according to age brackets

2. Number of male and female in a population
3. Number of children in the population

Select the code from below:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

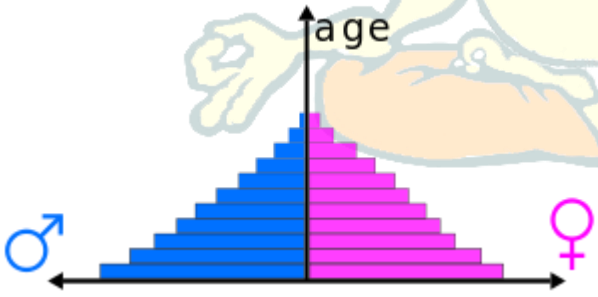
Q.118) Solution (d)

Population Pyramid

A population pyramid, also called an "age pyramid", is a graphical illustration that shows the distribution of various age groups in a population (typically that of a country or region of the world), which forms the shape of a pyramid when the population is growing. This tool can be used to visualize and age composition of a particular population.

Population pyramids are often viewed as the most effective way to graphically depict the age and distribution of a population, partly because of the very clear image these pyramids represent.

A great deal of information about the population broken down by age and sex can be read from a population pyramid, and this can shed light on the extent of development and other aspects of the population. A population pyramid also tells how many people of each age range live in the area. There tends to be more females than males in the older age groups, due to females' longer life expectancy.



Population pyramid gives a clear picture of how a country transitions from high fertility to low fertility rate. The population pyramid here indicates stage 2 on the demographic transition. The broad base of the pyramid means the majority of population lies between ages 0–14, which tells us that the fertility rate of the country is high and above population sub-replacement fertility level. There is a higher dependency ratio of younger population

over the working population. Moreover, there is lesser older population due to shorter life expectancy which is around 60 years.

Think

How is population pyramid of a developed country different from a developing country.

Q.119) Which of the following Biosphere reserves of India has become the first Mixed UNESCO World Heritage site in India?

a) Panna
b) Achnakmar Amarkantak
c) Great Nicobar
d) Kanchendzonga

Q.119) Solution (d)

Kanchedzonga/ Kanchenjunga Biosphere spere

Kanchenjunga National Park also Kanchenjunga Biosphere Reserve is a National Park and a Biosphere reserve located in Sikkim, India. It was inscribed to the UNESCO World Heritage Sites list on July 17, 2016, becoming the first "Mixed Heritage" site of India. The park gets its name from the mountain Kangchenjunga (alternative spelling Kangchendzonga) which is 8,586 metres (28,169 ft) tall, the third-highest peak in the world. The total area of this park is 849.5 km2 (328.0 sq mi).

There are many glaciers in the park including the Zemu glacier. Animals like musk deer, snow leopard, Clouded Leopard, and Himalayan tahr all make their home in this park.

Think

- Biosphere reserves of India which are in Man and Biosphere program

Q.120) Match List I with List II and select the correct answer using the code given below the Lists:

List I ***(Vulnerable tribes)***	**List II** ***(Region/State)***
1. Juang	A. Tamil Nadu
2. Saharia	B. Odisha
3. Codava	C. Rajasthan

4. Toda D. Karnataka

Code:

1-2-3-4

a) B-C-D-A
b) B-C-A-D
c) D-B-C-A
d) A-C-D-B

Q.120) Solution (a)

Correct answer

Juang : : Odisha
Saharia : : Rajasthan
Codava : : Karnataka
Toda : : Tamil Nadu

In News:

Juang tribe was in news. Nineteen Juang tribal children had died in the last three months due to acute malnutrition-related diseases in inaccessible hamlets atop the Nagada hills, in Odisha's Jajpur district.

Source: http://www.thehindu.com/news/national/The-lost-tribe-of-Odisha/article14553424.ece

A recent Anthropological Survey of India (AnSI) publication has brought to the fore startling revelations about the Particularly Vulnerable Tribal Groups (PVTGs) in the country including the fact that no base line surveys have been conducted among more than half of such groups.

Refer below articles and identify different vulnerable tribes and associated region/state.

Source: http://www.thehindu.com/news/national/vulnerable-tribes-lost-in-a-classification-trap/article17894997.ece

http://www.thehindu.com/news/cities/Vijayawada/in-sri-lanka-this-tribe-speaks-telugu/article22810325.ece

Q.121) Match List I with List II and select the correct answer using the codes given.

List-I (Timber)	**List-II (Country)**

1. Oak	A. Myanmar
2. Douglas fir	B. Canada
3. Mahogany	C. Mexico
4. Teak	D. Honduras

Codes:

1 – 2 – 3 – 4

a) C – B – A – D
b) B – C – D – A
c) B – C – A – D
d) C – B – D – A

Q.121) Solution (d)

Correct answer:

Oak : : France
Douglas fir : : Canada
Mahogany : : Honduras
Teak : : Myanmar

Oak

An oak is a tree or shrub native to the Northern Hemisphere, and includes deciduous and evergreen species extending from cool temperate to tropical latitudes in the Americas, Asia, Europe, and North Africa. North America contains the largest number of oak species, with approximately 90 occurring in the United States, while Mexico has 160 species of which 109 are endemic. The second greatest center of oak diversity is China, which contains approximately 100 species.

Douglas fir

P. menziesii, commonly known as Douglas fir, is a coniferous evergreen species native to Canada and the United States. It is the most exploited timber species in North America and one of the most important timber species globally. It commonly grows to 250 feet in height and 6 feet in diameter and lives more than 500 years. It is an important species to its ecosystem, providing habitat and food for small mammals.

Mahogany

Mahogany is a kind of wood—the straight-grained, reddish-brown timber of three tropical hardwood species of the genus Swietenia, indigenous to the Americas, part of the pantropical chinaberry family, Meliaceae.

Honduran or big-leaf mahogany (Swietenia macrophylla), with a range from Mexico to southern Amazonia in Brazil, the most widespread species of mahogany and the only true mahogany species commercially grown today.

Teak

Teak is a tropical hardwood tree species native to south and southeast Asia, mainly India, Sri Lanka, Indonesia, Malaysia, Thailand, Myanmar and Bangladesh but is naturalised and cultivated in many countries in Africa and the Caribbean. Myanmar's teak forests account for nearly half of the world's naturally occurring teak. Teak is sometimes known as the "Burmese teak".

Q.122) Identify the type of climate by considering below given statements:

1. Dry, warm summer with off- shore trade winds
2. Concentration of rainfall in winter with on-shore westerlies
3. Drought resistant xerophytic plants in an environment deficient in moisture
4. Wide range of citrus fruits are grown here

Choose correct code from the below given options:

a) Warm temperate western margin climate
b) Warm temperate eastern margin climate
c) Hot desert mid latitude climate
d) Steppe climate

Q.122) Solution (a)

Warm temperate western margin climate also called as Mediterranean climate:

- Dry, warm summer with off- shore Trade winds.
- Concentration of rainfall in winter with on-shore Westerlies
- Drought resistant Xerophytic plants in an environment deficient in moisture
- Wide range of Citrus fruits are grown here
- Mediterranean-type climate regions occur roughly between 30° and 40° latitude on the west coasts of continents, where offshore there are cold ocean currents.
- The Mediterranean climate has hot and dry summers and mild-wet winters. The natural vegetation of this biome adapted according to the dry and hot summer conditions.

Q.123) Consider the following statements:

1. It is governed by topography.
2. Large changes in mean temperature occur over short distances.
3. Precipitation types and intensity also vary spatially.

The above characteristics are related with which of the following climate type?
Select the correct code:

a) Polar Climates
b) Cold Snow Forest Climates
c) Highland Climates
d) Tundra Climate

Q.123) Solution (c)

Highland climates are governed by topography. In high mountains, large changes in mean temperature occur over short distances. Precipitation types and intensity also vary spatially across high lands. There is vertical zonation of layering of climatic types with elevation in the mountain environment.

Q.124) The following options lists the tribes with their respective climatic region.

1. Inuits - Hot desert
2. Hausa - Sudan type climate
3. Bedouin - Tundra
4. Pygmies - Equatorial

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

a) 1 only
b) 1 and 4 only
c) 2 and 4 only
d) None

Q.124) Solution (c)

Explanation:
Hausa - Sudan type climate (Tropical savannah)
Inuits - Tundra
Bedouin – Hot desert (Arabia)
Pygmies - Equatorial

Q.125) Consider the following statements:

1. These regions have a mean monthly temperature which remains always around 26°C with little variation and no winters.
2. These regions record the heaviest rainfall on this planet with over 20^0 centimeters which is well distributed throughout the year.
3. Due to substantial heat the mornings are bright and sunny with high evaporation.
4. These regions receive heavy convectional rain in the afternoon from the towering cumulonimbus clouds.

The above features are of which type of climate?

a) Humid Sub-tropical climate
b) Equatorial Climate
c) Tropical Savanna Climate
d) Laurentian climate

Q.125) Solution (b)

Characteristics of Equatorial Climates

- Regions with this climate experience high temperatures all year round. The average monthly temperatures are about 26 – 28 degrees Celsius. The annual temperature range (the difference between the average temperature of the hottest and coldest months) is very small. The annual temperature range may be as low as 3 degrees Celsius. The diurnal or daily temperature range (the difference between the highest temperature in the day and the lowest temperature at night) is usually greater. Humidity is usually very high.
- Another major characteristic of this climate is the high rainfall. These regions usually experience 200 centimeter of rainfall or more in a year. Rainfall is high for most of the year. Many equatorial regions are affected by the ITCZ. As the ITCZ passes over these areas it brings heavy rainfall and thunderstorms. In some areas, the ITCZ causes two periods of very heavy rainfall every year. One occurs when the ITCZ crosses these areas on its way north and another occurs when it crosses these areas again on its way south.

Many regions close to the equator experience an equatorial climate. These regions include, the Amazon Basin (South America), the Congo Basin (Africa), Malaysia, Indonesia and some areas in northern Australia.

Q.126) Consider the characteristics of the natural vegetation:

1. These kind of Forests found in areas with Moderate rainfall of 100 to 200 cm per annum
2. Mean annual temperature of about 27 degree C
3. Average relative humidity of 60 to 70 %
4. This type of forest is found in some parts of Odisha and West Bengal

Identify the type of Vegetation from the options given below:

a) Mediterranean Shrublands
b) Tropical wet evergreen Forests
c) Tropical dry evergreen forests
d) Tropical Moist deciduous Forests

Q.126) Solution (d)

Tropical Moist deciduous Forests

- These kind of Forests found in areas with Moderate rainfall of 100 to 200 cm per annum
- Mean annual temperature of about 27 degree C
- Average relative humidity of 60 to 70 %

- This type of forest is found in some parts of Odisha and West Bengal, also found along the Western Ghats surrounding the belt of evergreen forests

Q.127) Consider the following

1. A meteor is the flash of light that we see in the night sky when a small chunk of interplanetary debris burns up as it passes through our atmosphere.
2. If any part of a meteoroid survives the fall through the atmosphere and lands on Earth, it is called a meteorite.

Select the correct answer using the codes given below.

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.127) Solution (c)

Most of us probably have seen meteors or shooting stars. A meteor is the flash of light that we see in the night sky when a small chunk of interplanetary debris burns up as it passes through our atmosphere. "Meteor" refers to the flash of light caused by the debris, not the debris itself.

The debris is called a meteoroid. A meteoroid is a piece of interplanetary matter that is smaller than a kilometer and frequently only millimeters in size. Most meteoroids that enter the Earth's atmosphere are so small that they vaporize completely and never reach the planet's surface.

If any part of a meteoroid survives the fall through the atmosphere and lands on Earth, it is called a meteorite. Although the vast majority of meteorites are very small, their size can range from about a fraction of a gram (the size of a pebble) to 100 kilograms (220 lbs) or more (the size of a huge, life-destroying boulder).

Do you know?

Asteroids are generally larger chunks of rock that come from the asteroid belt located between the orbits of Mars and Jupiter.

Comets are asteroid-like objects covered with ice, methane, ammonia, and other compounds that develop a fuzzy, cloud-like shell called a coma and sometimes a visible tail whenever they orbit close to the Sun.

Q.128) Consider the following statements

1. In summer solstice (21st June) the northern hemisphere will have the longest day and shortest night.
2. In winter solstice (22nd December) the southern hemisphere will have the longest night and shortest day.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.128) Solution (a)

The sun is vertically overhead at the Tropic of Cancer on about 21st June. This is known as June or Summer solstice, **when northern hemisphere will have longest day and shortest nights.**

The sun is vertically overhead at the Tropic of Capricorn on about 22nd December. This is known as winter solstice, **when southern hemisphere will have longest day and shortest nights.**

Do you know?

- The tropics mark the limit of the overhead sun, for beyond these, the sun is never overhead at any time of the year.

THINK!

- Dawn
- Twilight

Q.130) Your friend is sailing in the ship in Indian ocean is at 75^0 E longitude calls you. He wishes you good morning and asks your local time. You being at Greenwich say 7.00am. What is the actual time of your friend's place at Indian Ocean.

a) 11.00am
b) 12.00pm
c) 12.30pm
d) None

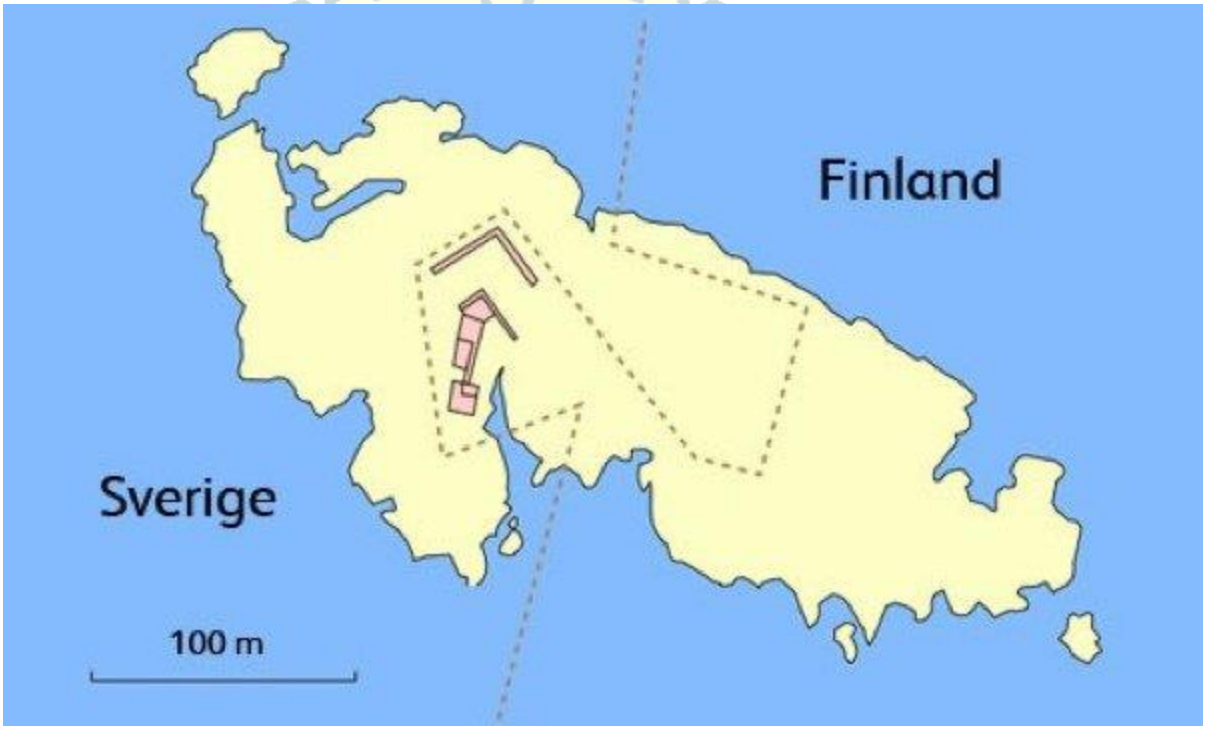
Q.130) Solution (b)

Every 15 degrees of longitude equals 1 hour. So, if you are standing at 0 degrees longitude (Greenwich) and you move or travel 15 degrees east or west, you'll notice a difference of 1 hour. This 1-hour difference is negative or positive, can be determined by the direction in which you have traveled i.e westwards or eastwards of the Meridian longitude.

Your friend is at Indian Ocean 75^0 E longitude, this means in time he is ahead of you. So, we have to add 75*4=300 minutes or 5 hours to 7.00am. Which gives 12.00pm. Thus, the actual time of your friend is 12.00 pm.

Do you know?

- The small island of **Markets Fyr** in the Baltic Sea is only 300 meters by 80 meters at its furthest points. **The countries of Sweden and Finland own this island, half and half.** The Swedish side keeps to Swedish time and the Finnish side to Finnish time. Islands are usually prime candidates for irregular shaped time zones so that they are in the same one. Could this be the smallest example of two-time zones?



THINK!

- International date line.

Q.131) Consider the following statements.

1. Equator passes through only three island countries viz. Maldives, Kiribati, and Indonesia.
2. The landmasses of Maldives and Kiribati do not touch the equator itself.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.131) Solution (c)

Although the equator stretches 24,901 miles (40,075 kilometers) around the world, **it travels through the territory of just 13 countries.** And yet the landmasses of two of these countries do not touch the Earth's equator. Located at 0 degrees latitude, the equator splits the Earth into Northern and Southern Hemispheres, and any location along the imaginary line is equidistant from the North and South Poles.

The countries of Sao Tome and Principe, Gabon, Republic of the Congo, the Democratic Republic of the Congo, Uganda, Kenya, Somalia, Maldives, Indonesia, Kiribati, Ecuador, Colombia, and Brazil all lie along the equator, **but the landmasses of Maldives and Kiribati**

do not touch the equator itself. Instead, the equator passes through water controlled by these two island countries.

Seven of the countries are in Africa—the most of any continent—while South America is home to three of the nations (Ecuador, Colombia, and Brazil) and remaining **three (Maldives, Kiribati, and Indonesia) are island nations in the Indian and Pacific oceans.**

Do you know?

- The terms summer, fall, winter, and spring don't really apply to regions along the equator. Instead, people who live in the especially humid tropic regions refer to only two seasons: wet and dry.

THINK!

- Tropic of cancer passes through which all countries?

Q.132) Which of the following are responsible for tides?

1. Gravitational force of sun, moon and rotation of earth.
2. During spring tide, the Sun, Moon, and Earth form a configuration known as a syzygy.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.132) Solution (c)

Tides are the rise and fall of sea levels caused by the combined effects of the **gravitational forces exerted by the Moon and the Sun and the rotation of Earth.**

Approximately twice a month, around new moon and full moon when the Sun, Moon, and Earth form a line **(a configuration known as a syzygy),** the tidal force due to the sun reinforces that due to the Moon. The tide's range is then at its maximum; this is called the spring tide. It is not named after the season, but, like that word, derives from the meaning "jump, burst forth, rise", as in a natural spring.

Do you know?

- The Highest Astronomical Tide is the perigean spring tide when both the sun and moon are closest to the Earth.

THINK!

- Einstein ring

Q.133) Which of the following are indirect sources to know interior of earth?

1. Meteors
2. Gravitation
3. Seismic Waves
4. Volcanic eruptions

Select the correct answer using the codes given below.

a) 1, 2 and 3 only
b) 2, 3 and 4 only
c) 1, 3 and 4 only
d) All the above

Q.133) Solution (a)

Sources of Information about the interior of the earth

Direct Sources:

- Rocks from mining area
- Volcanic eruptions

Indirect Sources

- By analyzing the rate of change of temperature and pressure from the surface towards the interior.
- **Meteors,** as they belong to the same type of materials earth is made of.
- **Gravitation,** which is greater near poles and less at the equator.
- **Gravity anomaly,** which is the change in gravity value according to the mass of material, gives us information about the materials in the earth's interior.
- **Magnetic sources**
- **Seismic Waves:** the shadow zones of body waves (Primary and secondary waves) give us information about the state of materials in the interior.

Do you know?

- Mohorovicic (Moho) discontinuity forms the boundary between crust and asthenosphere [asthenosphere is a part of mantle].

THINK!

- Major elements of earth's crust.

Q.134) Consider the following pairs.

Rock Type	Example
1. Igneous	Granite
2. Metamorphic	Gneiss
3. Sedimentary	Sandstone

Which of the above pairs is/are correctly matched?

a) 1 only
b) 2 only
c) 1 and 3 only
d) All the above

Q.134) Solution (d)

Igneous Rocks

- Formed out of magma and lava and are known as primary rocks.
- If molten material is cooled slowly at great depths, mineral grains may be very large.
- Sudden cooling (at the surface) results in small and smooth grains.
- Granite, gabbro, pegmatite, basalt, etc.are some of the examples of igneous rocks.
- **There are two types of igneous rocks: intrusive rocks (Granite) and extrusive rocks (Basalt-Deccan Traps).**
- Having their origin under conditions of high temperatures, the igneous rocks are
- Acid igneous rocks, such as granite, are less dense and are lighter in colour than basic rocks.

Metamorphic Rocks

- The word metamorphic means 'change of form'.
- Form under the action of pressure, volume and temperature (PVT) changes.
- Metamorphism occurs when rocks are forced down to lower levels by tectonic processes or when molten magma rising through the crust comes in contact with the crustal rocks.
- Metamorphism is a process by which already consolidated rocks undergo recrystallization and reorganization of materials within original rocks.

- **Granite under pressure metamorphoses into gneiss.**

Sedimentary Rocks

- Sedimentary or detrital rocks.
- Formed as a result of denudation (weathering and erosion).
- These deposits through compaction turn into rocks. This process is called lithification.
- Cover 75 per cent of the earth's crust but volumetrically occupy only 5 per cent.
- They are layered or stratified of varying thickness. Example: sandstone, shale etc.
- Till or Tillite == Ice deposited sedimentary rocks.
- Loess == Wind deposited sediments.

Depending upon the mode of formation, they are classified into

- mechanically formed — sandstone, conglomerate, limestone, shale, loess etc.
- organically formed — geyserite, chalk, limestone, coal etc.
- chemically formed — chert, limestone, halite, potash etc.

Do you know?

Metamorphic Rocks in India

- The gneisses and schists are commonly found in the Himalayas, Assam, West Bengal, Bihar, Orissa, Madhya Pradesh and Rajasthan.
- Quartzite is a hard rock found over Rajasthan, Bihar, Madhya Pradesh, Tamil Nadu and areas surrounding Delhi.
- Marble occurs near Alwar, Ajmer, Jaipur, Jodhpur in Rajasthan and parts of Narmada Valley in Madhya Pradesh.
- Slate, which is used as a roofing material and for writing in schools, is found over Rewari (Haryana), Kangra (Himachal Pradesh) and parts of Bihar.
- Graphite is found in Orissa and Andhra Pradesh.

THINK!

- Rock cycle

Q.135) Consider the following statements regarding the Tropics:

1. The sun is overhead Tropic of Capricorn during Summer Solstice.
2. Tropic of Capricorn and Tropic of Cancer marks the extreme limits where Sun can be overhead atleast once in a year.
3. In Asia, Tropic of Capricorn passes only through Indonesia.

Which of the above statements are correct?

a) 1 and 2
b) 2 only
c) 2 and 3
d) All of the above

Q.135) Solution (b)

Notable Latitudes

- The Equator represents 0° latitude, while the North and South Poles represent 90° North and 90° South latitudes. In addition to the Equator, there are four other major latitudes that are usually found on maps and globes. The positions of these latitudes are determined by the Earth's axial tilt.
- The Arctic Circle is the latitude 66° 34′ North. All locations falling North of this latitude are said to be in the Arctic Circle.
- The Antarctic Circle on the other hand, is the latitude 66° 34′ south. Any locations falling south of this latitude are said to be in the Antarctic Circle.
- Places in both the Arctic and Antarctic circles experience extreme weather, and experience the Midnight Sun.
- The latitude 23° 26′ North is also known as the Tropic of Cancer. It marks the northern-most position on the Earth, where the Sun is directly overhead at least once a year. This happens during the June Solstice, when the Earth's Northern Hemisphere is tilted towards the Sun.
- The Tropic of Capricorn is the latitude that lies at 23° 26′ South of the Equator. It is the southern-most position on the globe, where the sun is directly overhead during the December Solstice.

Sometimes, latitudes north of the Equator are denoted by a positive sign. Latitudes south of the Equator are given negative values. This eliminates the need to add whether the specified latitude is north or south of the Equator.

Note: Tropic of Capricorn does not pass through Asia.

Q.136) The earth revolves around the sun in an elliptical path. Consider the following statements regarding this:

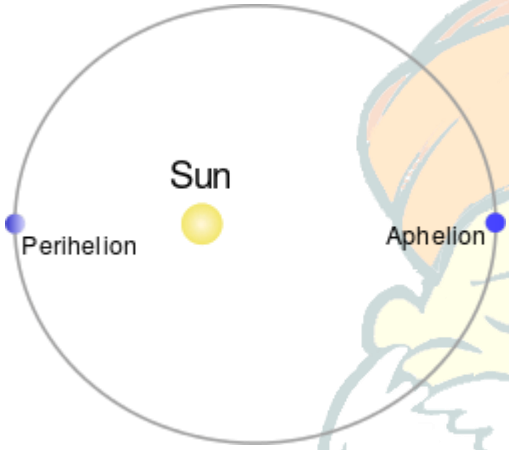
1. The earth is closest to the sun on 3rd January.
2. When the earth is at its maximum distance from sun, it is called Aphelion.

Which of the above statements is/are correct?

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

Q.136) Solution (c)

The perihelion is the point in the orbit of a celestial body where it is nearest to its orbital focus, generally a star. It is the opposite of aphelion, which is the point in the orbit where the celestial body is farthest from its focus.



Earth is about 147.1 milion kilometers (91.4 million miles) from the Sun at perihelion around January 3, in contrast to about 152.1 million kilometers (94.5 million miles) at aphelion around July 4 — a difference of about 5.0 million kilometers (3.1 million miles).

Think

Apogee and Perigee

Q.137) Which of the following factors are responsible for change in seasons on earth?

a) Rotation of the earth on its axis
b) Elliptical orbit of the earth
c) Tilt of the earth's axis
d) All of the above

Q.137) Solution (c)

Seasons result from the tilt of Earth's axis, which is 23.4 degrees away from perpendicular to the plane of Earth's orbit around the sun. Winter falls on the hemisphere where sunlight strikes least directly, and summer falls where sunlight strikes most directly, regardless of the Earth's distance from the Sun.

In the northern hemisphere, summer occurs at the same time as aphelion. Despite this, there are larger land masses in the northern hemisphere, which are easier to heat than the seas. Consequently, summers are 2.3 °C (4 °F) warmer in the northern hemisphere than in the southern hemisphere under similar conditions.

Think

How does season impact the vegetation of a place?

Q.138) A great circle is a circle on the surface of the earth, the plane of which passes through the center of the earth. Which of the following statements regarding Great Circles are NOT correct?

1. All latitudes form Great circles.
2. Only one longitude forms a Great Circle.
3. A great circle divides the earth into two equal halves.

Select the code from following:

a) 1 and 2
b) 3 only
c) 1 and 3
d) All of the above

Q.138) Solution (a)

Note: Incorrect options have been asked.

Great Circle

A great circle is the largest possible circle that can be drawn around a sphere. All spheres have great circles. If you cut a sphere at one of its great circles, you'd cut it exactly in half. A great circle has the same circumference, or outer boundary, and the same center point as its sphere. The geometry of spheres is useful for mapping the Earth and other planets.

The Earth is not a perfect sphere, but it maintains the general shape. All the meridians on Earth are great circles. Meridians, including the prime meridian, are the north-south lines we use to help describe exactly where we are on the Earth. All these lines of longitude meet at the poles, cutting the Earth neatly in half.

The Equator is another of the Earth's great circles. If you were to cut into the Earth right on its Equator, you'd have two equal halves: the Northern and Southern Hemispheres. The Equator is the only east-west line that is a great circle. All other parallels (lines of latitude) get smaller as you get near the poles.

Do you know?

Great circles are useful in planning routes. The shortest path between two points on the surface of a sphere is always a segment of a great circle. Plotting great circles comes in very handy for airplane pilots trying to fly the shortest distance between two points. For example, if you flew from Atlanta, Georgia, to Athens, Greece, you could fly roughly along the path of one of Earth's great circles, which would be the shortest distance between those two points. When planning routes, however, pilots have to take other factors into account, such as air currents and weather. Great circles are just general paths to follow.

Q.139) Periglacial landforms are one of the evidences of Continental Drift. Which of the following are the examples of Periglacial landforms?

1. Pingo
2. Blockfields
3. Areti
4. Coombe

Select the code from below:

a) 1,2 and 3
b) 2,3 and 4
c) 1,2 and 4
d) All of the above

Q.139) Solution (c)

Note: Even if you didn't know the answer, you could have marked it through elimination. Areti is a glacial landform and not a periglacial landform. It could have been eliminated.

Periglacial Landform

Periglaciation (adjective: "periglacial," also referring to places at the edges of glacial areas) describes geomorphic processes that result from seasonal thawing of snow in areas of permafrost, the runoff from which refreezes in ice wedges and other structures. "Periglacial" suggests an environment located on the margin of past glaciers. However, freeze and thaw cycles influence landscapes outside areas of past glaciation. Therefore, periglacial environments are anywhere that freezing and thawing modify the landscape in a significant manner.

Periglaciation results in a variety of ground conditions but especially those involving irregular, mixed deposits created by ice wedges, solifluction, gelifluction, frost creep and rockfalls. Periglacial environments trend towards stable geomorphologies.

- **Coombe and head deposits** – Coombe deposits are chalk deposits found below chalk escarpments in Southern England. Head deposits are more common below outcrops of granite on Dartmoor.
- **Patterned Ground** – Patterned ground occurs where stones form circles, polygons and stripes. Local topography affects which of these are expressed. A process called frost heaving is responsible for these features.
- **Solifluction lobes** – Solifluction lobes are formed when waterlogged soil slips down a slope due to gravity forming U shaped lobes.
- **Blockfields or Felsenmeer** – Blockfields are areas covered by large angular blocks, traditionally believed to have been created by freeze-thaw action. A good example of a blockfield can be found in the Snowdonia National Park, Wales. Blockfields are common in the unglaciated parts of the Appalachian Mountains in the northeastern United States, such as at the River of Rocks or Hickory Run Boulder Field, Lehigh County, Pennsylvania.

Other landforms include:

- Bratschen
- Palsa
- Pingo
- Rock glacier
- Thermokarst

Think

- Glacial Landforms
- Since a question on periglacial landforms was asked in mains last year, this year you might find it in the prelims.

Q.140) Which of the following statements are correct regarding the Earth's crust?

1. It is the top constituent of lithosphere.
2. Continental crust is called Felsic while oceanic crust is called mafic.
3. Silicon is the most abundant element in the earth's crust.

Select the code from following

a) 1 only
b) 1 and 2
c) 1 and 3
d) All of the above

Q.140) Solution (b)

Earth's Crust

The crust is a thin shell on the outside of the Earth, accounting for less than 1% of Earth's volume. It is the top component of lithosphere: a division of Earth's layers that includes the crust and the upper part of the mantle. The lithosphere is broken into tectonic plates that move, allowing heat to escape from the interior of the Earth into space.

The crust lies on top of the mantle, a configuration that is stable because the upper mantle is made of peridotite and so is significantly denser than the crust. The boundary between the crust and mantle is conventionally placed at the Mohorovicic discontinuity, a boundary defined by a contrast in seismic velocity.

The crust of the Earth is of two distinctive types:

- Oceanic: 5 km (3 mi) to 10 km (6 mi) thick and composed primarily of denser, more mafic rocks, such as basalt, diabase, and gabbro.
- Continental: 30 km (20 mi) to 50 km (30 mi) thick and mostly composed of less dense, more felsic rocks, such as granite.

Because both continental and oceanic crust is less dense than the mantle below, both types of crust "float" on the mantle.

Most Abundant Elements of Earth's	**Approximate % by weight**

Crust

O	46.6
Si	27.7
Al	8.1
Fe	5.0
Ca	3.6
Na	2.8
K	2.6
Mg	1.5

Q.141) Igneous Rocks are the primary rocks of the earth's crust. Which of the following statements are correct regarding the igneous rocks?

1. They are formed by cooling and hardening of magma.
2. Igneous rocks are most likely to have fossils in them.
3. Intrusive igneous rocks have bigger crystals than extrusive igneous rocks.

Select the code from following:

a) 1 only
b) 2 and 3
c) 1 and 3
d) All of the above

Q.141) Solution (c)

Types of Rocks

The three main types, or classes, of rock are **sedimentary**, **metamorphic**, and **igneous** and the differences among them have to do with how they are formed.

Sedimentary

Sedimentary rocks are formed from particles of sand, shells, pebbles, and other fragments of material. Together, all these particles are called sediment. Gradually, the sediment

accumulates in layers and over a long period of time hardens into rock. Generally, sedimentary rock is fairly soft and may break apart or crumble easily. You can often see sand, pebbles, or stones in the rock, and it is usually the only type that contains fossils.

Examples of this rock type include conglomerate and limestone.

Metamorphic

Metamorphic rocks are formed under the surface of the earth from the metamorphosis (change) that occurs due to intense heat and pressure (squeezing). The rocks that result from these processes often have ribbonlike layers and may have shiny crystals, formed by minerals growing slowly over time, on their surface.

Examples of this rock type include gneiss and marble.

Igneous

Igneous rocks are formed when magma (molten rock deep within the earth) cools and hardens. Sometimes the magma cools inside the earth, and other times it erupts onto the surface from volcanoes (in this case, it is called lava). When lava cools very quickly, no crystals form and the rock looks shiny and glasslike. Sometimes gas bubbles are trapped in the rock during the cooling process, leaving tiny holes and spaces in the rock.

Examples of this rock type include basalt and obsidian.

Intrusive igneous rocks get more time to cool down. This gives time to crystal to grow bigger. On the other hand extrusive rocks cool down soon and small crystal formation is there.

Do you know?

Igneous rocks are primary rocks because they form directly by the material coming out from the interior of earth. Sedimentary and metamorphic rocks are a result of external forces.

Q.142) Consider the following statements:

1. The inner planets are those that exist between the sun and the asteroid belt.
2. Mercury, Venus, Earth and Mars are inner planets which are very close to the sun and are made up of gases and liquids.

Which of the above statements is/are correct?

a) 1 only
b) 2 only

c) Both 1 and 2
d) Neither 1 nor 2

Q.142) Solution (a)

All of the inner planets - Mercury, Venus, Earth and Mars - are considered terrestrial planets due to the fact that their surfaces are made mostly of solids (rocks).

Inner planets have no or few moons, with Earth having one moon, and Mars having two. In contrast, the outer planets are much more likely to have moons and rings. For example, Jupiter, known to be the largest planet in the solar system, has several moons. Jupiter, Saturn and Uranus have rings around them.

Do you know?

Similarities between the inner and outer planets:

The inner and outer planets all follow an elliptical orbit, share the same orbital plane, are spherical and contain some of the same elements. Besides those attributes, each planet is very different.

The inner planets are those that exist between the sun and the asteroid belt. They are:

- Mercury
- Venus
- Earth
- Mars

The outer planets are those that are between the asteroid belt and the end of the solar system. These are:

- Jupiter
- Saturn
- Uranus
- Neptune

The outer planets are known as Jovian or gas giants. They are much larger in size than the inner planets and are primarily composed of gases that surround a liquid metal core.
The inner planets are all smaller and denser than the outer planets. They are mostly solid and composed of rock rather than gas.

The reason for the difference in the size, density, and composition of the planets is that the gravity of the sun tends to attract heavier, solid elements, such as heavy metals, while lighter gases, such as hydrogen, helium, nitrogen, and oxygen, are not pulled as strongly inward.

The elements that exist in all of the planets are iron and nickel. Mercury, the planet closest to the sun, is almost entirely made of these two elements, while the outer planets only have trace amounts located in their core.

https://www.reference.com/science/outer-planets-solar-system-6c2ccfedd6b8ff33?qo=leafPageFeaturedContent

Q.143) Consider the following pairs:

1. Isohels/Isohals : : Imaginary lines on a map passing through places of same duration of sunshine.
2. Isohypse : : Imaginery lines passing through places having the same height from the sea level.
3. Isohytes : : Lines joining the places on the earth's surface having equal rainfall.
4. Isonephs : : Imaginery lines passing through places having same mean cloudiness over a certain period.

Which of the pairs given above is/are correct?

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

Q.143) Solution (d)

Isotherm is a line on a map connecting points having the same temperature at a given time or on average over a given period.

Isobar is a line on a map connecting points having the same atmospheric pressure at a given time or on average over a given period.

Isohyte is a line on a map joining the places on the earth's surface having equal rainfall.

Isobath is an imaginary line or a line on a map or chart that connects all points having the same depth below a water surface (as of an ocean, sea, or lake)

Isohel/Isohal is an imaginary line on a map passing through places of same duration of sunshine.

Isohypse is an imaginary line passing through places having the same height from the sea level.

Isonephs is an imaginary line passing through places having same mean cloudiness over a certain period.

Isohaline is a line on a map joining points of equal salinity in an aquatic system.

Q.144) Which one of the following straits is nearest to the International Date Line?

a) Malacca Strait
b) Strait of Florida
c) Bering Strait
d) Strait of Gibraltar

Q.144) Solution (c)

The International Date Line is an imaginary Line on the 180th meridian in the Pacific Ocean that goes through the Bering Strait (between Alaska and Russia), which is half way around the world from Greenwich, England. It is basically a straight Line; however, there are some zigzags. These zigzags are necessary because otherwise one country would be observing two Dates at the same time. In order to prevent this, the International Date Line curves around these countries and only goes through the Pacific Ocean.

Q.145) Consider the following statements:

1. The lunar eclipse is a phenomenon that occurs when the Earth, moon and sun are in perfect alignment, blanketing the moon in the Earth's shadow.
2. "Blood Moon" is the term used when a second full moon in a calendar month.
3. Total lunar eclipse takes place when blue moon, supermoon and blood moon coincides.

Which of the above statements are correct?

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

Q.145) Solution (b)

In News:

- January 31 witnessed a rare three lunar phenomenon: A supermoon, a blue moon and a blood moon.
- This was the first time all three events occurred simultaneously since 1866 - more than 150 years ago.
- This phenomenon was visible in large parts of the US, north-eastern Europe, Russia, Asia, the Indian Ocean, the Pacific, and Australia.

Pic link:
https://d39gegkjaqduz9.cloudfront.net/TH/2018/02/01/CNI/Chennai/TH/5_01/205bf5bf_b7b57471_1_mr.jpg

Do you know?

- The next blue moon total lunar eclipse won't be until December 31, 2028, according to NASA.

Terms explained: *(Important for Prelims and Mains)*
Blue moon, supermoon and blood moon coincided on a total lunar eclipse day, also called "Chandra Grahan".

Lunar eclipse

- The lunar eclipse is a phenomenon that occurs when the Earth, moon and sun are in perfect alignment, blanketing the moon in the Earth's shadow.
- In total lunar eclipse, the direct sunlight is completely blocked by the earth's shadow.

Blue Moon

- "Blue Moon" is the term used when a second full moon in a calendar month. Jan 31 witnessed first lunar eclipse of the year and had second full moon in the month. This is called "Blue Moon". In addition, the moon will appear crimson in colour.

Blood Moon

- During total lunar eclipse, when the moon gets shadowed by earth, the sunlight passes through the earth's atmosphere and breaks down. The red part of the sunlight gets least refracted, giving moon the tinge of orangish red. This is called "Blood Moon".

Supermoon

- When the eclipse happened, the moon was close to earth by 60,000 km against the average distance between the moon and the earth. The moon appeared brighter and bigger. This is called "supermoon".

Q.146) Which among the below given pairs is/are incorrect?

Boundary Interaction : : Physical Feature

1. Subduction Zone : : Alps Mountains
2. Collision Zone : : Andes Mountains
3. Transform Boundary Interaction : : North Anatolian Fault in Turkey
4. Divergent Plates : : East Pacific Rise

Choose appropriate answer from the codes given below:

a) 1 and 2 only
b) 3 and 4 only
c) 3 only
d) None

Q.146) Solution (a)

Correct pairs:

1. Transform Boundary Interaction : : North Anatolian Fault in Turkey
2. Collision Zone : : Alps Mountains
3. Divergent Plates : : East Pacific Rise
4. Subduction Zone : : Andes Mountains

Q.150) Consider the following countries:

1. Australia
2. Namibia
3. Brazil
4. Chile

Through which of the above does the Tropic of Capricorn pass?

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

Q.150) Solution (d)

The **Tropic of Capricorn** line passes through Chile, Argentina, Paraguay, Brazil, Namibia, Botswana, South Africa, Mozambique, Madagascar, Australia and French Polynesia, clipping New Caledonia, Fiji, Tonga and the Cook Islands before landfall at Pitcairn.

There are 10 countries, 3 continents and 3 water bodies lies on **Tropic of Capricorn** passes.

- South America – Argentina, Brazil, Chile Paraguay
- Africa – Namibia, Botswana, South Africa, Mozambique, Madagascar
- Australia – Australia
- Water Bodies – Indian Ocean, Atlantic Ocean, Pacific Ocean

There are 16 countries, 3 continents and 6 water bodies lies on **Tropic of Cancer** passes.

- North America – Mexico, Bahamas(Archipelago)
- Africa – Niger, Algeria, Mauritania, Egypt, Libya, Mali, Western Sahara
- Asia – Myanmar, Omen, Bangladesh, India, Saudi Arabia, China, United Arab Emirates, Taiwan
- Water Bodies – Indian Ocean, Atlantic Ocean, Pacific Ocean, Taiwan Strait, Red Sea, Gulf of Mexico

There are 13 countries, 3 continents and 3 water bodies lies on **Equator** passes.

- South America – Equador, Columbia, Brazil
- Africa – Gabon, Congo, Democratic Republic of Congo, Uganda, Kenya, Sao Tome and Principe, Somalia
- Asia – Maldives, Indonesia and Kiribati(Oceania)
- Water Bodies – Atlantic, Pacific, Indian Ocean

There are 8 countries, 3 continents and 6 water bodies lies on **Prime Meridian passes**.

- Europe – United Kingdom, Spain, France
- Africa – Ghana, Algeria, Mali, Togo, Burkina Faso
- Antarctica – Antarctica
- Water Bodies – Arctic Ocean, Norwegian Sea, Greenland Sea, Mediterranean Sea, Atlantic Ocean, Southern Ocean

Q.151) Consider the following statements:

1. When the sun, the earth and the moon are in a position of right angle, this position is called quadrature.
2. The position of the sun, the moon and the earth in a straight line is called syzygy.
3. When the position of the earth is in between the sun and moon, this is called conjunction.

Which of the statements given above is/are correct?

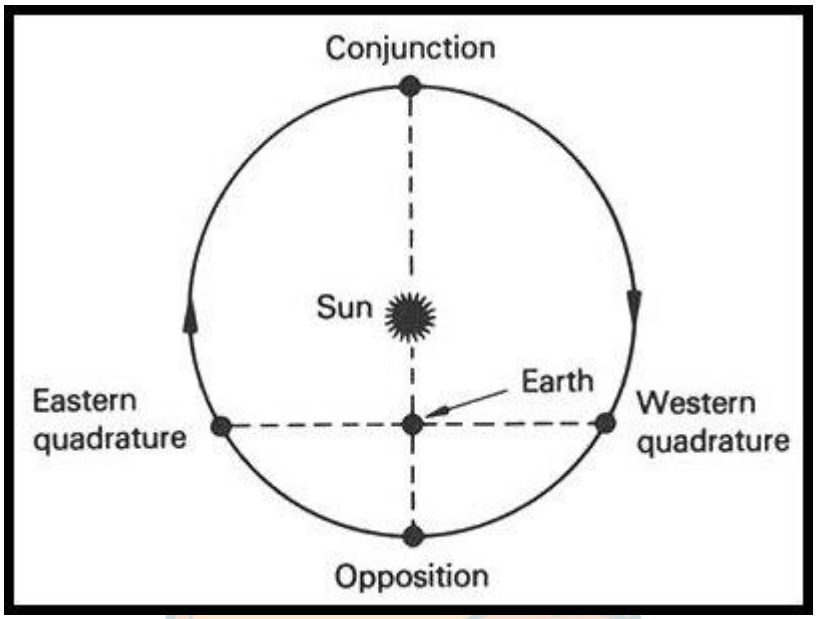
a) 1 and 2 only
b) 2 only
c) 1 and 3 only
d) 1, 2 and 3

Q.151) Solution (a)

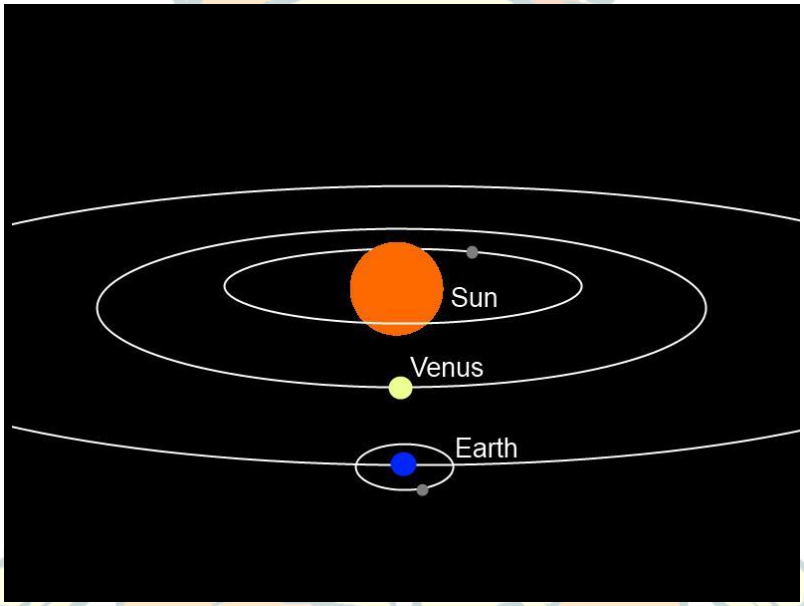
When the sun, the earth and the moon are in a position of right angle, this position is called quadrature.

When the position of the earth is in between the sun and moon, this is called opposition.

The position is called conjunction when the sun and the moon are in one side of the earth.



The position of the sun, the moon and the earth in a straight line is called syzygy.



Q.152) Consider the following pairs.

Types of volcano	**Example**
1. Composite	Hawaiian
2. Shield	Mt. Vesuvius
3. Fissure type	Deccan traps

4. Caldera	Krakatoa

Which of the above pairs/is are correctly matched?

a) 1 and 3 only
b) 1, 2 and 3 only
c) 3 and 4 only
d) All the above

Q.152) Solution (c)

Composite Type Volcanic Landforms

- They are conical or central type volcanic landforms.
- Along with andesitic lava, large quantities of pyroclastic material and ashes find their way to the ground.
- Andesitic lava along with pyroclastic material accumulates in the vicinity of the vent openings leading to formation of layers, and this makes the mounts appear as composite volcanoes.
- The highest and most common volcanoes have composite cones.
- They are often called strato – volcanoes.
- **Stromboli 'Lighthouse of the Mediterranean', Mt. Vesuvius, Mt. Fuji etc. are examples.**

Shield Type Volcanic Landforms

- The **Hawaiian volcanoes** are the most famous examples.
- These volcanoes are mostly made up of basalt, a type of lava that is very fluid when erupted.
- These volcanoes are not steep.
- They become explosive if somehow water gets into the vent; otherwise, they are less explosive.
- **Example: Mauna Loa (Hawaii).**

Fissure Type Flood Basalt Landforms [Lava Plateaus]

- Sometimes, a very thin magma escapes through cracks and fissures in the earth's surface and flows after intervals for a long time, spreading over a vast area, finally producing a layered, undulating (wave like), flat surface.
- Example: **Deccan traps (peninsular India), Snake Basin, U.S.A, Icelandic Shield, Canadian Shield etc.**

Caldera Lake

- After the eruption of magma has ceased, the crater frequently turns into a lake at a later time. This lake is called a 'caldera'. Examples: **Lonar in Maharashtra and Krakatao in Indonesia.**

Do you know?

Andesitic or Acidic or Composite or Stratovolcanic lava

- These lavas are highly viscous with a high melting point.
- They are light-colored, of low density, and have a high percentage of silica.
- They flow slowly and seldom travel far before solidifying. The resultant cone is therefore steep sided.
- The rapid solidifying of lava in the vent obstructs the flow of the out-pouring lava, resulting in loud explosions, throwing out many volcanic bombs or pyroclasts.
- Sometimes the lavas are so viscous that they form a spine or plug at the crater like that of Mt. Pelee in Martinique.

THINK!

- Basic or Basaltic or Shield lava.

Q.153) Consider the following statements about earthquakes.

1. The foci of earthquakes along mid-ocean ridges are deep seated one.
2. The foci of earthquakes along alpine-Himalayan belt are at shallow depth.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.153) Solution (d)

Shallow focus earthquakes are called crustal earthquakes as they exist in the earth's crustal layer. Shallow focus earthquakes (most common at submarine ridges. Hardly felt). **Example are earth quakes at midocean ridges.**

Deep focus earthquakes are known as intra plate earthquakes, as they are triggered off by collision between plates. **Benioff zone is a zone of seismicity** corresponding with the down-

going slab in a subduction zone **(Convergent Boundary).** Deep focus earthquakes (Occurs at trenches – convergent boundary. Very powerful. **Japan lies along trench line.** Hence it faces devastating earthquakes). **Examples are alpine-Himalayan belt**

Shallow-focus earthquakes occur at **depths less than 70 km**, while deep-focus earthquakes occur at **greater focal depths of 300 – 700 km.**

Shallow focus earthquakes are found within the earth's outer crustal layer, while deep focus earthquakes occur within the deeper subduction zones of the earth.

Shallow focus earthquakes are of smaller magnitudes, of a range 1 to 5, while deep focus earthquakes are of higher magnitudes, 6 to 8 or more.

Do you know?

- **Isoseismic Line** A line connecting all points on the surface of the earth where the intensity is the same.

THINK!

- Seismic waves.

Q.154) Which of the following are the chemical weathering processes?

1. Solution
2. Carbonation
3. Hydration
4. Salt weathering

Select the correct answer using the codes given below.

a) 1, 2 and 3 only
b) 2, 3 and 4 only
c) 1 and 2 only
d) All the above

Q.154) Solution (a)

Chemical Weathering Processes

- A group of weathering processes viz; solution, carbonation, hydration, oxidation and reduction act on the rocks to decompose, dissolve or reduce them to a fine state.

- Water and air (oxygen and carbon dioxide) along with heat speed up all chemical reactions.

Physical Weathering Processes

- Physical or mechanical weathering processes depend on some applied forces like (i) gravitational forces (ii) expansion forces due to temperature changes, crystal growth or animal activity; (iii) water pressures controlled by wetting and drying cycles.

Salt Weathering is a physical weathering process

- Salts in rocks expand due to thermal action, hydration and crystallization.
- Many salts like calcium, sodium, magnesium, potassium and barium have a tendency to expand.
- High temperature ranges in deserts favour such salt expansion.
- Salt crystals in near-surface pores cause splitting of individual grains within rocks, which eventually fall off. This process of falling off of individual grains may result in granular disintegration or granular foliation.

Do you know?

Significance of weathering

- Weathering is **the first step in formation of soils.**
- Weathering of rocks and deposits helps in the **enrichment and concentrations** of certain valuable ores of iron, manganese, aluminium, copper etc.
- Weathering helps in soil enrichment.
- Without weathering, the concentration of the same valuable material may not be sufficient and economically viable to exploit, process and refine. **This is what is called enrichment.**

THINK!

- Mass movement

Q.155) Which of the following are the necessary conditions for the formation of deltas?

1. The river must have large load.
2. Presence of large lakes on the river course.
3. Presence of shallow adjoining sea or continental shelf.
4. Strong currents running at right angles to the mouth of the river.

Select the correct answer using the codes given below.

a) 1 and 4 only

b) 1 and 3 only
c) 1, 2 and 3 only
d) All the above

Q.155) Solution (b)

The following are necessary conditions for formation of river delta

- **The river must have large load**. This will be possible if there is active erosion in the upper and middle stages.
- There should not be extensive deposition in the middle stage e.g**. presence of lake in between or high evaporation rate (first).**
- The river's load must be deposited faster than it can be removed by the action of currents and tides i.e no strong current should be at right angle to the mouth of the river.
- Presence of **shallow adjoining sea or continental shelf.**
- The velocity of a river must be sufficiently low to allow most of its load to be deposited in the river's mouth.

Do you know?

A delta is formed by a combination of two processes:

- load-bearing capacity of a river is reduced as a result of the check to its speed as it enters a sea or lake, and
- clay particles carried in suspension in the river coagulate in the presence of salt water and are deposited.
- The finest particles are carried farthest to accumulate as bottom-set beds.

THINK!

- Types of deltas.

Q.156) Consider the following pairs.

Plateau types	Examples
1. Intermontane	Tibetan plateau
2. Volcanic	Columbian-snake plateau
3. Dissected	Bolivian plateau

Which of the above pairs/is are correctly matched?

a) 1 only
b) 1 and 3 only
c) 1 and 2 only
d) All the above

Q.156) Solution (c)

Plateaus enclosed by mountains are called as Intermontane Plateaus, they include the highest, largest and in many respects most complex plateaus of the world.

Examples: Tibetan plateau, Bolivian plateau, Mexican plateau.

Volcanoes also form several varieties of plateaus. The largest are built by the lava flow. Smaller, degraded plateaus are formed by the resistant lava caps that protect the land from erosion and maintain its high elevation after the surrounding land has been worn away.

Examples: Antrium plateau, north-western part of Deccan plateau, Columbia-snake plateau.

A dissected plateau is a plateau area that has been severely eroded so that the relief is sharp.

Examples: Scottish Highlands etc.

Do you know?

Deccan Plateau

- Deccan Plateau is a large plateau which forms most of the southern part of India.
- It is bordered by two mountain ranges, the Western Ghats and the Eastern Ghats.
- The plateau includes the Deccan Traps which is the largest volcanic feature on Earth.
- Made of multiple basalt layers or lava flows, the Deccan Traps covers 500,000 square kilometers in area.
- The Deccan Traps are known for containing some unique fossils.
- The Deccan is rich in minerals. Primary mineral ores found in this region are mica and iron ore in the Chotanagpur region, and diamonds, gold and other metals in the Golconda region.

THINK!

- Plateaus and Minerals.

Q.157) consider the following pairs.

Plateaus	Major mineral
1. Kimberley	Gold
2. Katanga	Copper
3. Laurentian	Iron ore
4. Mexican	Silver

Which of the above pairs/is are correctly matched?

a) 1 and 3 only
b) 1 and 4 only
c) 2 and 4 only
d) All the above

Q.157) Solution (d)

Kimberley Plateau

- Lies in the northern part of Australia.
- This plateau is made of volcanic eruption.
- Many minerals like iron, gold, lead, zinc, silver and diamond are found here.
- **Diamond is also found here.**

Katanga Plateau

- It is lying in Congo.
- **It is famous for copper production.**
- Other minerals like Cobalt, Uranium, Zinc, Silver, Gold and Tin are also mined here.

Laurentian Plateau

- Lying in the eastern part of Canada, it is a part of Canadian Shield.
- Fine quality of iron-ore is found here.

Mexican Plateau

- It is called as 'Mineral Store'. Different types of metallic minerals like silver, copper etc. are obtained from here.
- World's biggest silver mine Chihuahua is situated in the plateau.

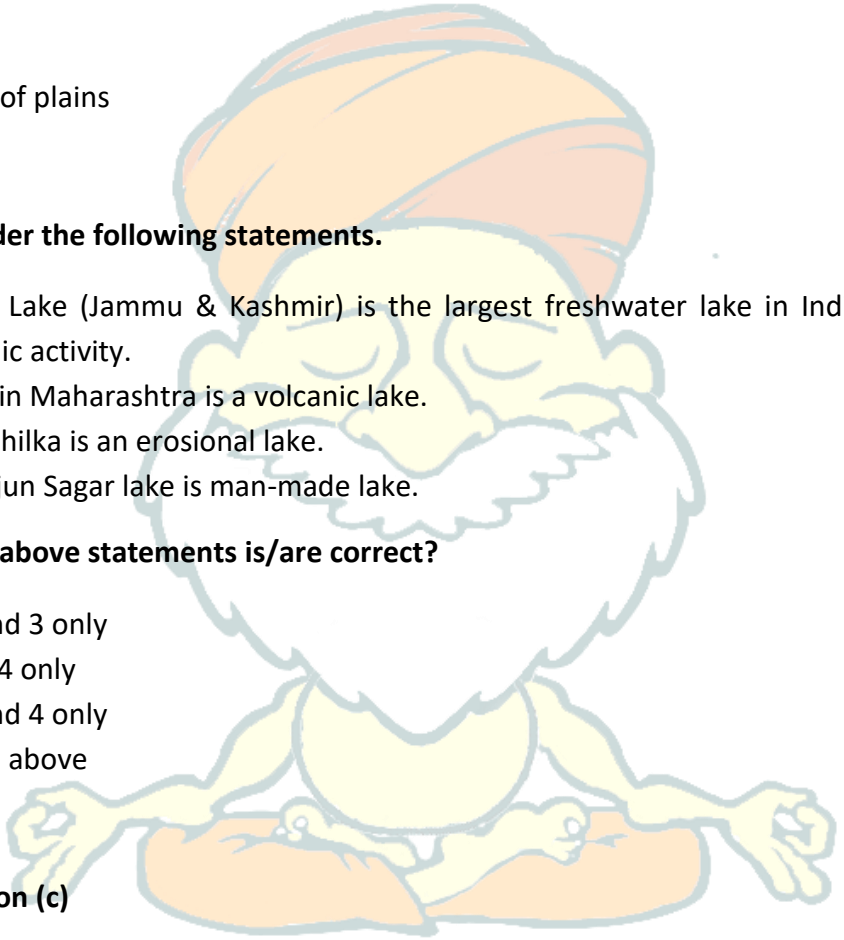
Do you know?

Patagonian Plateau

- It is a Piedmont plateau (Arid Landforms) lying in southern part of Argentina.
- **It is a rain shadow desert plateau.**
- It is an important region for sheep rearing.

THINK!

- Types of plains



Q.158) Consider the following statements.

1. Wular Lake (Jammu & Kashmir) is the largest freshwater lake in India, formed by tectonic activity.
2. Lonar in Maharashtra is a volcanic lake.
3. Lake Chilka is an erosional lake.
4. Nagarjun Sagar lake is man-made lake.

Which of the above statements is/are correct?

a) 1, 2 and 3 only
b) 2 and 4 only
c) 1, 2 and 4 only
d) All the above

Q.158) Solution (c)

Tectonic lakes

- Due to the warping (simple deformation), subsidence (sliding downwards), bending and fracturing (splitting) of the earth's crust, tectonic depressions occur. (We have studied all these terms in previous posts)
- Such depressions give rise to lakes of immense sizes and depths.
- They include Lake Titicaca, and the Caspian Sea.
- **Wular lake in India formed by tectonic activity.**

Lakes Formed by Volcanic Activity

- Crater and caldera lakes
- During a volcanic explosion the top of the cone may be blown off leaving behind a natural hollow called a crater.
- This may be enlarged by subsidence into a caldera.
- In dormant or extinct volcanoes, rain falls straight into the crater or caldera which has no superficial outlet and forms a crater or caldera lake.
- **Examples: Lonar in Maharashtra and Krakatao in Indonesia.**

Man-made lakes

- Besides the natural lakes, man has now created artificial lakes by erecting a concrete dam across a river valley so that the river water can be kept back to form reservoirs.
- **Example: Lake Mead above the Hoover Dam on the Colorado River, U.S.A., Nagarjun Sagar Lake.**
- Man's mining activities, e.g. tin mining in West Malaysia, have created numerous lakes. Inland fish culture has necessitated the creation of many fishing-lakes.

Lakes due to Marine deposits

- Also called Lagoons.
- **Example: Lake Chilka**

Do you know?

Rift valley lakes

- A rift valley is formed when two blocks of earth move apart letting the 'in between' block slide downwards. Or, it's a sunken land between two parallel faults.
- Rift valleys are deep, narrow and elongated. Hence the lakes formed along rift valleys are also deep, narrow and very long.
- Water collects in troughs (Valley in the rift) and their floors are often below sea level.
- The best-known example is the East African Rift Valley which runs through Zambia, Malawi, Tanzania, Kenya and Ethiopia, and extends along the Red Sea to Israel and Jordan over a total distance of 3,000 miles.
- **It includes such lakes as Lakes Tanganyika, Malawi, Rudolf, Edward, Albert, as well as the Dead Sea1,286 feet below mean sea level, the world's lowest lake.**

THINK!

- Fresh water lakes of India.

Q.159) Which of the following statements regarding Rift Valleys are correct?

1. They are formed due to Continental – continental divergence.
2. They have flat bottom topography.
3. Himalayan rivers make Rifts Valleys in their old age.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.159) Solution (a)

Rift Valley

A rift valley is linear-shaped lowland between several highlands or mountain ranges created by the action of a geologic rift or fault. A rift valley is formed on a divergent plate boundary, a crustal extension or spreading apart of the surface, which is subsequently further deepened by the forces of erosion. When the tensional forces were strong enough to cause the plate to split apart, a center block dropped between the two blocks at its flanks, forming a graben. The drop of the center creates the nearly parallel steeply dipping walls of a rift valley when it is new. That feature is the beginning of the rift valley, but as the process continues, the valley widens, until it becomes a large basin that fills with sediment from the rift walls and the surrounding area. One of the best known examples of this process is the East African Rift.

Note: Himalayan rivers do not form a rift valley. Rift valley is a secondary landform and is formed because of endogenic forces and not due to erosion.

Q.160) Which of the following are evidences of Continental Drift provided by Wegener?

1. Jig Saw fit of the continents across Atlantic.
2. Similar age and crystal structure of rocks found on East of S. America and West coast of Africa.
3. Similar fossils of Aquatic animals found on the East coast of S. America and West Coast of Africa.
4. Presence of Periglacial landforms in Polar Regions.

Select the code from following:

a) 1 and 2

b) 3 and 4
c) 1, 2 and 3
d) All of the above

Q.160) Solution (a)

Evidences in support of continental Drift

(i) **"Jig saw" fit-** Wegener was struck by the geographical similarity between the opposite coasts of the atlantic ocean.the outlines of the two coasts appears to be the detached portion of the other ie. The east coast of north and South America can be exactly fit into the left coast of Africa and Europe.

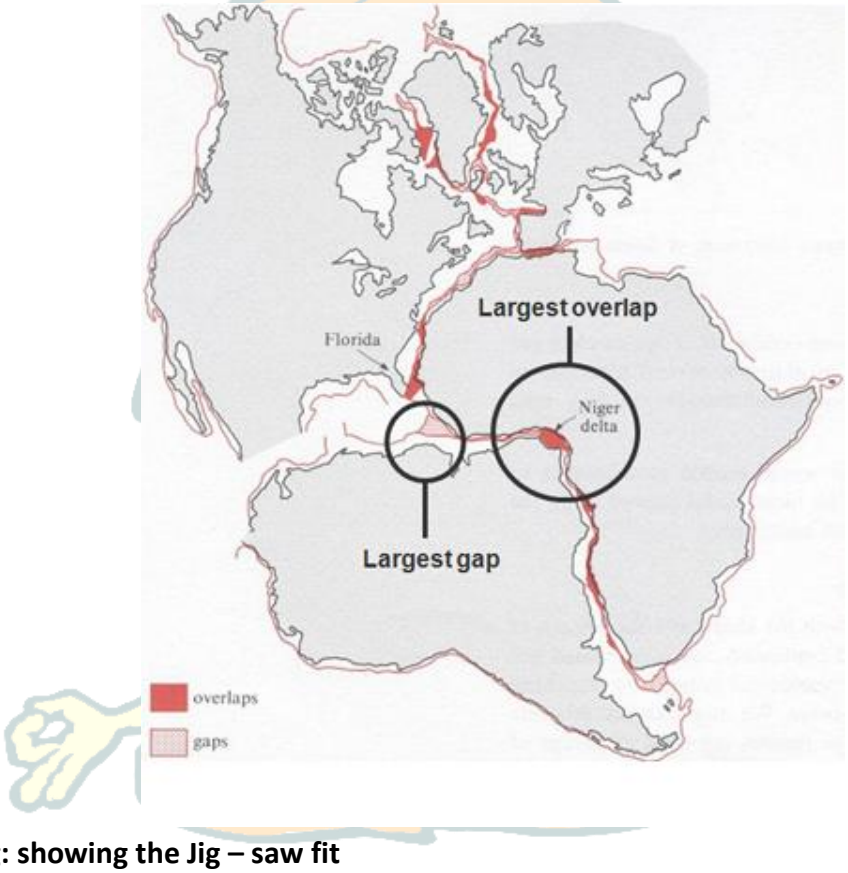


Fig: showing the Jig – saw fit

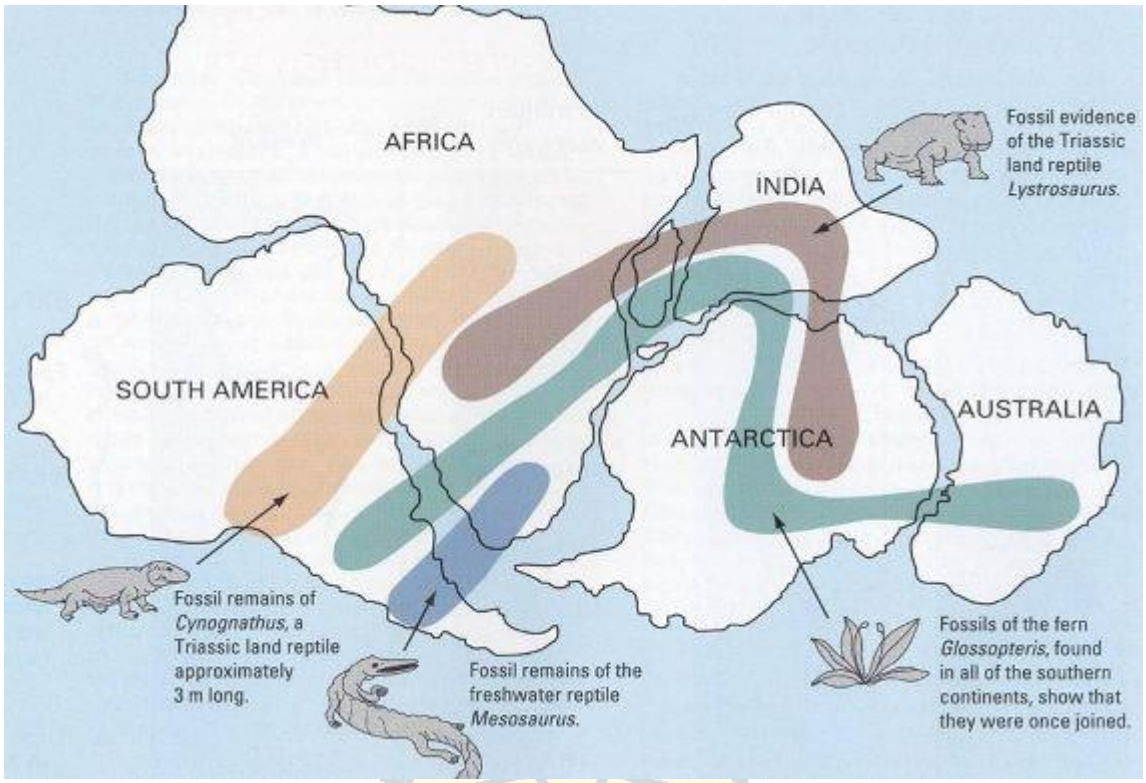
(ii) **Geological structure-** there is remarkable similarity in geological structure along the two coasts of Atlantic. The best example is provided by the Appalachian mountains of north America which come right up to the coast and continue their trend across the ocean in old Hercynian mountains of south west Ireland, Wales and central Europe. The opposite coasts of Africa and Brazil display even greater resemblance in their structure and rocks.

Fig: Similar Geological structure

(iii) **Permo-carboniferous glaciations-** it presents a strong proof that at one point of time these land masses were assembled together , since the evidences of this glaciation are found in Brazil, Falkland island, South Africa, Indian peninsula as well as Australia. It is difficult to explain these extensive glaciations on the basis of existing distribution of landmass and water. According to Wegener at the time of Pangaea, the South Pole was situated near Durban of the present coast of south Africa.

(iv) **Similar Fossil** remains of terrestrial animals are found on both coasts of the Atlantic. This cannot be possible if the two landmasses were not joined as it quite impossible for these animals to swim across the Atlantic.

Note: Here the term 'terrestrial' is important. Had they been marine they would have swam across the ocean. But it is hardly possible for a terrestrial animal to swim across the ocean to die on the other coast.



(v) The migratory pattern of some animal species also hints towards the joined land mass. For example the entire lemming (a rodent) population crosses the North America and falls in the Atlantic. This is estimated that they have not forgotten their route, when the landmasses were joined, the might have travelled to Europe and central Asia.

Note: 3rd and 4th statements are incorrect because in 3rd statements 'Aquatic' animals are given. It should be terrestrial animals. In 4th statement the region should be equatorial and not polar.

Q.161) Continental drift theory is currently the most accepted theory to explain the shape of earth's surface and formation of landforms. Which of the following statements according to Plate Tectonic theory are correct?

1. The lithosphere is broken in fragments called plates and they are moving with respect to each other over Aesthenosphere.
2. The forces responsible for movement of plates are gravitational pull of the moon and earth's rotation.

Select the code from following:

a) 1 only
b) 2 only

c) Both 1 and 2
d) Neither 1 nor 2

Q.161) Solution (a)

Plate Tectonic Theory:

The term plate tectonics was first used by **Tuzo Wilson** of the University of Toronto but the theory of plate tectonics was first published by **W. J. Morgan** of the Princeton University in 1962. This theory is based on the concept of 'sea- floor spreading' advocated by Hess. It is an improvement over the Wegener's continental drift theory and has been considered as the most sophisticated and comprehensive theory about the drift of continents and expansion of sea floors.

According to this theory **the lithosphere is believed to have been broken into fragments which are in constant movement with respect to each other**. The movement of these plates is attributed to the convention currents being generated in upper mantle. The margins of the plates are the sites of considerable geologic activity such as sea floor spreading, volcanic eruptions, crustal deformation, mountain building and continental drift.

Q.162) Which of the following landforms are associated with Oceanic – Oceanic plate convergence?

1. Oceanic trench
2. Oceanic ridge
3. Volcanic island chain
4. Folding mountains

Select the code from following:

a) 1 and 2
b) 2,3 and 4
c) 1 and 3
d) All of the above

Q.162) Solution (c)

Note: Study the following table very carefully. If you can understand and remember the following table, you will be able to explain the formation of all the secondary reliefs.

Plate boundary		Plate movement	seafloor	Events observed	examples
Divergent plate boundaries	Ocean - ocean	apart	Forms by seafloor spreading	Ridge forms at spreading centre. Plate area increases. Many small volcanoes and earthquakes	Mid atlantic ridge, east pacific rise
	Continent -continent		New ocean basin may form as the continent split	Continent drifts apart, ocean may intrude. Formation of rift valleys and block mountains	East African rift.
Convergent plate boundary	Ocean - continent	together	Destroyed at subduction zones	Dense oceanic lithosphere plunges beneath less dense continental crust. Earthquake traces path of down moving plate as it descends into asthenosphere. A trench is formed. Subducted plate partially melts and magma rises to form continental volcanoes.	Western South america

	Ocean - ocean		Destroyed at subduction zone	Denser crust plunges into lighter crust and is subducted forming a curved trench and a volcanic arc.	Aleutians
	Continent-continent		**NA**	Collision between masses of gigantic continental lithosphere. Neither mass is subducted. Plate edges are compressed, folded and uplifted	Himalayas, alps
Transform plate boundary		Past each other	Neither created nor destroyed	A transform fault is formed where plates move past each other. Strong earthquakes along the fault	San Andreas fault.

Q.163) Which of the following are necessary conditions for generation of Tsunami waves?

1. Earthquake
2. Vertical displacement of water in ocean
3. Fast wind speed on the surface of the ocean

Select the code from following:

a) 1 only
b) 1 and 2

c) 1 and 3
d) All of the above

Q.163) Solution (b)

Tsunamis:

The seismic waves travelling through the ocean and sea water results into high sea waves which are known as tsunamis. 'Tsunami' is a Japanese term which has been universally adopted to describe a large seismically generated sea wave. These waves are responsible for causing considerable destruction in certain coastal areas where submarine earthquakes occur.

Pre – conditions for Tsunami:

For a Tsunami to occur, two conditions are required:

- There should be an earthquake from which energy can be transferred.
- There should be a vertical displacement of the water. i.e. during earthquake the crust should move vertically. That's why Tsunamis are originated near oceanic trenches where plates are being subducted. In Atlantic Ocean, a number of earthquakes occur on Mid – Oceanic ridge but since there is no sudden vertical movement, Tsunamis are not formed. Tsunamis can also be triggered if seamounts break. This can cause vertical displacement of water.

Q.164) Which of the following statements is/are correct regarding Reverse Faulting?

1. It occurs due to compression force.
2. There is net destruction of surface in case of Reverse faulting.

Select the code from following:

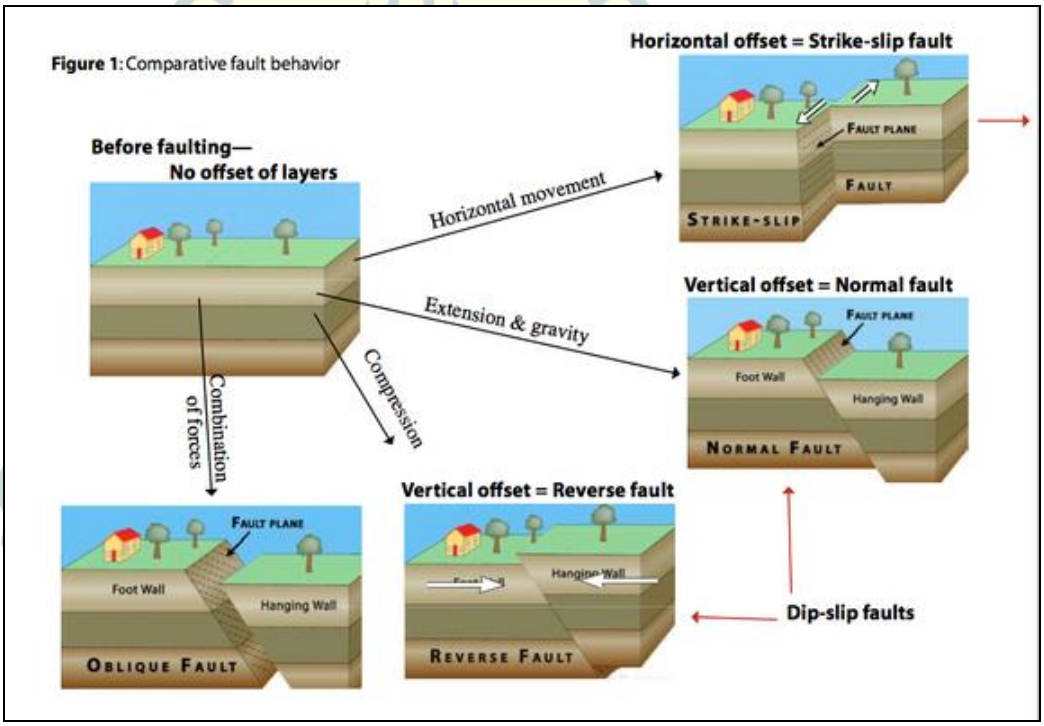
a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q.164) Solution (c)

Faults:

A fault is a fracture in the earth's crust due to tension force. It can also occur due to compression in hard and brittle rocks.

- When there is tension the crust ruptures. One block is thrown upwards and the other downwards. The upthrown block is called **Horst** while the downthrown block is called **Graben**. The line along which the fault occurs is called strike. This fault is called normal fault and is most common. In case of a normal fault, new surface is generated in the form of scarp.
- When there is compression, in case of hard rocks instead of folding, the faulting occurs. The block with hanging wall is thrown upwards while the one with footwall is thrown downwards. This is called a reverse fault. In case of a reverse fault there is net destruction of the surface.
- When the forces are acting parallel to each other, along the line of fault the blocks move past each other without being upthrown or downthrown. This is called lateral fault.



The landforms formed due to faulting of land are block mountains, rift valleys, step mountains, hinge faults, scissors fault etc.

Q.165) Which of the following landforms are formed by the erosional action of Glaciers?

1. Fjords
2. Areti
3. Cirque
4. V – shape Valley
5. Moraines

Select the code from following:

a) 1,2 and 3
b) 2,3 and 4
c) 2,3 and 5
d) All of the above

Q.165) Solution (a)

Erosional landforms of Glaciers

Cirque/Corrie

- Hollow basin cut into a mountain ridge.
- It has steep sided slope on three sides, an open end on one side and a flat bottom.
- When the ice melts, the cirque may develop into a tarn lake.

Glacial Trough

- Original stream-cut valley, further modified by glacial action.
- It is a 'U' Shaped Valley. It at mature stage of valley formation.
- Since glacial mass is heavy and slow moving, erosional activity is uniform – horizontally as well as vertically.
- A steep sided and flat bottomed valley results, which has a 'U' shaped profile.

Hanging Valley

- Formed when smaller tributaries are unable to cut as deeply as bigger ones and remain 'hanging' at higher levels than the main valley as discordant tributaries.
- A valley carved out by a small tributary glacier that joins with a valley carved out by a much larger glacier.

Arete

- Steep-sided, sharp-tipped summit with the glacial activity cutting into it from two

Horn

- Ridge that acquires a 'horn' shape when the glacial activity cuts it from more than two sides.

D-Fjord

- Steep-sided narrow entrance-like feature at the coast where the stream meets the coast.
- Fjords are common in Norway, Greenland and New Zealand.

THINK!

- Why fjords are very good fishing grounds?

Q.166) Match the following in correct sequence:

Land forms	**Features**
1. Rivers	A. Interlocking Spurs
2. Desert	B. Bergschrund
3. Glacier	C. Stacks
4. Karsts	D. Yardangs
	E. Stalagmite

1-2-3-4

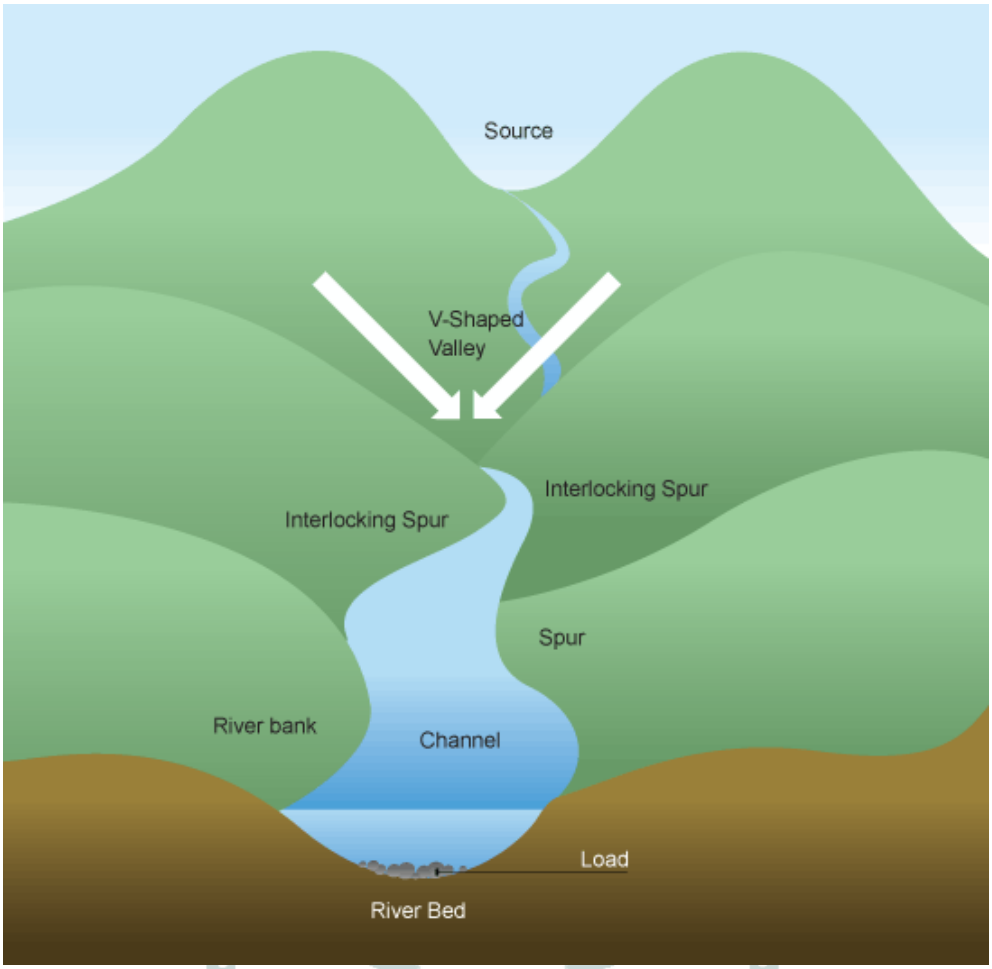
a) C-B-D-E
b) A-D-B-E
c) A-B-C-E
d) A-C-D-B

Q.166) Solution (b)

Interlocking Spurs:

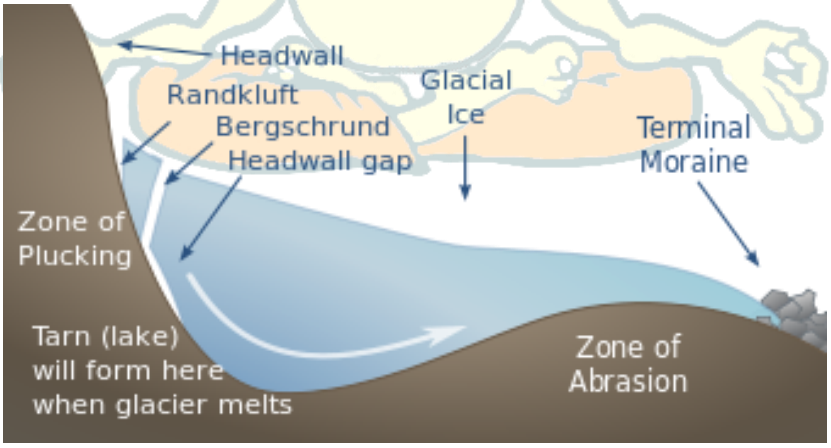
Spurs are ridges of hard rock, which a river is forced to wind around as it passes downstream in the upper course as is cannot erode the hard rock.

Interlocking spurs are formed when the river is forced to swing side to side around the spurs of hard rock which interlock as you look at the river.



Bergschrund

Bergschrund, (German: "mountain crevice"), a crevasse or series of crevasses often found near the head of a mountain glacier. The erosion of the rock beneath a bergschrund contributes to the formation of a cirque.



Stacks:

A stack or sea stack is a geological landform consisting of a steep and often vertical column or columns of rock in the sea near a coast, formed by wave erosion.

Stacks are formed over time by wind and water, processes of coastal geomorphology. They are formed when part of a headland is eroded by hydraulic action, which is the force of the sea or water crashing against the rock.

Yardang

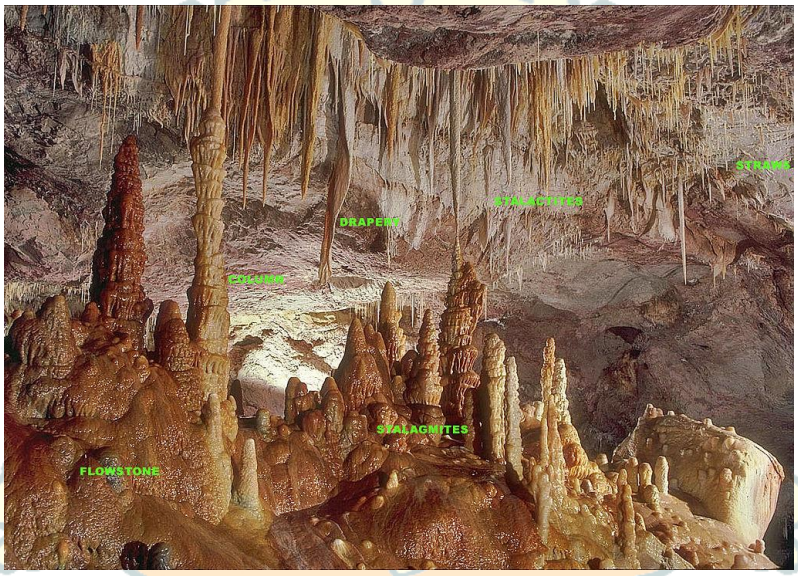
A yardang is a streamlined protuberance carved from bedrock or any consolidated or semiconsolidated material by the dual action of wind abrasion by dust and sand, and deflation which is the removal of loose material by wind turbulence.

Yardangs become elongated features typically three or more times longer than wide, and when viewed from above, resemble the hull of a boat. Facing the wind is a steep, blunt face that gradually gets lower and narrower toward the lee end.

Yardangs are formed by wind erosion, typically of an originally flat surface formed from areas of harder and softer material. The soft material is eroded and removed by the wind, and the harder material remains. The resulting pattern of yardangs is therefore a combination of the original rock distribution, and the fluid mechanics of the air flow and resulting pattern of erosion.

Stalagmite

A stalagmite is a type of rock formation that rises from the floor of a cave due to the accumulation of material deposited on the floor from ceiling drippings. Stalagmites may be composed of lava, minerals, mud, peat, pitch, sand, sinter and amberat (crystallized urine of pack rats).



Q.167) Consider the following:

1. Mesas and Buttas are associated with arid areas.
2. Peneplains are associated with humid conditions.
3. Dissected plateaux are associated with humid areas.

Which of the statements given above is/are correct?

e) 1 only

f) 2 only
g) 1 and 2 only
h) 1, 2 and 3

Q.167) Solution (d)

Mesas and Buttas are associated with arid areas, whereas Dissected plateaux are associated with humid areas.

Peneplains are associated with humid conditions, whereas Pediplains are associated with arid and semi-arid conditions.

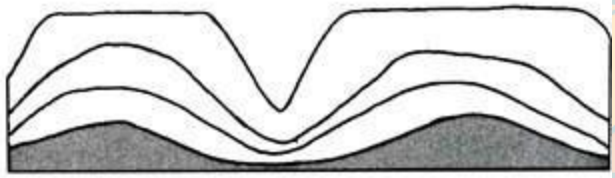


Fig. 24 Peneplain
In the formation of a peneplain in humid conditions the hills are both lowered and worn back to give an undulating lowland

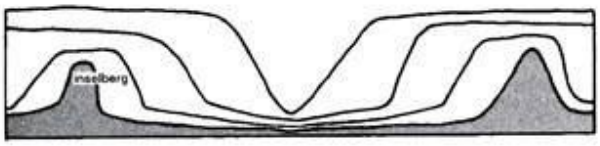


Fig. 25 Pediplain
In the formation of a pediplain in arid or semi-arid conditions the hills are worn back to form a gently sloping plain but some steep hills remain. These are called inselbergs

Do you know?

A plateau that is eroded and broken into numerous smaller pieces becomes a dissected plateau.

A dissected plateau is a plateau area that has been severely eroded so that the relief is sharp. Such an area may be referred to as mountainous, but dissected plateaus are distinguishable from orogenic mountain belts by the lack of folding, metamorphism, extensive faulting, or magmatic activity that accompanies orogeny.

THINK!

- Different landforms of wind and water erosion in Deserts

Q.168) Consider the below statements in regard to different seismic waves:

1. Earth quake are the zone of seismicity where surface waves are the most destructive.
2. P and S waves both forms shadow zones and shadow zone of P waves is larger than that of S wave.
3. Shadow zones forms due to varying refractive indexes of different layers of earth.

Which of the statements given above are correct?

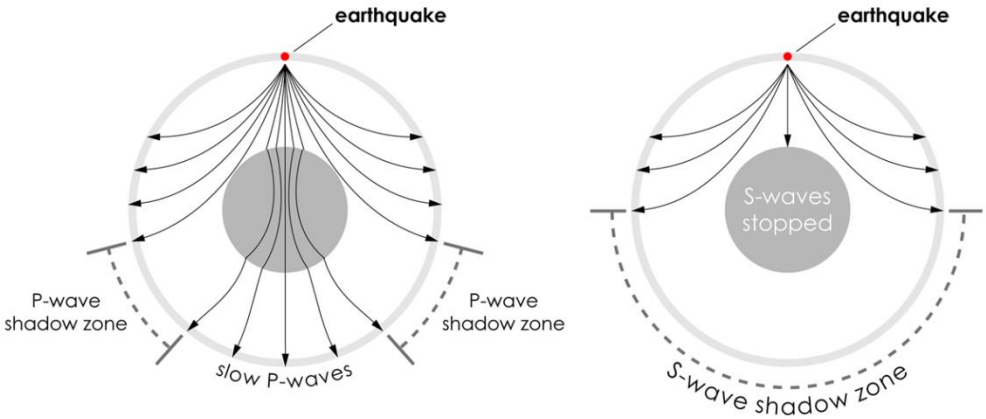
a) 1 and 2 only
b) 1 and 3 only
c) 2 and 3 only
d) 1, 2 and 3

Q.168) Solution (b)

P and S waves both forms shadow zones, however, shadow zone of S wave is larger than that of P wave. Hence, statement (2) is wrong.

P-waves move faster and are the first to arrive at the surface. These waves are of high frequency. They can travel in all mediums.

Statement (1) and (2) are correct. Surface Waves also called as long period waves. They are low frequency, long wavelength, and transverse vibration. These waves are responsible for most the destructive force of earthquake.



Q.169) Which of the following is/are the characteristic features of the convergent plate boundary?

1. Formation of zone of progressively deeper earthquakes.
2. Formation of chain of volcanic islands.
3. Shortening and thickening of the plates within the collision zone.

Choose the correct answer using the codes below:

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

Q.169) Solution (d)

Do you know?

Effects that are found at convergent plate boundary (oceanic) include: a zone of progressively deeper earthquakes, an oceanic trench, a chain of volcanic islands, and the destruction of oceanic lithosphere.

Effects found at a convergent boundary between continental plates include: intense folding and faulting, a broad folded mountain range, shallow earthquake activity, shortening and thickening of the plates within the collision zone.

THINK!

- Plate Boundaries: Convergent, Divergent, and Transform Boundaries

Q.170) Which of the following statements is/are not correct?

1. Ash and cinder cones are built where eruptions are of the explosive type with a predominance of pyroclastic material.
2. The ash and cinder cones seldom attain heights in excess of a few hundred metres.

Choose the appropriate answer:

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

Q.170) Solution (d)

Both the given statements are correct. However, since the question asks for 'not correct', answer is option (d).

On the basis of material ejected, the volcanoes may be classified into four major types: (i) basalt cones, (ii) basalt domes or shield, (iii) ash or cinder cones, and (iv) composite or strato cones.

(i) Basalt cones

Basalt cones are rare. They are likely to be low rather than high cones because of the fluidity of basaltic lava. The Rangitoo (New Zealand) and Skjaldbreit(Iceland) are the most suitable examples of basalt cone volcanoes.

(ii) Basalt domes or shield

The Hawaiian volcanoes are the excellent examples of basalt domes or shield volcanoes as are Mt. Etna and many of the volcanoes of Iceland. Basalt domes are formed where fluid basaltic lava is extruded. They often attain great heights (e.g., Mauna Loa has an altitude of 4,219 metres).

(iii) Ash or cinder cones

Ash and cinder cones are built where eruptions are of the explosive type with a predominance of pyroclastic material. Growth of an ash or cinder cone begins around a crater. The ash and cinder cones seldom attain heights in excess of a few hundred metres

(iv) Composite or strato cones

A strato volcano is characterized by alternating sheet of lava and pyroclastric material. Its structure attests to alternating periods of explosive and quiet eruptions. Lava intruded into fissures solidifies to form dykes (dikes), if injected between layers of fragmental ejecta it forms sills.

THINK!

- Different types of Volcanoes

Q.171) Which of the following pair of rocks do not lead to formation of caves in Karst Topography?

a) Shale and limestone
b) Limestone and sandstone
c) Shale and sandstone
d) None of the above

Q.171) Solution (c)

Limestone and chalk are sedimentary rocks of organic origin and in its pure state, limestone is made up of calcite or cacium carbonate.

Limestone is soluble in rain-water, which, with carbon-di-oxide from the air, forms a weak acid. A region with a large stretch of limestone therefore possesses a very distinct type of topography – Karst topography.

Karst regions have a bleak landscape. In areas where there are alternating beds of rocks (shales, sandstones, quartzites) with limestones or dolomites in between or in areas where limestones are dense, massive and occurring as thick beds, cave formation is prominent. Water percolates down either through the materials or through cracks and joints and moves horizontally along bedding planes. It is along these bedding planes that the limestone dissolves and long and narrow to wide gaps called caves result.

THINK!

- Characteristic features of a Karst Region

Q.172) What types of erosion cause the undercutting of a waterfall?

a) Abrasion and hydraulic action
b) Abrasion and attrition
c) Attrition and hydraulic action
d) Eskar and attrition

Q.172) Solution (a)

Abrasion and hydraulic action erode the soft rock so the hard rock is left as an overhang. Attrition breaks down the river's load.

Erosion involves the wearing away of rock and soil found along the river bed and banks. Erosion also involves the breaking down of the rock particles being carried downstream by the river.

The four main forms of river erosion

Hydraulic action - the force of the river against the banks can cause air to be trapped in cracks and crevices. The pressure weakens the banks and gradually wears it away.

Abrasion - rocks carried along by the river wear down the river bed and banks.

Attrition - rocks being carried by the river smash together and break into smaller, smoother and rounder particles.

Solution - soluble particles are dissolved into the river.

THINK!

- Difference between Abrasion and Attrition

Q.173) Consider the following statements about troposphere.

1. All kinds of weather changes take place only in this layer.
2. Ozone can also be found in tropospheric zone.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.173) Solution (c)

Troposphere

- It is the lowermost layer of the atmosphere.
- The height of this layer is about 18 km on the equator and 8 km on the poles.
- The thickness of the troposphere is greatest at the equator because heat us transported to great heights by strong convectional currents.
- **Troposphere contains dust particles and water vapor.**
- **This is the most important layer of the atmosphere because all kinds of weather changes take place only in this layer.**
- The air never remains static in this layer. Therefore, this layer is called 'changing sphere' or troposphere.
- The environmental temperature decreases with increasing height of the atmosphere. It decreases at the rate of 1 degree Celsius for every 165 m of height. This is called Normal Lapse Rate.
- The zone separating troposphere from the stratosphere is known as tropopause.
- The air temperature at the tropopause is about – 80 degrees Celsius over the equator and about – 45 degree Celsius over the poles. The temperature here is nearly constant, and hence, it is called tropopause.
- **Tropospheric ozone is a greenhouse gas** and initiates the chemical removal of methane and other hydrocarbons from the atmosphere. Thus, its concentration affects how long these compounds remain in the air.

Do you know?

- Most of tropospheric ozone formation occurs when nitrogen oxides (NOx), carbon monoxide (CO) and volatile organic compounds (VOCs), react in the atmosphere in the presence of sunlight. NOx, CO, and VOCs are called ozone precursors.

THINK!

- Stratosphere

Q.174) Consider the following statements.

1. The phenomenon in which temperature increases with increasing altitude temporarily and locally under certain conditions is known as inversion of temperature.
2. The inversion of temperature is more pronounced in subtropical high-pressure belt zone.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.174) Solution (c)

The phenomenon in which temperature increases with increasing altitude temporarily and **locally under certain conditions is known as inversion of temperature.**

Inversion is usually of short duration but quite common nonetheless.

Long winter night, clear sky, dry air and absence of winds leads to quick radiation of heat from the earth's surface, as well as from the lower layers of the atmosphere.

Subtropical high, one of several regions of semi-permanent high atmospheric pressure located over the oceans between 20° and 40° of latitude in both the Northern and Southern hemispheres of the Earth. These highs are associated with the subsidence of the Hadley cell and move several degrees of latitude toward the poles in the summer. In both hemispheres, subsidence is greater on the eastern sides of the highs. The subsiding air warms by compression and, coupled with cooling of the lowest layers overlying the cold ocean currents normally found off the west coasts of the continents, **forms a pronounced temperature inversion (warm air over cold), called the trade-wind inversion.** The inversion acts as a barrier to vertical convection and is largely responsible for the aridity and high

frequency of fog found along the west coasts of the subtropical continents, especially in summer.

Do you know?

Ideal Conditions for Temperature Inversion

- Long nights, so that the outgoing radiation is greater than the incoming radiation.
- Clear skies, which allow unobstructed escape of radiation.
- Calm and stable air, so that there is no vertical mixing at lower levels.

THINK!

- Economic Implications of Temperature Inversion

Q.175) Consider the following statements.

1. Transfer of heat by the movement of a mass or substance from one place to another, generally vertical, is called convection.
2. In tropical regions particularly in northern India during the summer season, local winds called 'Loo' is the outcome of convection process.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.175) Solution (a)

Convection (vertical transfer of heat)

- Transfer of heat by the movement of a mass or substance from one place to another, generally vertical, is called convection.
- The convection transfer of energy is confined only to the troposphere.

Advection (horizontal transfer of heat)

- The transfer of heat through horizontal movement of air (wind) is called advection.
- Winds carry the temperature of one place to another. The temperature of a place will rise if it lies in the path of winds coming from warmer regions. The temperature will fall if the place lies in the path of the winds blowing from cold regions.

- Horizontal movement of the air is relatively more important than the vertical movement. In the middle latitudes, most of diurnal (day and night) variations in daily weather are caused by advection alone.
- In tropical regions particularly in northern India during the summer season, local winds called 'Loo' is the outcome of advection process.

Do you know?

- Maximum insolation is received over the subtropical desert, where the cloudiness is the least. The equator receives comparatively less insolation than the tropics. Generally, at the same latitude, the insolation is more over the continent than over the oceans. In winter, the middle and higher latitudes receive less radiation than in summer.

THINK!

- Factors influencing Insolation

Q.176) 'Urban Thermal Plume' often in news is

a) Rising air in the lower altitudes of the Earth's atmosphere caused by urban areas being warmer than surrounding areas.
b) Subsiding air in the lower latitudes of earth's atmosphere caused by urban areas being cold at winter nights.
c) A column of air above urban heat island that causes temperature inversion.
d) None

Q.176) Solution (a)

An urban thermal plume describes rising air in the lower altitudes of the Earth's atmosphere caused by urban areas being warmer than surrounding areas. Over the past thirty years there has been increasing interest in what have been called urban heat island (UHI), but it is only since 2007 that thought has been given to the rising columns of warm air, or 'thermal plumes' that they produce.

Do you know?

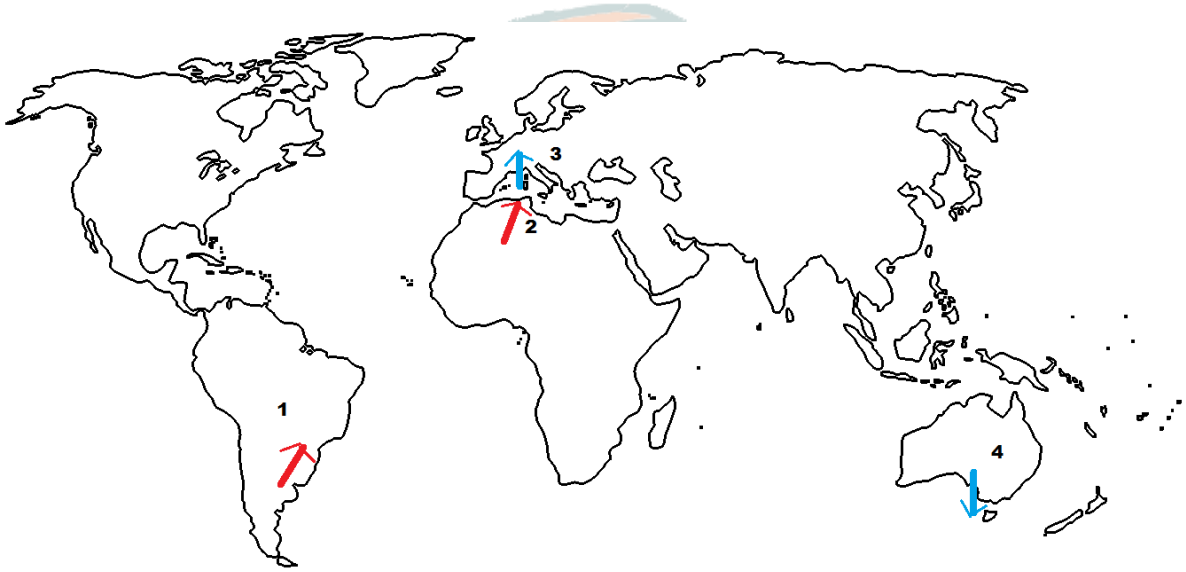
- Urban heat island (UHI) is a urban area which is significantly warmer than its surrounding rural areas.
- The temperature difference usually is larger at night than during the day, and is most apparent when winds are weak.

THINK!

- Consequences of UHI

Q.177) Consider the following pairs.

Local wind name	Type	Location on the map
1. Pampero	Cold	1
2. Sirocco	Warm	3
3. Foehn	Warm	2
4. Brickfielder	Warm	4



Which of the above pairs is/are correctly matched?

a) 1 only
b) 2 and 3 only
c) 1 and 4 only
d) All the above

Q.177) Solution (c)

Brickfielder	**Very hot north-east summer wind that blows dust and sand across Australia.**
Chincook	Warm, dry wind of the Rocky Mountains, USA. Welcomed by cattlemen because it can remove snow cover very quickly. Named after a local Indian tribe.
Foehn	**Warm, dry European wind that flows down the side of mountains.**

Haboob	The Arabic name for a violent wind which raises sandstorms, especially in North Africa.
Levanter	Pleasant, moist east wind that brings mild weather to the Mediterranean.
Mistral	Violent, dry, cold, north-west wind that blows along the coasts of Spain and France.
Sirocco	**Hot, dry South wind that blows across North Africa from the Sahara. Becomes very hot and sticky as it reaches the sea.**
Elephanta	Malabar coast; South easterly wind; Marks end of southwest monsoon
Nor'easter	North east USA; Strong storm winds from the northeast
Nor'wester	East coast of New Zealand; Warm dry winds
Santa Ana winds	Southern California Strong, extremely dry winds; Responsible for frequent wildfires
Shamal	Persian Gulf; Strong Northwesterly wind; Causes large sandstorms in Iraq
Calima	Sahara to Canary Islands (west African coast); Carries dust from the Sahara
Pampero	**The pampero is a burst of cold polar air from the west, southwest or south on the pampas in the south of Brazil, Argentina, Uruguay, Paraguay and Bolivia.**

Do you know?

- Loo is a Harmful Wind. In the plains of northern India and Pakistan, sometimes a very hot and dry wind blows from the west in the months of May and June, usually in the afternoons. It is known as Its temperature invariably ranges between 45°C and 50°C. It may cause sunstroke to people.

THINK!

- Land and sea breezes

Q.178) Consider the following statements.

1. Jet streams help in maintenance of latitudinal heat balance by mass exchange of air.
2. Jet streams can also cause a bumpy flight.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.178) Solution (c)

Influence of Jet Streams on Weather

- **Jet streams help in maintenance of latitudinal heat balance by mass exchange of air.**
- PFJ influence the mid-latitude weather disturbances. Usually there are severe storms when jet streams interfere with surface wind systems.
- Jet streams also influence the path of temperate cyclones. They have an influence on distribution of precipitation by the temperate cyclones.
- Sub-tropical jet stream and some temporary jet streams together influence Indian Monsoon patterns. (more about this while studying India Monsoons in Indian geography)
- Jet streams also exercise an influence on movement of air masses which may cause prolonged drought or flood conditions.

Jet Streams and Aviation

- Jet streams are used by aviators if they have to fly in the direction of the flow of the jet streams and avoid them when flying in opposite direction.
- **Jet streams can also cause a bumpy flight,** because the jet stream is sometimes unpredictable and can cause sudden movement, even when the weather looks calm and clear.
- During volcanic eruptions plumes of volcanic ash have a tendency to get sucked into the same jet stream that airplanes use for travel.

Do you know?

Temporary jet streams

- While the polar and subtropical jet streams are the best known and most studied, other jet streams can form when wind speeds are above 94 kph in the upper atmosphere at about 9 – 14.5 km above the surface.
- They are few. Important ones are **Somali Jet and The African Easterly jet.**

THINK!

- Geostrophic wind

Q.179) Consider the following statements.

1. Fogs formed by condensation of warm air when it moves horizontally over a cold surface, are known as radiational fog.
2. Haze is an atmospheric phenomenon where dust, smoke and other dry particles obscure the clarity of the sky.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.179) Solution (b)

When the temperature of an air mass containing a large quantity of water vapour falls all of a sudden, condensation takes place within itself on fine dust particles.

So, the fog is a cloud with its base at or very near to the ground. Because of the fog and mist, the visibility becomes poor to zero.

Radiation fog results from radiation, cooling of the ground and adjacent air. These fogs are not very thick. Usual in winters.

Fogs formed by condensation of warm air when it moves horizontally over a cold surface, are **known as advectional fog.** These fogs are thick and persistent. Occurs over warm and cold water mixing zones in oceans.

Haze is traditionally an atmospheric phenomenon where dust, smoke and other dry particles obscure the clarity of the sky (No condensation. Smog is similar to haze but there is condensation in smog).

Sources for haze particles include farming (ploughing in dry weather), traffic, industry, and wildfires.

Do you know?

- White frost, snow and some clouds (cirrus clouds) are produced when the temperature is lower than the freezing point.
- Dew, fog and clouds result even when the temperature is higher than the freezing point.

THINK!

- Types of clouds

Q.180) Ionosphere in atmosphere is immensely important for communications. Which of the following statements are correct regarding Ionosphere?

1. The gas particles in ionosphere are ionized by Cosmic rays and solar flares.
2. It is found in mesosphere and thermosphere.
3. The thickness of ionosphere changes during day and night time.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

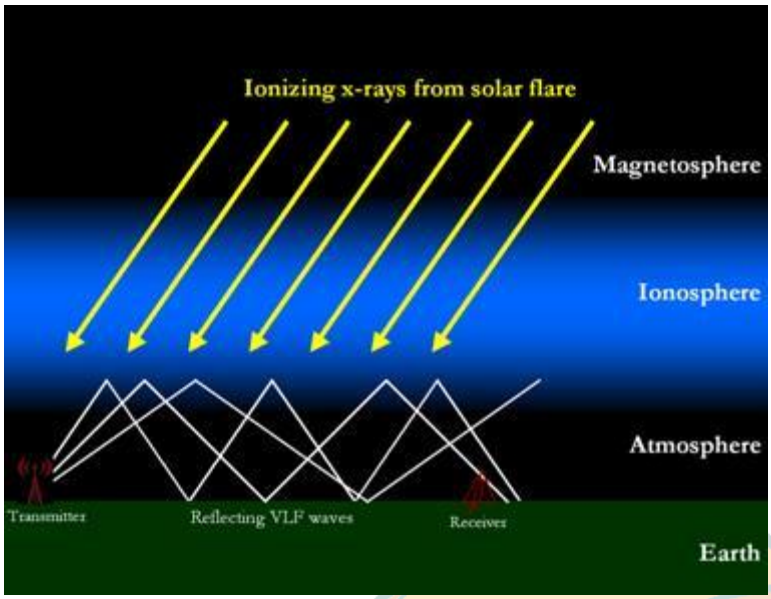
Q.180) Solution (d)

Ionosphere

The ionosphere is defined as the layer of the Earth's atmosphere that is ionized by solar and cosmic radiation. It lies 75-1000 km (46-621 miles) above the Earth. (The Earth's radius is 6370 km, so the thickness of the ionosphere is quite tiny compared with the size of Earth.) Because of the high energy from the Sun and from cosmic rays, the atoms in this area have been stripped of one or more of their electrons, or "ionized," and are therefore positively charged. The ionized electrons behave as free particles. The Sun's upper atmosphere, the corona, is very hot and produces a constant stream of plasma and UV and X-rays that flow out from the Sun and affect, or ionize, the Earth's ionosphere. Only half the Earth's ionosphere is being ionized by the Sun at any time.

During the night, without interference from the Sun, cosmic rays ionize the ionosphere, though not nearly as strongly as the Sun. These high energy rays originate from sources throughout our own galaxy and the universe -- rotating neutron stars, supernovae, radio galaxies, quasars and black holes. Thus the ionosphere is much less charged at nighttime, which is why a lot of ionospheric effects are easier to spot at night – it takes a smaller change to notice them.

The ionosphere has major importance to us because, among other functions, it influences radio propagation to distant places on the Earth, and between satellites and Earth. For the very low frequency (VLF) waves that the space weather monitors track, the ionosphere and the ground produce a "waveguide" through which radio signals can bounce and make their way around the curved Earth:



The Earth's ionosphere and ground form a "waveguide" through which VLF radio signals can propagate or "bounce" around the Earth.The Earth's ionosphere and ground form a "waveguide" through which VLF radio signals can propagate or "bounce" around the Earth.

Parts of Ionosphere

The ionosphere is composed of three main parts, named for obscure historical reasons: the D, E, and F regions. The electron density is highest in the upper, or F region. The F region exists during both daytime and nighttime. During the day it is ionized by solar radiation, during the night by cosmic rays. The D region disappears during the night compared to the daytime, and the E region becomes weakened.

Q.181) Which of the following statements correctly define an 'Urban Heat Island'?

a) It is the name given to urbanization of an Island leading to deforestation.
b) It refers to an urban area whose temperature is 4 – 5 ^{o}C higher than surrounding area.
c) It is an area in a metropolitan city where thermal power plants are established.
d) It is a hypothetical model which predicts the formation of human colonies in Mars.

Q.181) Solution (b)

Urban Heat Island

An urban heat island (UHI) is an urban area or metropolitan area that is significantly warmer than its surrounding rural areas due to human activities. The temperature difference usually

is larger at night than during the day, and is most apparent when winds are weak. UHI is most noticeable during the summer and winter. The main cause of the urban heat island effect is from the modification of land surfaces. Waste heat generated by energy usage is a secondary contributor. As a population center grows, it tends to expand its area and increase its average temperature.

Monthly rainfall is greater downwind of cities, partially due to the UHI. Increases in heat within urban centers increases the length of growing seasons, and decreases the occurrence of weak tornadoes. The UHI decreases air quality by increasing the production of pollutants such as ozone, and decreases water quality as warmer waters flow into area streams and put stress on their ecosystems.

Q.182) Which of following are correct similarities between Tornadoes and Cyclones?

1. They both can originate only on sea surface.
2. They rotate counter clockwise in Northern hemisphere and clockwise in Southern Hemisphere.
3. They both originate due to formation low pressure.

Select the code from following:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.182) Solution (b)

Comparison chart

Cyclone versus Tornado comparison chart

	Cyclone	Tornado
About	A cyclone is an atmospheric system of rapidly circulating air massed about a low-pressure center, usually accompanied by stormy often destructive weather. Storms that begin in the Southern Pacific are called cyclones.	A tornado is a rotating column of air ranging in width from a few yards to more than a mile and whirling at destructively high speeds, usually accompanied by a funnel-shaped downward extension of a cumulonimbus cloud. Winds 40-300+

Cyclone versus Tornado comparison chart

	Cyclone	Tornado
		mph.
Rotation	Clockwise in the southern hemisphere and counterclockwise in the northern hemisphere.	Clockwise in the southern hemisphere and counterclockwise in the northern hemisphere
Intensity	Commonly quite strong. The scale for measuring cyclones is called the Beaufort Scale and Saffir-Simpson scale and may vary in different countries.Winds may approach 300kph and cause widespead damage.	The scale used for rating the strength of tornadoes is called the Fujita (F), Enhanced Fujita (EF), and TORRO (T) Scale.
Location	Southern Pacific Ocean, Indian Ocean. Cyclones in the northwest Pacific that reach (exceed) 74 mph are "typhoons".	Tornados have been spotted in all continents except Antarctica.
Most affected areas	Pacific Ocean	In areas where a convergence of cold and warm fronts is common. i.e. US Midwest.
Frequency	10-14 per year	The United States records about 1200 tornadoes per year, whereas the Netherlands records the highest number of tornadoes per area compared to other countries. Tornadoes occur commonly in spring and the fall season and are less common in winters
Occurrence	warm areas	Places where cold and warm fronts converge. Can be just almost anywhere.
Forms of precipitation	rain	Rain, sleet, and hail

Q.183) Which of the following are correct differences between Hail and sleet?

1. Hail formation occurs in tropical areas while Sleet formation occurs in temperate areas.
2. Hail has layered concentric structure while sleet has amorphous structure.
3. Hail and sleet are devastating for agriculture and human life.

Select the code from below:

a) 1 and 2
b) 2 and 3
c) 1 and 3
d) All of the above

Q.183) Solution (a)

Sleet: it is a type of precipitation in the form of mixture of rain and snow. It is a frozen rain which forms when rain while falling to the earth passes through a layer of very cold air mass. Sometimes sleet may grow into hailstorms when violent vertical currents are produced in the atmosphere. It is usually formed during Temperate cyclones.

Sleet is good for agriculture, especially citrus fruits.

Hail: It falls in the form of small ice pellets. Hail is the most destructive form of precipitation produced in violent thunderstorms or cumulinimbus clouds. The hail consists of concentric layers of ice alternating with layers of snow. Its structure resembles to that of onion.

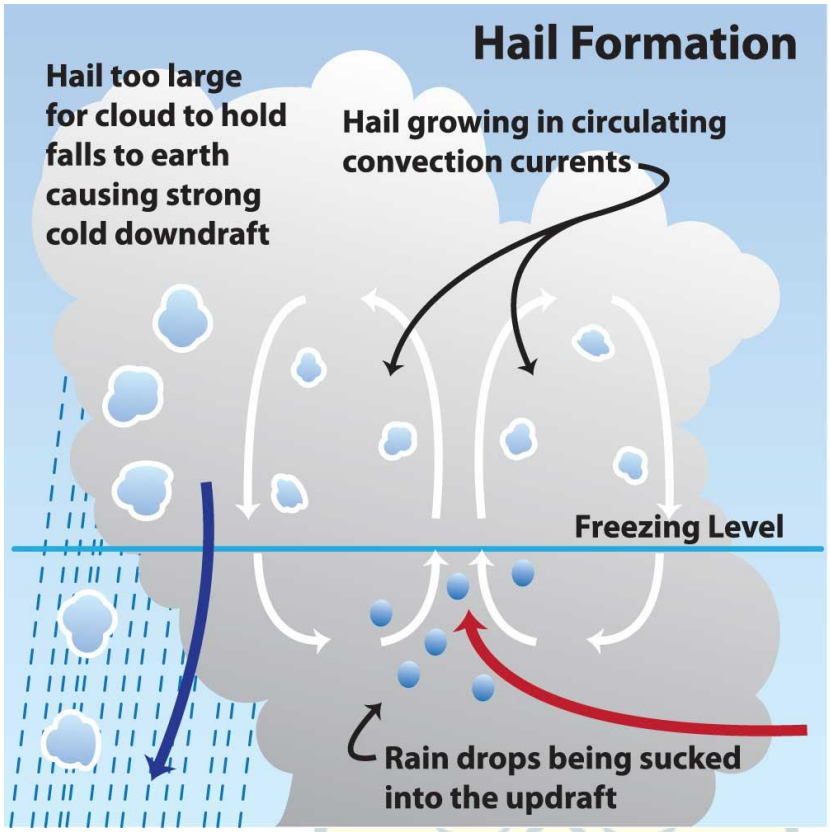


Fig explaining Hail formation

Q.184) Had Himalayas not been there, what would have been the climatic condition of India?

1. The temperature of India would have been colder.
2. India would have been a desert.
3. India would have received much higher rainfall.
4. Monsoon winds would have been missing

Select the code from following:

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

Q.184) Solution (a)

Himalayas protect India from cold winds coming from the North (Russia and China). If Himalayas were not there, India would have much lower average temperature.

Himalayas also creates a barrier in the path of monsoon winds. Majority of rain caused during monsoon season is orographic rain caused due to the presence of Himalayas. Had Himalayas not been there, these winds would have passed without causing any rain leaving India parched.

Think

- Role of Tibet Plateau in Monsoon

Q.185) Auroras are the natural lights formed in the sky. Which of the following statements regarding Auroras are correct?

1. The effect is caused by the interaction of charged particles from the sun with atoms in the upper atmosphere.
2. The effect is seen only in the Northern hemisphere.

Select the code from following:

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

Q.185) Solution (a)

Aurora

An aurora, sometimes referred to as polar lights, northern lights (**aurora borealis**) or southern lights (**aurora australis**), is a natural light display in the Earth's sky, predominantly seen in the high-latitude regions (around the Arctic and Antarctic).

Auroras are produced when the magnetosphere is sufficiently disturbed by the solar wind that the trajectories of charged particles in both solar wind and magnetospheric plasma, mainly in the form of electrons and protons, precipitate them into the upper atmosphere (thermosphere/exosphere) due to Earth's magnetic field, where their energy is lost.

The resulting ionization and excitation of atmospheric constituents emits light of varying color and complexity. The form of the aurora, occurring within bands around both polar regions, is also dependent on the amount of acceleration imparted to the precipitating particles. Precipitating protons generally produce optical emissions as incident hydrogen atoms after gaining electrons from the atmosphere. Proton auroras are usually observed at lower latitudes

Think

- Solar Flare

Q.186) Consider the following:

Assertion (A): As an air parcel rises its temperature increases.

Reason (R): A rising air parcel absorbs heat from the surrounding and expands.

Select the code from following:

a) A and R are correct and R is correct reason of A
b) A and R are correct but R is not the Correct explanation of A.
c) A is correct but R is incorrect
d) Both A and R are incorrect

Q.186) Solution (d)

Adiabatic Process

As a parcel ascends its pressure decreases with height. Due to decrease of pressure, there is a drop in temperature of the air parcel. As there is no external heat exchange, the process is **called Adiabatic process**. As the temperature is reduced, it is called **adiabatic cooling.** The point to be remembered is that, it is different from environmental lapse rate. In case of environmental lapse rate, the temperature decrease with increase in altitude but the air is not moving from its place. In case of Adiabatic cooling, the air parcel itself is moving and there is a drop of temperature in air parcel. **The rate of change of temperature is called Adiabatic rate of cooling.**

Similarly as the parcel descends, the pressure in parcel increases hence there is an increase in temperature. This is called Adiabatic heating.

Condition for instability: When the Adiabatic lapse rate of cooling is lower than the local lapse rate, there is a condition for unstable air.

Think

Difference between Adiabatic Lapse rate and Normal lapse rate

Q.187) Arrange the following planetary winds in order of their occurrence from South pole to North:

1. South Westerlies
2. South East Trade Winds
3. North East trade Winds
4. North Westerlies

Choose the correct codes from the options given below

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

Q.187) Solution (c)

Observe in fig below

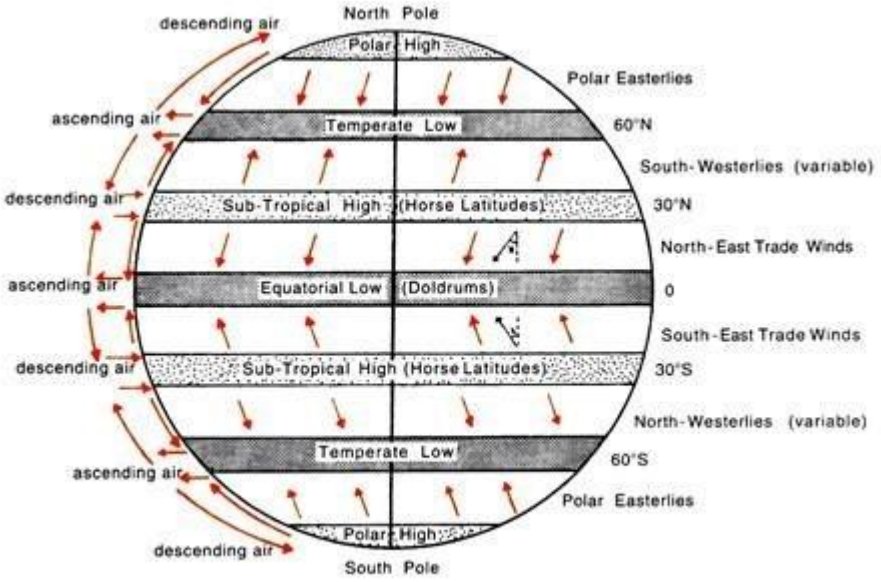


Fig. 115 The distribution of world pressure belts and planetary winds

Q.188) Consider the following statements:

1. Characteristics of Halo is associated with Cumulonimbus clouds
2. Severe thunderstorms and hail storms are associated with Cirrostratus Clouds.
3. Altocumulus clouds appear like waves in the sky and indicate fine weather.

Choose correct codes from the options given below:

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

Q.188) Solution (c)

Explanation:

- Characteristics of Halo is associated with Cirrostratus Clouds
- Severe thunderstorms and hail storms are associated with Cumulonimbus clouds.
- Altocumulus clouds appear like waves in the sky and indicate fine weather.

Q.189) Match the following:

Tropical Cyclones	Place of Occurrence
1. Typhoons	a) North Western Australia
2. Hurricanes	b) Guinea lands of West Africa
3. Tornadoes	c) China Sea
4. Willy-Willies	d) West Indian Islands in the Caribbean

Choose the correct codes from the below given options:

a. 1-c,2-d,3-b,4-a
b. 1-a,2-b,3-c,4-d
c. 1-c,2-b,3-d,4-a
d. 1-a,2-c,3-b,4-d

Q.189) Solution (a)

Typhoons : China Sea

Hurricanes: West Indian Islands in the Caribbean

Tornadoes: Guinea lands of West Africa

Willy-Willies: North Western Australia

Q.190) From the below given different ocean currents, identify only the warm ocean currents:

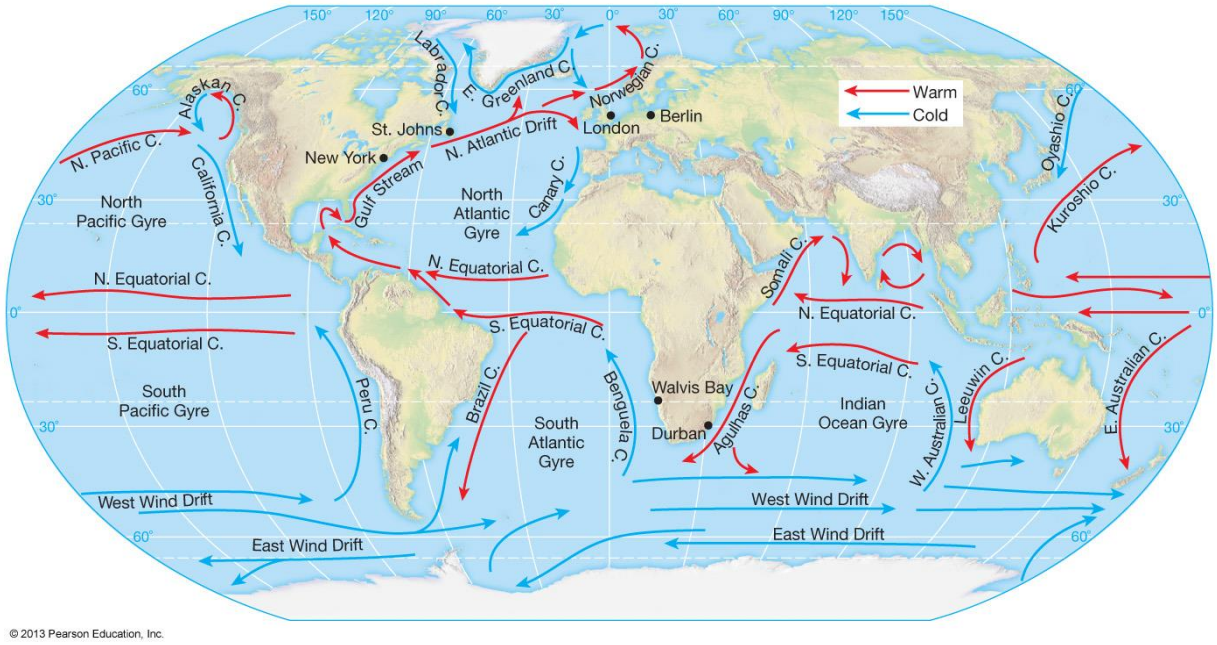
1. Canary current
2. California current
3. Norwegian current
4. North Equatorial current
5. East Australian current

Choose the correct answer:

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

Q.190) Solution (c)

In general, currents in the western part of every continent are cold and currents coming from the polar region are generally cold.
Those currents which flow from equatorial regions towards poles which have a higher surface temperature and are called warm current. They are usually observed on the east coast of the continents in the lower and middle latitudes of both hemispheres.
In the northern hemisphere, they are also found on the west coast of the continents in the higher latitudes (E.g. Alaska and Norwegian Currents). Refer below figure



Q.191) Which of the following is/are true about Convectional rainfall?

1. It occurs in the areas of intense heat and abundant moisture.
2. Solar radiation is the main source of heat to produce convectional currents in air.

Choose correct code from the options given below:

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

Q.191) Solution (c)

On the basis of mode of occurrence, the rainfall can be classified into three categories:

i) Convectional rainfall: it occurs in the areas of intense heat and abundant moisture. Solar radiation is the main source of heat to produce convectional currents in air. The belt of doldrums and equatorial region generally records this type of rainfall. This type of rainfall is not much effective for crops as most of the water is drained off in the form of surface drainage.

ii) Orographic rainfall: This type of rainfall occurs from vertical uplift of an air stream by the topographic barriers. This type of rainfall occurs on the windward side of the mountain ranges. On windward side also the amount of rainfall starts decreasing after certain height.

iii) Cyclonic or frontal rainfall: cyclonic rainfall occurs when deep and extensive air masses converge and move upward which lead to their adiabatic cooling. We will discuss about cyclones in further details.

Q.192) The prerequisite condition for the formation of artesian well are -

4. Layer of permeable rock lying between two impermeable rock layers so that water does not get escape.
5. The permeable rock should be exposed at the ground surface, so that rock can soak rainwater.
6. Structure of rock strata must be synclinal.

Select the correct code:

e) 1 and 2 only
f) 2 and 3 only
g) 1 and 3 only
h) 1, 2 and 3

Q.192) Solution (d)

The geologic conditions necessary for an artesian well are an inclined aquifer sandwiched between impervious rock layers above and below that trap water in it. Water enters the exposed edge of the aquifer at a high elevation and percolates downward through interconnected pore spaces.

Q.193) Vosges mountain, Great Rift Valley, Sierra Nevada, Rhine valley, are examples of –

a) Volcanic mountains
b) Block mountains
c) Fold mountains
d) None of the above

Q.193) Solution (b)

Block Mountains are created when large areas are broken and displaced vertically. The uplifted blocks are termed as horsts and the lowered blocks are called graben.

Sierra Nevada, Rhine valley and Vosges (France, Europe)

Great Rift Valley (Africa) – mount Kilimanjaro

In India Narmada and Tapi valley also are examples of the same. Narmada flows between Vindhya and Satpura ranges (i.e. horsts) while Tapi flows between Satpura and Gwaligarh hills.

Q.194) Consider the following statements.

1. A mid-oceanic ridge is composed of two chains of mountains separated by a large depression.
2. Mid-oceanic ridges are formed at convergent boundary of two plates.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.194) Solution (a)

A mid-oceanic ridge is composed of two chains of mountains separated by a large depression. The mountain ranges can have peaks as high as 2,500 m and some even reach above the ocean's surface.

Running for a total length of 75,000 km, these ridges form the largest mountain systems on earth. These ridges are either broad, like a plateau, gently sloping or in the form of steep-sided narrow mountains.

These oceanic ridge systems are of tectonic origin formed **at divergent plate boundaries** and provide evidence in support of the theory of Plate Tectonics.

Do you know?

- **A land bridge**, in biogeography, is an isthmus or wider land connection between otherwise separate areas, over which animals and plants are able to cross and colonise new lands. A land bridge can be created by marine regression, in which sea levels fall, exposing shallow, previously submerged sections of continental shelf; or

when new land is created by plate tectonics; or occasionally when the sea floor rises due to post-glacial rebound after an ice age.

THINK!

- Straits

Q.195) 'Insular shelf' means

a) A continental shelf allocated to landlocked countries.
b) The shelf surrounding an island.
c) The shelf formed out of deposition.
d) The shelf formed by fall in sea level.

Q.195) Solution (b)

The continental shelf is an underwater landmass which extends from a continent, resulting in an area of relatively shallow water known as a shelf sea. Much of the shelves were exposed during glacial periods and interglacial periods.

The shelf surrounding an island is known as an insular shelf.

Do you know?

Economic significance of continental shelf

- Marine food comes almost entirely from continental shelves;
- They provide the richest fishing grounds;
- They are potential sites for polymetallic nodules, petroleum.

THINK!

- International Seabed Authority

Q.196) With regard to Ocean currents, consider the following statements.

1. The general pattern of circulation in the southern hemisphere of the Indian Ocean is anti-clockwise as that of the other oceans.
2. The cold waters of the Peru Current are partially responsible for making the coast of the northern Chile and western Peru with very scanty rainfall.

Which of the above statements is/are correct?

a) 1 only

b) 2 only
c) Both 1 and 2
d) None

Q.196) Solution (c)

In the South Pacific Ocean, the South Equatorial Current flows towards the west and turns southward as the East Australian Current.

From Tasmania, it flows as the cold South Pacific Current from west to east and crosses the Pacific Ocean along with the West Wind Drift.

On reaching the south-western coast of South America, it turns northward and flows as the cold Peru Current or Humbolt Current.

The cold waters of the Peru Current are partially responsible for making the coast of the northern Chile and western Peru with very scanty rainfall.

Peru Current eventually joins with the South Equatorial Current and completes the circuit.

The pattern of circulation of ocean currents in the Indian Ocean differs from the general pattern of circulation in the Atlantic and the Pacific Oceans.

This is because the Indian Ocean is blocked by the continental masses in the north.

The general pattern of circulation in the southern hemisphere of the Indian Ocean is anti-clockwise as that of the other oceans.

In the northern hemisphere, there is a clear reversal of currents in the winter and summer seasons, which are completely under the influence of the seasonal changes of monsoon winds.

Do you know?

- **Surface currents constitute** about 10 per cent of all the water in the ocean, these waters are the upper 400 m of the ocean;
- **Deep water currents** or **Thermohaline Currents** make up the other 90per cent of the ocean water. These waters move around the ocean basins due to variations in the density and gravity. Deep waters sink into the deep ocean basins at high latitudes, where the temperatures are cold enough to cause the density to increase.

THINK!

- Economic importance of Ocean currents.

Q.197) A distinct dry season is absent, great uniformity of temperature throughout the year with no winters. Cloudiness and heavy precipitation takes place.

The above lines define which of the following type of climate.

a) Savanna climate
b) Monsoon climate
c) Equatorial climate
d) Desert climate

Q.197) Solution (c)

The most outstanding feature of the equatorial climate is its **great uniformity of temperature throughout the year with no winters.**

The average monthly temperatures are about 26 – 28 degrees Celsius, with small annual range of temperature ~ 3*C & fairly greater diurnal range of temperature ~ 12* – 15*C.

Cloudiness and heavy precipitation ~ 150 – 250 cm of rainfall or more in a year, helps to moderate the temperature, so that even at the equator, climate is not unbearable.

There is no month without the rain & **a distinct dry season like that of savanna or tropical monsoon climate is absent.**

Most of the rainfall is convectional, with thunderstorm & lightening often accompanying the torrential showers.

The convection uplift is related to the position of the ITCZ and rainfall totals double when the sun is directly overhead at the spring and autumn equinox, with the least rain falls at June & December solstices.

Do you know?

- Certain high value industrial crops for which equatorial climate suits best are grown now a day such as rubber, cocoa, oil palms, coconuts, sugarcane, coffee, tea etc.

THINK!

- Vegetation in Equatorial Regions.

Q.198) Consider the following statements about British type of climate.

1. The natural vegetation of this climatic type is deciduous forests that shed their leaves in the cold season, to protect themselves against winter snow & frost.

2. In northern America British type of climate is confined mainly to coastlands of British Columbia.

Which of the above statements is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) None

Q.198) Solution (c)

British type Climate – Cool Temperate Western Margin

Cool temperate western margins are under the permanent influence of the westerlies all-round the year approx. at 50^0 N- S

They are also regions of much cyclonic activity, typical of Britain, & are thus said to experience the British type of climate.

From Britain, the climatic belt stretches far inland into lowlands of N-W Europe, including such regions as northern & western France, Belgium, Netherland, Denmark, Western Norway & N-W Iberia.

There is so much oceanic influence on both the temperature & precipitation that the climate is also referred as North West European Maritime Climate.

In northern America, the high Rockies prevent the on-shore westerlies from penetrating far inland & British type of climate is confined mainly to coastlands of British Columbia (West coast of Canada)

In the southern hemisphere, this type of climate is experienced in southern Chile, Tasmania (southern Australia) & Most parts of New Zealand, particularly in South Island, surrounded by large expanses of water.

The natural vegetation of this climatic type is deciduous forests that shed their leaves in the cold season, to protect themselves against winter snow & frost.

Some of the common species which provide hardwoods from these deciduous forests are Oak, Elms, Birch, Neech, Poplar & Hornbeam; along with certain other species such as chestnut, maple & lime.

Do you know?

- British type of climate is even more equable in S – Hemisphere, due to lack of continental mass (Tasmania, New Zealand & Southern Chile) & more presence of oceanic water, which means extreme of temperature are not likely at all, hence annual temperature range is further reduced here.

THINK!

- Market Gardening

Q.199) Lumbering & its associated timber, paper & pulp industries are the most important economic undertaking. Agriculture is less important in view of severity of winters & its long duration. Fishing is the most outstanding economic activity. This climatic region found in northern hemisphere only. The above lines describe which of the following type of climatic regions?

a) Siberian type of climate
b) China type climate
c) Polar climate
d) Laurentian Climate

Q.199) Solution (d)

Laurentian Climate

The Laurentian type of climate has cold, dry winters & warm, wet simmers.

Winter temperature may be well below freezing point & snow falls to quite a depth.

Summers are warm as the tropics approx. 25^0 C & if were not for the cooling effects of the off shore cold currents from arctic, the summers may even be hotter.

Though, rain falls throughout the year (except interiors of china), there is distinct summer maximum from the easterly winds from the oceans

The annual precipitation is approx. 75 -150 cm with 2/3rd of it falling in summer.

Lumbering & its associated timber, paper & pulp industries are the most important economic undertaking.

Agriculture is less important in view of severity of winters & its long duration

Fortunately, the maritime influence & heavy rainfall enables some of the hardy crops to be raised for local needs such as potatoes, oats, rye & barley.

Fishing is the most outstanding economic activity of Laurentian climatic region especially in Newfoundland & Japan mainly due to their geographical importance.

Gently sloping continental shelves around the islands of Newfoundland & Japan are rich in planktons, mainly due to meeting of warm & cold ocean currents.

Fish feeds on minute marine organisms – planktons, which are present in abundance only in shallow waters adjacent to land masses, where sunlight can penetrate through

Japanese also make use of fish wastes, fish meals & seaweeds as fertilizers & is among one of the few countries involved in seaweed cultivation on submerged coastal farms.

Another aspect of Japanese fishing is pearl culture obtained from the shale fish called pearl oyster found deep inside the sea.

Do you know?

- This climate type has been named after the coniferous forest cover of the same name found in the region. the region extends from 50-55 degrees to 60-70 degrees latitudes in northern hemisphere.
- It stretches as an almost continuous belt across southern Canada, northern Europe and Russia. The Tundra region lies on the north and the Temperate Grasslands on the south.

THINK!

- Tundra climate

Q.200) Consider the following statements about Mediterranean Climate:

1. This is a dry-winter, wet-summer climate.
2. This climate owes its origin to the seasonal shifting of wind and pressure belts due to northward and southward migration of the sun.
3. Fires occur frequently in Mediterranean climate zones.

Which of the above statements is/are correct?

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

Q.200) Solution (c)

Mediterranean Climate:

This type of climate has developed between 30^0 – 40^0 latitudes in both the hemispheres.

- This is a **wet-winter, dry-summer climate.** Extremely dry summers are caused by the sinking air of the subtropical highs and may last for up to five months.
- This climatic region includes European, Asiatic and African lands bordering the Mediterranean Sea.
- This climate owes its origin to **the seasonal shifting of wind and pressure belts** due to northward and southward migration of the sun.
- In winter they are under the influence of westerlies which are moisture laden thus brings rainfall in winters whereas they come under the influence of subtropical high-pressure belt in summers thus associated with anti-cyclonic conditions.
- Plants have adapted to the extreme difference in rainfall and temperature between winter and summer seasons. Sclerophyll plants range in formations from forests, to woodland, and scrub. Eucalyptus forests cover most of the chaparral biome in Australia.
- **Fires occur frequently in Mediterranean climate zones.**

Do you know?

- The area is important for fruit cultivation, cereal growing, wine-making and agricultural industries as well as engineering and mining.

THINK!

- Steppe climate

Q.201) which of the following statements is/ are correct regarding tsunami waves?

1. The speed of waves is higher in open sea as compared to the continental shelf.
2. The height of waves is higher in open seas as compared to the continental shelf.

Select the code from following:

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

Q.201) Solution (a)

The deeper the water; the faster the **tsunami**.

In the deep ocean, **tsunamis** can move as fast as a jet plane, over 500 mph, and can cross entire oceans in less than a day. As the **waves** enter shallow water near land, they slow to the **speed** of a car, approximately 20 or 30 mph.

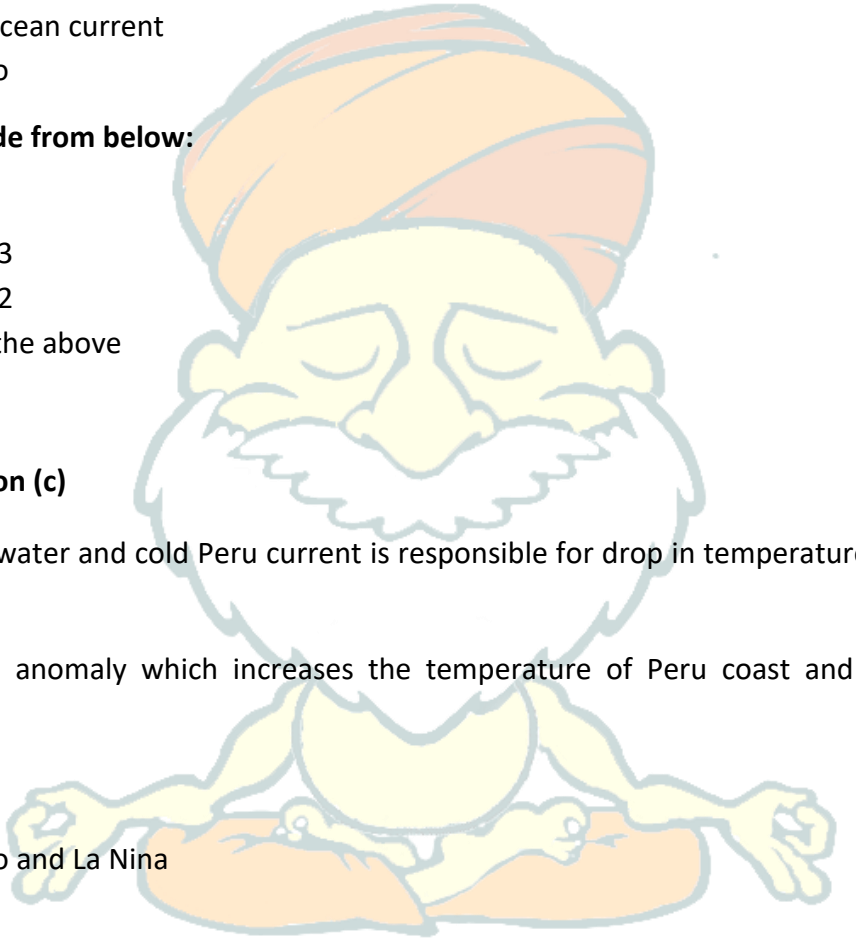
As the Tsunami approaches the coast, wave shoaling effect takes place which increases amplitude (height) of the wave enormously.

Q.202) Which of the following are responsible for drop in temperature at Peru cost?

1. Upwelling of water
2. Cold ocean current
3. El Nino

Select the code from below:

a) 1 only
b) 2 and 3
c) 1 and 2
d) All of the above



Q.202) solution (c)

Upwelling of water and cold Peru current is responsible for drop in temperature at the Peru coast.

El Nino is an anomaly which increases the temperature of Peru coast and creates low pressure.

Think

- El Nino and La Nina

Q.203) A narrow stretch of water which connects two seas is called

a. Bay
b. Strait
c. Peninsula
d. Isthmus

Q.203) Solution (b)

Strait of Gibralter

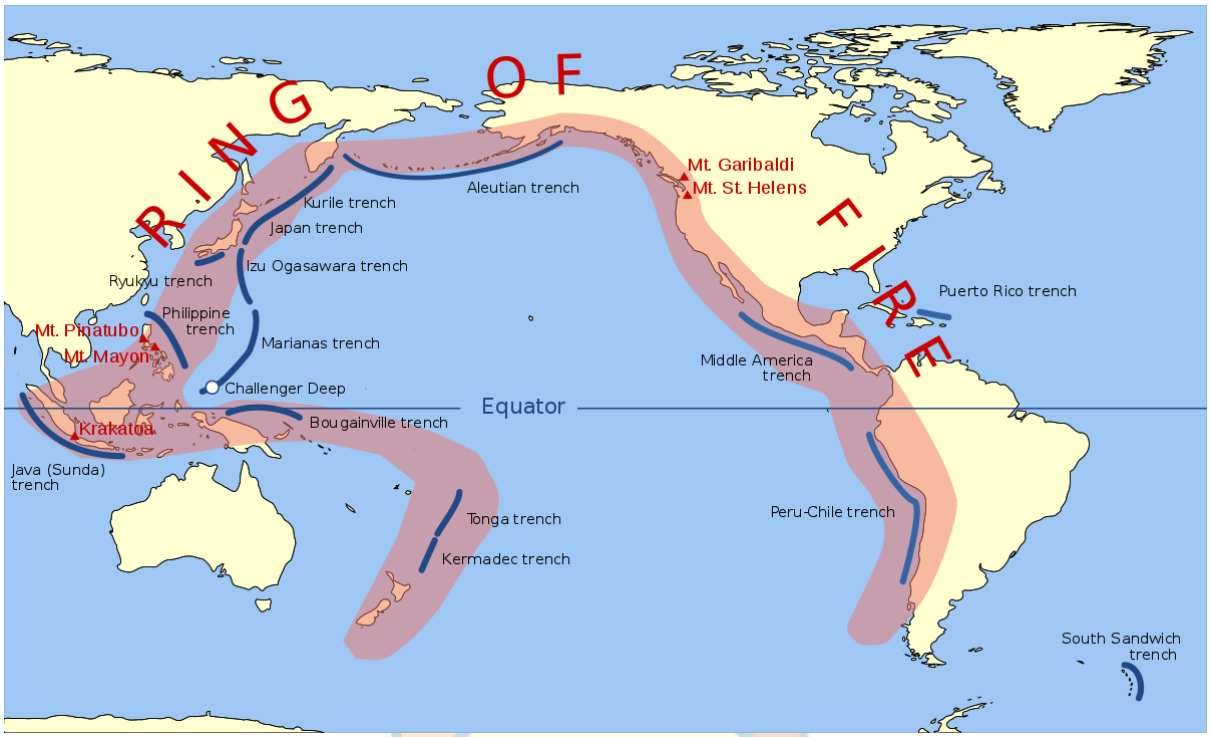
A strait is a naturally formed, narrow, typically navigable waterway that connects two larger bodies of water. Most commonly it is a channel of water that lies between two land masses.

Q.204) Main cause of formation of Pacific Ring of Fire is

a) Meteor shower
b) Divergence of Pacific plate
c) Thermal power plants
d) Subduction of Pacific plate

Q.204) Solution (d)

Ring of Fire



The Ring of Fire is a major area in the basin of the Pacific Ocean where many earthquakes and volcanic eruptions occur. In a 40,000 km (25,000 mi) horseshoe shape, it is associated with a nearly continuous series of oceanic trenches, volcanic arcs, and volcanic belts and plate movements. It has 452 volcanoes (more than 75% of the world's active and dormant volcanoes). The Ring of Fire is sometimes called the circum-Pacific belt.

The Ring of Fire is a direct result of plate tectonics: the movement and collisions of lithospheric plates. The eastern section of the ring is the result of the Nazca Plate and the Cocos Plate being subducted beneath the westward-moving South American Plate. The Cocos Plate is being subducted beneath the Caribbean Plate, in Central America. A portion of the Pacific Plate and the small Juan de Fuca Plate are being subducted beneath the North American Plate. Along the northern portion, the northwestward-moving Pacific plate is being subducted beneath the Aleutian Islands arc. Farther west, the Pacific plate is being subducted along the Kamchatka Peninsula arcs on south past Japan. The southern portion is more complex, with a number of smaller tectonic plates in collision with the Pacific plate from the Mariana Islands, the Philippines, Bougainville, Tonga, and New Zealand; this portion excludes Australia, since it lies in the center of its tectonic plate. Indonesia lies between the Ring of Fire along the northeastern islands adjacent to and including New Guinea and the Alpide belt along the south and west from Sumatra, Java, Bali, Flores, and Timor.

Q.205) Which of the following statements are correct regarding Atoll?

a) It is a ring shaped coral island.
b) It is the name given to cluster of mangrove trees.
c) It is the name given to a sandbar which connects mainland to an island.
d) It is the name given to an island formed by mid oceanic ridge.

Q.205) Solution (a)

Atoll:

It is a ring shaped island reef that encircles (sometimes completely surrounding) a central lagoon in which detrital material collects. In some oceanic Atolls calcareous Algae forms the bulk of the reef.

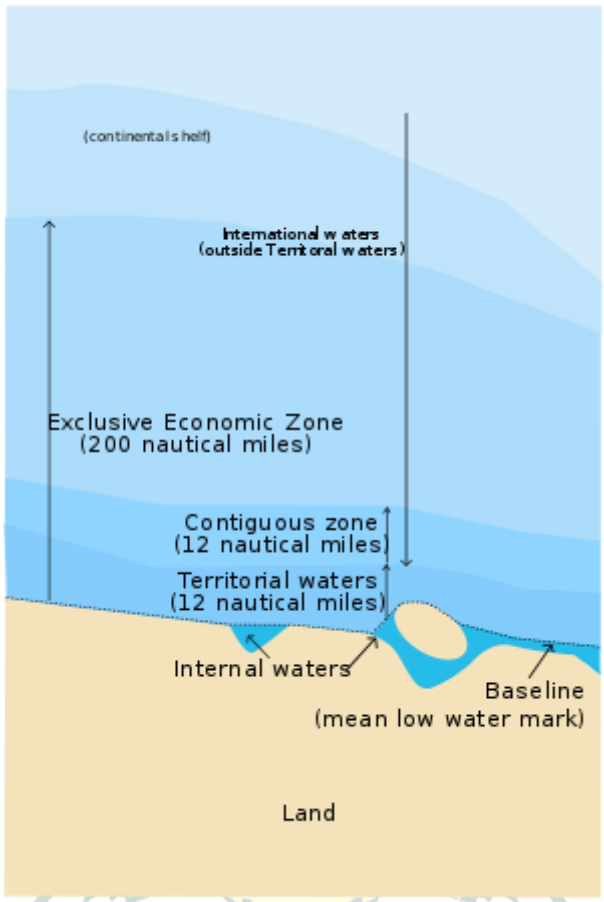
Note: The Lakshadweep and Maldives islands in the Indian ocean are composed of Atolls

Q.206) According to UNCLOS, the territorial waters of a country are extended to what distance?

a) 12 km
b) 24 km
c) 200 km
d) None of the above

Q.206) Solution (d)

The territorial waters are upto 12 Nautical Miles. Note, the distance is not in kilometres.



Q.207) Which of the following countries have a coastline in Pacific as well as Atlantic Ocean?

1. USA
2. Mexico
3. Brazil
4. Columbia

Select the code from below:

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

Q.207) Solution (d)

Factual Question

Note: Columbia is the only South American Country with coastline in Pacific and Atlantic.

Q.208) A flat, largely featureless part of the ocean floor between the mid-ocean ridge and the continental rise is called –

a) Abyssal Plain
b) Seamount
c) Oceanic (Volcanic) Island
d) Gyre

Q.208) Solution (a)

Abyssal Plain - A flat, largely featureless part of the ocean floor between the mid-ocean ridge and the continental rise.

Seamount - A submarine mountain (usually volcanic) that rises 1 km or more above the sea-floor (Example: Emperor Seamount chain). Most form above a mantle plume.

Oceanic (Volcanic) Island - A seamount that rises above sea level (Example: Hawaiian Islands). Most form above a mantle plume.

Atoll - A circular coral reef that forms a ring of islands around a central lagoon. Form in shallow water on the flanks of a submerging oceanic island.

Deep Ocean Trenches - Most occur along subduction zones. Previously discussed under 'Plate Tectonics'.

Q.209) Consider the below statements with regard to Neap Tide:

1. It occurs when the Earth, Sun and Moon are aligned.
2. Results in greatest variation between high and low tides.
3. Neap tides occur during the first and third quarter moon, when the moon appears "half full."

Which of the statements given above is/are correct?

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

Q.209) Solution (b)

Tides are long-period waves that roll around the planet as the ocean is "pulled" back and forth by the gravitational pull of the moon and the sun as these bodies interact with the Earth in their monthly and yearly orbits.

During full or new moons—which occur when the Earth, sun, and moon are nearly in alignment—average tidal ranges are slightly larger. This occurs twice each month. The moon appears new (dark) when it is directly between the Earth and the sun. The moon appears full when the Earth is between the moon and the sun. In both cases, the gravitational pull of the sun is "added" to the gravitational pull of the moon on Earth, causing the oceans to bulge a bit more than usual. This means that high tides are a little higher and low tides are a little lower than average.

These are called spring tides, a common historical term that has nothing to do with the season of spring. Rather, the term is derived from the concept of the tide "springing forth." Spring tides occur twice each lunar month all year long, without regard to the season.

Seven days after a spring tide, the sun and moon are at right angles to each other. When this happens, the bulge of the ocean caused by the sun partially cancels out the bulge of the ocean caused by the moon. This produces moderate tides known as neap tides, meaning that high tides are a little lower and low tides are a little higher than average. Neap tides occur during the first and third quarter moon, when the moon appears "half full."

In simple words,

Spring Tide - Occurs when the Earth, Sun and Moon are aligned (full moon, new moon). Results in greatest variation between high and low tides.

Neap Tide - Occurs when the Moon is 90^{o} out of alignment with the Sun and Earth (first quarter moon, third quarter moon). Results in smallest variation between high and low tides.

Q.210) With reference to North Equatorial Current, consider the below statements and identify the incorrect statement:

a) It is a significant Pacific and the Atlantic Ocean current that flows from east to west.
b) They flow in between 10^{o} north and 20^{o} north latitudes.
c) The current passes or cuts through the equator, hence the name North Equatorial Current.

d) In both oceans, it is separated from the equatorial circulation by the equatorial counter current, which flows eastward.

Q.210) Solution (c)

The North Equatorial Current is a significant Pacific and Atlantic Ocean current that flows east-to-west between about 10° north and 20° north. It is the southern side of a clockwise subtropical gyre. Despite its name, the North Equatorial Current is not connected to the equator. In both oceans, it is separated from the equatorial circulation by the Equatorial Countercurrent (also known as the North Equatorial Countercurrent), which flows eastward. The westward surface flow at the equator in both oceans is part of the South Equatorial Current.

Q.211) Which of the following are the breeding grounds for temperate cyclone?

1. South-east Caribbean region
2. Mexican Gulf
3. Mediterranean basin extending up to Russia
4. North-west Australia

Codes:

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

Q.211) Solution (b)

The favourite breeding grounds of temperate cyclones are:

- Over USA and Canada, extending over Sierra Nevada, Colorado, Eastern Canadian Rockies and the Great Lakes region.
- Mexican Gulf
- The belt extending from Iceland to Barents Sea and continuing over Russia and Siberia.
- Winter storms over Baltic Sea.
- Mediterranean basin extending upto Russia and even upto India in winters (called western disturbances).

- The Antarctic frontal zone.

Q.212) Consider the below statements:

1. An isthmus is a narrow piece of land connecting two larger areas across an expanse of water that otherwise separates them.
2. The Kra Isthmus is the narrowest part of the Malay Peninsula, in southern Thailand and Malaysia.

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

Q.212) Solution (a)

An isthmus is a narrow piece of land connecting two larger areas across an expanse of water that otherwise separates them.
The Kra Isthmus is the narrowest part of the Malay Peninsula, in southern Thailand and Myanmar (not Malaysia).

Q.213) Consider the following statements regarding type of climate:

1. It is a transitional type of climate found between the equatorial forests and trade wind hot deserts.
2. This type of climate is characterized by an alternate hot, rainy season and cool, dry season.
3. Extreme diurnal range of temperature is another characteristic of this type of climate
4. This landscape is typified by tall grass and short trees

Identify the type of climate from the below given options:

a) Tropical Monsoon type of climate
b) Sudan type of climate
c) Warm temperate western margin climate
d) Steppe climate

Q.213) Solution (b)

Savanna or Sudan Climate:

- It is a transitional type of climate found between the equatorial forests and trade wind hot deserts.
- This type of climate is characterized by an alternate hot, rainy season and cool, dry season.
- Extreme diurnal range of temperature is another characteristic of this type of climate
- This landscape is typified by tall grass and short trees

Q.214) Nordic countries are generally considered to refer to which among the below countries?

1. Denmark
2. Sweden
3. Norway
4. Latvia
5. Lithuania

Select the appropriate option using the code below

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

d) 3, 4 and 5

Q.214) Solution (c)

Nordic countries are a group of countries in Northern Europe. These countries include Denmark, Finland, Iceland, Sweden, Norway, and the territories of the Aland Islands and the Faroe Islands.

Do you know?

Modi and the leaders of the five Nordic countries participated in the **first India-Nordic Summit** co-hosted by India and Sweden in Stockholm.

Summit titled **'India-Nordic Summit: Shared Values, Mutual Prosperity'**.

The Prime Ministers pledged to deepen cooperation between India and the Nordic countries and focused their discussions on key issues related to global security, economic growth, innovation and climate change.

They acknowledged that innovation and digital transformation drive growth in an interconnected world, which underpin a growing engagement between India and the Nordic countries.

India and five Nordic countries reaffirmed the importance of free trade as a catalyst for achieving inclusive growth and realising the Sustainable Development Goals amid rising protectionist tendencies displayed by powerful economies.

Source: https://economictimes.indiatimes.com/news/politics-and-nation/first-india-nordic-summit-calls-for-free-trade-and-rules-based-global-order/articleshow/63808071.cms

All the best

IASbaba