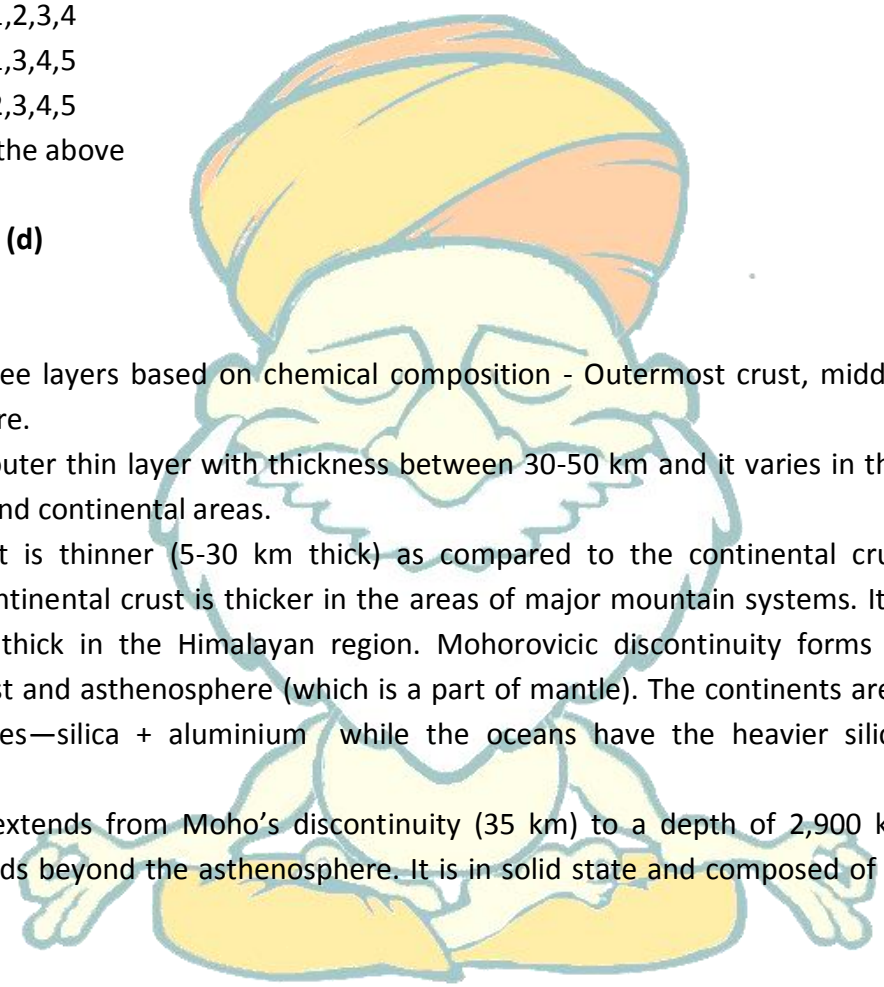
Q.1) With respect to the chemical composition of earth's layers consider the following statements:

1. The continental crust is thicker in the areas of major mountain systems.
2. Oceanic crust is thinner as compared to the continental crust.
3. The lower mantle extends beyond the asthenosphere. It is in solid state.
4. Core has the heaviest mineral materials of highest density.
5. Gutenberg Discontinuity – lies between the mantle and the outer core.

Which of the following statements are correct?

a) Only 1,2,3,4
b) Only 1,3,4,5
c) Only 2,3,4,5
d) All of the above



Q.1) Solution (d)

Explanation:

Earth has three layers based on chemical composition - Outermost crust, middle mantle and innermost core.

Crust is the outer thin layer with thickness between 30-50 km and it varies in thickness under the oceanic and continental areas.

Oceanic crust is thinner (5-30 km thick) as compared to the continental crust (50-70 km thick).The continental crust is thicker in the areas of major mountain systems. It is as much as 70 -100 km thick in the Himalayan region. Mohorovicic discontinuity forms the boundary between crust and asthenosphere (which is a part of mantle). The continents are composed of lighter silicates—silica + aluminium while the oceans have the heavier silicates—silica + magnesium.

The mantle extends from Moho's discontinuity (35 km) to a depth of 2,900 km. The lower mantle extends beyond the asthenosphere. It is in solid state and composed of solid rock and magma.

Core lies between 2900 km and 6400 km below the earth's surface. Core has the heaviest mineral materials of highest density. It is composed of nickel and iron. The outer core is liquid while the inner core is solid.

Mohorovicic Discontinuity (Moho) – separates the crust from the mantle. A soft asthenosphere (highly viscous, mechanically weak and ductile). It's a part of mantle. Gutenberg Discontinuity – lies between the mantle and the outer core.

Q.2) Consider the following statements regarding the paleomagnetism:

1. Some of the strongest evidence in support of the theory of seafloor spreading and plate tectonics comes from studying the magnetic fields surrounding oceanic ridges.
2. Rocks formed from underwater volcanic activity were mainly basalt, which is rich in silica,and low in iron.
3. Basalt contains magnetic minerals and as the rock is solidifying, these minerals align themselves in the direction of the magnetic field.
4. When Earth's magnetic field undergoes a reversal, the polarity recorded in the magma remains same.

Which of the above statements are correct?

a) Only 1,3,4
b) Only 2,3,4
c) Only 2,4
d) Only 1,3

Q.2) Solution (d)

Explanation:

Some of the strongest evidence in support of the theory of seafloor spreading and plate tectonics comes from studying the magnetic fields surrounding oceanic ridges. Rocks formed from this underwater volcanic activity were mainly basalt, which is low silica, iron-rich, volcanic rock that makes up most of the ocean floor. Basalt contains magnetic minerals and as the rock is solidifying, these minerals align themselves in the direction of the magnetic field. This basically locks in a record of which way the magnetic field was positioned at the time that part of the ocean floor was created. Paleomagnetist took a look at the ocean floor going out away from either oceanic ridges and found magnetic stripes that were flipped so that one stripe would be normal polarity and the next reversed. These oceanic ridges were actually boundaries with tectonic plates pulling apart. The movement of the plates allowed the magma to rise up and harden into new rock. As the new rock was formed near the ridge, older rock, which formed millions of years ago when the magnetic field was reversed, got pushed farther away, resulting in this magnetic striping.

Rising magma assumes the polarity of Earth's geomagnetic field before it solidifies into oceanic crust. When Earth's geomagnetic field undergoes a reversal, the change in polarity is recorded in the magma, which contributes to the alternating pattern of magnetic striping on the seafloor.

Q.3) In February 2017 the Barren Island saw another huge volcanic eruption and filled the sea with red lava fountains jutting out of the crater. Consider the following statements regarding it:

1. It is home to Asia's and India's only active volcano.
2. The volcano here was dormant for a long time, but in the year 1991 it experienced an explosion which was quite major.

Which of the above statements is/are correct?

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

Q.3) Solution (b)

Explanation:

135 km northeast of Port Blair, the capital of the Andaman and Nicobar Islands, lies Barren Island, which is home to South Asia and India's only active volcano. This active volcano along Sumatra to Myanmar is renowned as a Submarine surfacing volcano, just above the subduction zone of India and Burmese plate.

The other volcanic island in Indian territory is Narcondam, about 150 km north-east of Barren Island; it is probably extinct. Its crater wall has been completely destroyed.

Q.4) Consider the following statements regarding volcanic eruption:

1. After the eruption of magma has ceased, the crater frequently turns into a lake called a 'caldera'.
2. Oregan lake in USA is the largest volcanic crater lake in the world.

Which of the above statements is/are correct?

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

Q.4) Solution (a)

Explanation:

Lake Toba, Indonesia, the largest volcanic crater lake in the world.
A caldera is a large cauldron-like hollow that forms following the evacuation of a magma chamber/reservoir. When large volumes of magma are erupted over a short time, structural support for the crust above the magma chamber is lost. The ground surface then collapses downward into the partially emptied magma chamber, leaving a massive depression at the surface (from one to dozens of kilometers in diameter).

Q.5) Consider following regarding diastrophism:

1. Diastrophism includes orogeny, epeirogeny, earthquake, plate tectonics and seafloor spreading.
2. Orogenic processes involves mountain building through severe folding and affecting long and narrow belts of the earth's crust.
3. Epeirogenic processes involving uplift or warping of large parts of the earth's crust.
4. Epeirogeny is a mountain building process whereas Orogeny is continental building process.

Which of the above statements are correct?

a) Only 1,2
b) Only 1,4
c) Only 1,3
d) Only 2,3

Q.5) Solution (d)

Explanation:
Diastrophism is the general term applied to slow bending, folding, warping and fracturing. All processes that move, elevate or build up portions of the earth's crust come under diastrophism. They include:

- Orogenic processes involving mountain building through severe folding and affecting long and narrow belts of the earth's crust;
- Epeirogenic processes involving uplift or warping of large parts of the earth's crust;
- Plate tectonics involving horizontal movements of crustal plates.

In the process of orogeny, the crust is severely deformed into folds. Due to epeirogeny, there may be simple deformation. Orogeny is a mountain building process whereas epeirogeny is continental building process.

Q.6) CCEA approves survey project of Un-appraised Areas of Sedimentary Basins. Consider the following statements regarding it:

1. Sedimentary basin is a low area in the Earth's crust, of tectonic origin, in which sediments accumulate and are confined to small area of ocean basin.
2. The project will be implemented by Oil India Limited (OIL) and Oil and Natural Gas Corporation (ONGC).
3. India has total 26 sedimentary basins spread over onland, shallow water and deep water.
4. More than 50 percent of total sedimentary basin area does not have adequate geo-scientific data.

Which of the following options are true?

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

Q.6) Solution (c)

Explanation:

The Cabinet Committee on Economic Affairs approved survey project to acquire 48,243 Line Kilometer 2D seismic data for appraising those Indian sedimentary basin where availability of data is limited.

Sedimentary basin is a low area of tectonic origin in earth's crust, where sediments accumulate. It can range from as small as hundreds of metre to a large part of ocean basin. India has total 26 sedimentary basins that covers area of 3.14 Million Sq Km spread over onland, shallow water and deep water. 48% of total sedimentary basin area does not have adequate geo scientific data.

The project will be implemented by Oil India Limited (OIL) and Oil and Natural Gas Corporation (ONGC). Under it, survey work will be carried out in 24 states. OIL will conduct survey in North-Eastern States, while ONGC will cover remaining area. The entire project is likely to be completed by 2019-20.

After appraisal of these sedimentary basins, blocks will be offered for further exploration and production activities thus helping to increase the investments in domestic production of oil and gas and generate direct and indirect employment.

The appraisal of all unapprised areas is considered an important task to launch future Exploration and Production (E&P) activities. It will help in providing insight into basins thus providing help in planning future E&P activities.

It will also be useful in deciding focus areas of exploration activities in country and on basis of this primary data, E&P companies will be able take up further explorations in areas allocated to them.

Q.7) Consider the following statements regarding Sinkhole/Swallow Hole:

1. Sinkholes are triangular shaped depressions having an average depth of three to nine metres.
2. These holes are developed by enlargement of the cracks found in such rocks, as a result of continuous solvent action of the river water.
3. The surface streams which sink disappear underground through swallow holes.

Which of the above statements is/are incorrect?

a) Only 1,2
b) Only 2,3
c) Only 1,3
d) Only 1

Q.7) Solution (a)

Explanation:
Sinkholes are funnel-shaped depressions not triangular shaped and they are having an average depth of three to nine metres.
These holes are developed by enlargement of the cracks found in such rocks, as a result of continuous solvent action of the rainwater not river water.
The surface streams which sink disappear underground through swallow holes.

Q.8) Which lake has now made it to the Limca Book of Records for having India's largest floating island?

a) Kolleru lake
b) Vembanad lake
c) Pangong lake
d) Hebbagodi lake

Q.8) Solution (d)

Hebbagodi Lake has now made it to the Limca Book of Records for having India's largest floating island. The 12,000-sqft island has strips of vegetation that crisscross the waterbody. It

comprises rafts that allow plants to grow hydroponically (without soil, and through mineral nutrient solutions) and act as cleaning agents. The floating rafts are built with reused PVC pipes. The 12,000-sqft island has strips of vegetation that crisscross the waterbody. It comprises rafts that allow plants to grow hydroponically (without soil, and through mineral nutrient solutions) and act as cleaning agents. The floating rafts are built with reused PVC pipes.

Q.9) Consider the following statements regarding island arc formation:

1. In Ocean – Ocean Convergence, a denser oceanic plate subducts below a less denser oceanic plate forming a trench along the boundary.
2. As the ocean floor crust (oceanic plate) loaded with sediments subducts into the softer asthenosphere, the rocks on the continental side in the subduction zone become metamorphosed under high pressure and temperature.
3. A continuous upward movement of magma creates constant volcanic eruptions at the ocean floor.
4. Such volcanic landforms all along the boundary form a chain of volcanic islands which are collectively called as Island Arcs

Which of the above statements are correct?

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

Q.9) Solution (d)

Explanation:

In Ocean – Ocean Convergence, a denser oceanic plate subducts below a less denser oceanic plate forming a trench along the boundary. As the ocean floor crust (oceanic plate) loaded with sediments subducts into the softer asthenosphere, the rocks on the continental side in the subduction zone become metamorphosed under high pressure and temperature. After reaching a depth of about 100 km, plates melt. Magma has lower density and is at high pressure. It rises upwards due to the buoyant force offered by surrounding denser medium. The magma flows out, sometimes violently to the surface. A continuous upward movement of magma creates constant volcanic eruptions at the ocean floor. Constant volcanism above the subduction zone creates layers of rocks. As this process continues for millions of years, a volcanic landform is created which in some cases rises above the ocean waters.

Such volcanic landforms all along the boundary form a chain of volcanic islands which are collectively called as Island Arcs (Indonesian Island Arc or Indonesian Archipelago, Philippine Island Arc, Japanese Island Arc etc.).

Q.10) What is the name of the India had launched to provide assistance to earthquake and tsunami victims in Indonesia recently?

a) Operation Samudra Shakti
b) Operation Samudra Maitri
c) Operation Samudra Ekta
d) None of the above

Q.10) Solution (b)

Explanation:
India had launched massive humanitarian operation Samudra Maitri to provide assistance to earthquake and tsunami victims in Indonesia.
Background:
A shallow earthquake of magnitude 7.5 (richter scale) had struck in neck of Minahasa Peninsula, Indonesia on 28 September 2018 with its epicentre located in mountainous Donggala Regency, Central Sulawesi. The earthquake was located 77 km away from provincial capital Palu. This event was preceded by sequence of foreshocks, largest of which was a magnitude 6.1 tremor and followed by localised tsunami which had struck Palu, sweeping shore-lying houses and buildings on its way. It was deadliest earthquake to strike Indonesia since 2006 Yogyakarta earthquake, as well as deadliest earthquake worldwide so far in 2018.The earthquake also had caused major soil liquefaction in areas in and around Palu.

Q.11) With respect to seismic waves consider the following statements:

1. P-waves move faster and are the first to arrive at the surface.
2. A secondary wave cannot pass through liquids or gases.
3. They are low frequency, long wavelength, and transverse vibration.

Which of the above statements is/are incorrect?

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

Q.11) Solution (d)

Explanation:

Earthquake waves are basically of two types — body waves and surface waves.

Body waves are generated due to the release of energy at the focus and move in all directions travelling through the body of the earth. Hence, the name body waves.

The body waves interact with the surface rocks and generate new set of waves called surface waves. These waves move along the surface. There are two types of body waves. They are called P and S-waves.

1. Primary Waves (P waves):

- Also called as the longitudinal or compressional waves.
- They are Analogous to sound waves.
- Particles of the medium vibrate along the direction of propagation of the wave.
- 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.
- Velocity of P waves in Solids > Liquids > Gases.
- Their velocity depends on shear strength or elasticity of the material.

Secondary Waves (S waves):

- Also called as transverse or distortional waves.
- Analogous to water ripples or light waves.
- S - waves arrive at the surface with some time lag.
- A secondary wave cannot pass through liquids or gases.
- These waves are of high frequency waves.
- Travel at varying velocities (proportional to shear strength) through the solid part of the Earth's crust, mantle.

Surface Waves (L waves):

- Also called as long period waves.
- They are low frequency, long wavelength, and transverse vibration.
- Generally affect the surface of the Earth only and die out at smaller depth.
- Develop in the immediate neighborhood of the epicenter.
- They cause displacement of rocks, and hence, the collapse of structures occurs.
- These waves are the most destructive.
- Recoded last on the seismograph.

Q.12) Consider following statements regarding continental drift theory:

1. Continental drift refers to the movement of the continents relative to the ocean floor.
2. Gravity of the earth, buoyancy of the seas and the tidal currents were given as the main factors causing the drift, by Wegener.
3. One criticism of this theory is Continental Drift Theory shifts India's position too much to the south, distorting its relation with the Mediterranean Sea and the Alps.

Which of the above statements is/are correct?

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

Q.12) Solution (b)

Explanation:

Continental drift refers to the movement of the continents relative to each other. According to Wegener's Continental Drift Theory, there existed one big landmass which he called Pangaea which was covered by one big ocean called Panthalassa. A sea called Tethys divided the Pangaea into two huge landmasses: Laurentia (Laurasia) to the north and Gondwanaland to the south of Tethys. Drift started around 200 million years ago (Mesozoic Era), and the continents began to break up and drift away from one another.

Criticism about this theory includes:

Coastlines are a temporary feature and are liable to change. Several other combinations of fitting in of landforms could be attempted. Continental Drift Theory shifts India's position too much to the south, distorting its relation with the Mediterranean Sea and the Alps. The mountains do not always exhibit geological affinity.

Q.13) Consider the following statements regarding fold mountains:

1. Fold mountains are formed when sedimentary rock strata in geosynclines are subjected to tangential forces.
2. They are the loftiest mountains and they are generally concentrated along continental margins
3. The Aravali Range in India is the oldest fold mountain systems in the India.

Which of the above statements is/are incorrect?

a) Only 2

b) Only 2,3
c) Only 1
d) All of the above

Q.13) Solution (c)

Explanation:
Fold mountains are formed when sedimentary rock strata in geosynclines are subjected to compressive forces not tangential forces .They are the loftiest mountains and they are generally concentrated along continental margins. The Aravali Range in India is the oldest fold mountain systems in India.

Q.14) Consider following statements regarding marine erosional landforms:

1. Sea Cliff is shoreline marked by a steep bank.
2. When waves from opposite directions strike a narrow wall of rock, differential erosion of the rock leaves a bridge like structure called Stack.
3. When a portion of the sea arch collapses, the remaining column-like structure is called a sea arch.

Which of the above statements is/are correct?

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

Q.14) Solution (a)
Explanation:
When waves from opposite directions strike a narrow wall of rock, differential erosion of the rock leaves a bridge like structure called Sea arch. When a portion of the sea arch collapses, the remaining column-like structure is called a stack, skary or chimney rock.
If the fluvial erosion of a stream at the shore doesn't match the retreat of the sea, the rivers appear to be hanging over the sea. These river valleys are called hanging valleys. The burst of water through a small hole (called as Blow Holes or Spouting Horns)on a sea cave due to the compression of air in the cave by strong waves. They make a peculiar noise

Q.15) Consider the following statements regarding arid landform:

1. In hillslope geomorphology, a gully is a narrow and shallow channel cut into soil by the erosive action of flowing water.
2. A rill is a landform created by running water. Rills resemble large ditches or small valleys, which are few metres to tens of metres in depth and width.
3. A ravine is a landform narrower than a canyon and is often the product of stream cutting erosion. Ravines are typically classified as larger in scale than gullies, although smaller than valleys.

Which of the following statements is/are incorrect?

a) Only 1,2
b) Only 2,3
c) Only 1,3
d) None of the above

Q.15) Solution (a)

Explanation:

In hillslope geomorphology, a rill is a narrow and shallow channel cut into soil by the erosive action of flowing water. A gully is a landform created by running water. Gullies resemble large ditches or small valleys, which are few metres to tens of metres in depth and width. A ravine is a landform narrower than a canyon and is often the product of stream cutting erosion. Ravines are typically classified as larger in scale than gullies, although smaller than valleys.

Q.16) Consider the following statements:

1. Granite is a typical example of intrusive rock system.
2. Plutonic rocks are rocks formed by rapid cooling of the lava thrown out during volcanic eruptions.
3. The Deccan traps in the peninsular region are of basaltic origin.

Which of the above statements is/are correct?

a) Only 1,2
b) Only 2,3
c) Only 1,3
d) None of the above

Q.16) Solution (c)

Explanation:

Sometimes, the molten matter is not able to reach the surface and instead cools down very slowly at great depths, such rocks are called as Plutonic Rocks or intrusive rocks. Slow cooling allows big-sized crystals to be formed. Granite is a typical example. These rocks appear on the surface only after being uplifted and denuded.

While in case of lava or extrusive rock, these rocks are formed by rapid cooling of the lava thrown out during volcanic eruptions. Rapid cooling prevents crystallization, as a result such rocks are fine-grained. Basalt is a typical example. The Deccan traps in the peninsular region is of basaltic origin. Basic rocks contain a greater proportion of basic oxides, e.g. of iron, aluminium or magnesium, and are thus denser and darker in colour.

Q.17) Consider the following statement:

1. Peneplain refers to an undulating featureless plain punctuated with low-lying residual hills of resistant rocks. It is considered to be an end product of an erosional cycle.
2. The outer bend of the loop in a meander is characterized by intensive erosion and vertical cliffs and is called the slip off side. This side has a concave slope.
3. The inner side of the loop is characterized by deposition, a gentle convex slope, and is called the cliff slope side.

Which of the following statements is/are incorrect?

a) Only 1,2
b) Only 2,3
c) Only 1,3
d) None

Q.17) Solution (b)

Explanation:

A meander is defined as a pronounced curve or loop in the course of a river channel. Loop in a meander is characterized by intensive erosion and vertical cliffs and is called the cliff-slope side not slip off side. This side has a concave slope. The inner side of the loop is characterized by deposition, a gentle convex slope, and is called the slip-off side not cliff slope side. Morphologically, the meanders may be wavy, horse-shoe type or ox-bow/ bracelet type.

Q.18) Consider the following statements regarding doklam plateau:

1. Doklam is an area with a plateau and a valley, lying between Tibet's Chumbi Valley to the north, Bhutan's Ha Valley to the east and India's Sikkim state to the west.
2. It has been depicted as part of Bhutan in the Bhutanese maps since 1961, but it is also claimed by China.

Which of the above statements is/are correct?

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

Q.18) Solution (c)

Explaination:

Doko La (Doklam) is a strategically located tri-junction of India, Bhutan and China. Doklam is recognised as a Bhutanese territory by India and Bhutan. But, China claims some parts of the Doklam Plateau as part of its "ancient" frontier.

India and China were engaged in standoff at Doklam since June 16, 2017. The reason behind the stand-off was the Chinese attempt to build a road in the strategically located Doklam. On June 16, China attempted to build a road construction by bringing in earthmovers and construction machines in the Doklam area of Bhutan. The Royal Bhutan Army objected to these construction activities in its territory but was outnumbered and pushed back to its post by the China's PLA following which Bhutan called for the help of Indian Army. India and Bhutan have a Friendship Treaty according to which, India serves as a virtual security guarantor of Bhutan. Indian Army and Bhutan Army do joint patrolling at the tri-junction. The Indian Army had asked the PLA to stop the road construction activity that has resulted in a stand-off.

Note: It was in current Affairs last year. However, UPSC picks up such topics which were there in news for some days and then became obscure.

Q.19) Consider following regarding glacial depositional landforms:

1. The eskers resemble the features of an embankment and are often used for making roads
2. Kame Terraces Are broken ridges or un-assorted depositions looking like hump in a till plain
3. Drumlin are inverted boat-shaped deposition in a till plain caused by deposition.

Which of the above statements is/are incorrect?

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

Q.19) Solution (d)

Note: Incorrect options have been asked.

Explanation:

The glacial depositional landforms includes the following

Outwash Plain - When the glacier reaches its lowest point and melts, it leaves behind a stratified deposition material, consisting of rock debris, clay, sand, gravel etc. This layered surface is called till plain or an outwash plain.

Esker - Winding ridge of un-assorted depositions of rock, gravel, clay etc. running along a glacier in a till plain. The eskers resemble the features of an embankment and are often used for making roads.

Kame Terraces - Broken ridges or un-assorted depositions looking like hump in a till plain.

Drumlin - Inverted boat-shaped deposition in a till plain caused by deposition.

Kettle Holes - Formed when the deposited material in a till plain gets depressed locally and forms a basin.

Moraine - General term applied to rock fragments, gravel, sand, etc. carried by a glacier. Depending on its position, the moraine can be ground moraine and end moraine.

Q.20) Consider following statements regarding batholith:

1. Batholiths are large rock masses formed due to cooling down and solidification of hot magma inside the earth.
2. They appear on the surface only after the denudation processes remove the overlying materials.
3. Batholiths form the core of huge mountains and may be exposed on surface after erosion.
4. These are Basaltic in nature.

Which of the above statements is/are correct?

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

Q.20) Solution (a)

Explanation:

Batholiths are large rock masses formed due to cooling down and solidification of hot magma inside the earth. They appear on the surface only after the denudation processes remove the

overlying materials. Batholiths form the core of huge mountains and may be exposed on surface after erosion. These are granitic.

Other intrusive volcanic landforms includes

Laccoliths: These are large dome-shaped intrusive bodies connected by a pipe-like conduit from below.

Lapolith: As and when the lava moves upwards, a portion of the same may tend to move in a horizontal direction wherever it finds a weak plane. It may get rested in different forms. In case it develops into a saucer shape, concave to the sky body, it is called Lapolith.

Phacolith: Phacolith is a wavy mass of intrusive rocks, at times, is found at the base of synclines or at the top of anticline in folded igneous country. Such wavy materials have a definite conduit to source beneath in the form of magma chambers (subsequently developed as batholiths). These are called the Phacoliths.

Sills: Sills are solidified horizontal lava layers inside the earth.
The near horizontal bodies of the intrusive igneous rocks are called sill or sheet, depending on the thickness of the material. The thinner ones are called sheets while the thick horizontal deposits are called sills.

Dykes: When the lava makes its way through cracks and the fissures developed in the land, it solidifies almost perpendicular to the ground. It gets cooled in the same position to develop a wall-like structure. Such structures are called dykes.

Q.21) Consider the following statements:

1. The lava plateaus like Deccan traps are rich in black soil that is fertile and good for cultivation.
2. Maharashtra has good cotton growing soils called Regurs.
3. In India huge reserves of iron, coal and manganese are found in the Chotanagpur plateau.

Which of the above statements are correct?

a) Only 1
b) Only 2
c) Only 1,2
d) All of the above

Q.21) Solution (d)

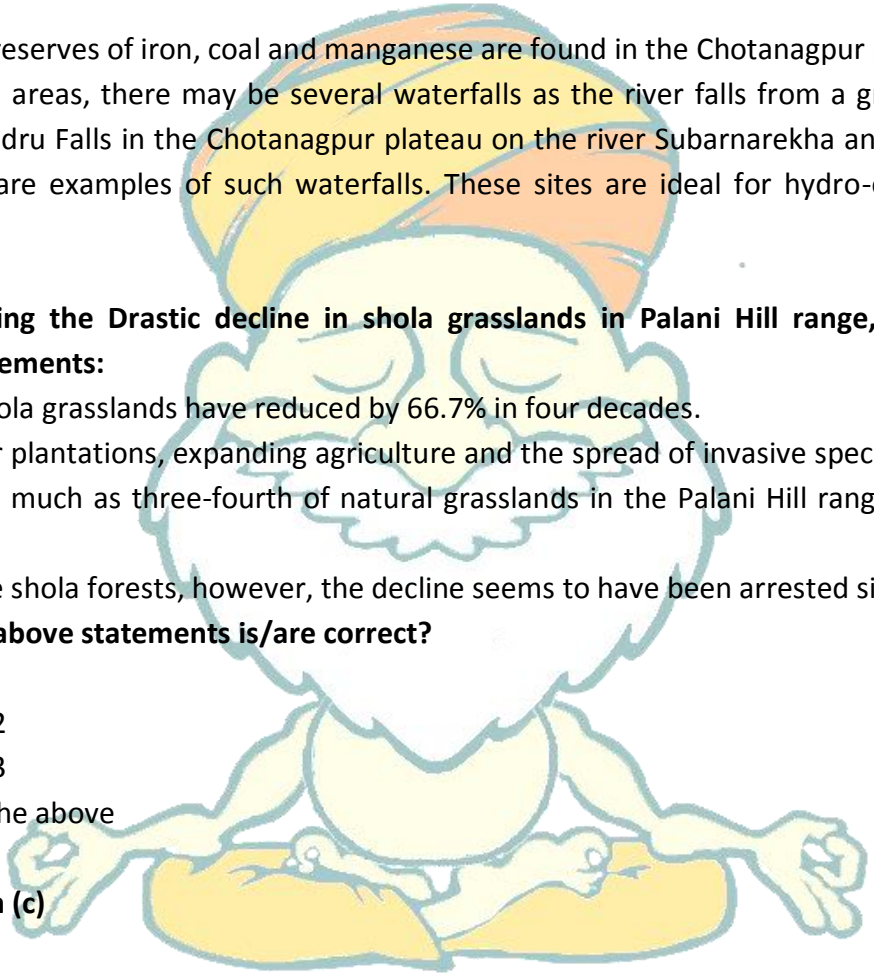
All the given statements are correct.

For your Information:

The Deccan Traps are one of the largest volcanic provinces in the world. It consists of more than 6,500 feet (>2,000 m) of flat-lying basalt lava flows and covers an area of nearly 200,000 square miles (500,000 square km) (roughly the size of the states of Washington and Oregon combined) in west-central India. Estimates of the original area covered by the lava flows are as high as 600,000 square miles (1.5 million square km).

REGUR SOIL - The regur soil is also called the black cotton soil as cotton is the main crop grown in this type of soil. The name regur is derived from the tamil word reguda which means cotton.

In India huge reserves of iron, coal and manganese are found in the Chotanagpur plateau.
In the plateau areas, there may be several waterfalls as the river falls from a great height. In India, the Hundru Falls in the Chotanagpur plateau on the river Subarnarekha and the Jog Falls in Karnataka are examples of such waterfalls. These sites are ideal for hydro-electric power generation.



Q.22) Regarding the Drastic decline in shola grasslands in Palani Hill range, consider the following statements:

1. The shola grasslands have reduced by 66.7% in four decades.
2. Timber plantations, expanding agriculture and the spread of invasive species have eaten into as much as three-fourth of natural grasslands in the Palani Hill ranges of Western Ghats.
3. For the shola forests, however, the decline seems to have been arrested since 2003.

Which of the above statements is/are correct?

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

Q.22) Solution (c)

Explanation:

Drastic decline in shola grasslands occurred in Palani Hill range. Timber plantations, expanding agriculture and the spread of invasive species have eaten into as much as two-thirds of natural grasslands in the Palani Hill range of Western Ghats, shows a recently published study. These drastic declines are particularly stark in shola grasslands (which are stunted forest growths of diverse grass species), and seem to be accelerating through the decades.

For the shola forests, however, the decline seems to have been arrested since 2003

Q.23) Consider the following statements regarding India and its neighbours:

1. India's longest border is with Bangladesh while the shortest border is with Afghanistan.
2. China claims the Aksai Chin district, the Changmo valley, Pangong Tso and the Sponggar Tso area of north-east Ladakh.
3. The Indo Myanmar boundary runs roughly along the watershed between the Brahmaputra and Ayeyarwady [Irrawaddy].
4. The eastern Indo china boundary runs from the eastern limit of Bhutan to a point near Diphu pass (Talu Pass) at the trijunction of India, Tibet and Myanmar.

Which of the above statements are incorrect?

a) Only 1,2,3
b) Only 2,3,5
c) Only 4,5
d) None of the above

Q.23) Solution (d)

Note: Question is asking for incorrect options. All the statements are correct.

Add on information

- India's border with China is the second longest border of India, next only to its border with Bangladesh.
- Five Indian states, namely Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh touch the Indian boundary with China. The Sino-Indian border is generally divided into three sectors namely:
    - The Western sector, (ii) the Middle sector, and (iii) the Eastern sector.
- The Western Sector Separates Jammu and Kashmir state of India from the Sinkiang (Xinjiang) province of China.
- The western sector boundary is largely the outcome of the British policy towards the state of Jammu and Kashmir.
- China claims the **Aksai Chin district, the Changmo valley, Pangong Tso and the Sponggar Tso area of north-east Ladakh** as well as a strip of about 5,000 sq km down the entire length of eastern Ladakh.

- China also claims a part of Huza-Gilgit area in North Kashmir (ceded to it in 1963 by Pakistan).

In the Middle Sector Two Indian states of Himachal Pradesh and Uttarakhand touch this border. The Eastern Sector is 1,140 km long boundary between India and China runs from the eastern limit of Bhutan to a point near **Diphu pass (Talu Pass) at the trijunction of India, Tibet and Myanmar.**

This line is usually referred to as the Mc Mahon Line after Sir Henry Mc Mahon, then foreign secretary of British India, who negotiated the boundary agreement between Great Britain and Tibet at Shimla accord in 1913-14.

Q.24) Consider the following statements regarding Himalayan ranges:

1. The Kumaon Himalayas lie in Uttarakhand and extend from the Satluj to the Beas river.
2. The extension of the Purvanchal Himalaya continues southwards upto Andaman and Nicobar Islands through the Myanmar range (Arakan Yoma).
3. Assam Himalayas occupy mainly the areas of Arunachal Pradesh and Bhutan.

Which of the above statements are correct?

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

Q.24) Solution (b)

Explanation:

The Kumaon Himalayas lie in Uttarakhand and extend from the Satluj to the Kali River.

Add on information:

Also known as the Assam Himalayas, the Eastern Himalayas occupy mainly the areas of Arunachal Pradesh and Bhutan.

The Assam Himalayas show a marked dominance of fluvial erosion due to heavy rainfall. The Himalayas take a sudden southward turn after the Dihang gorge and the hill ranges running in more or less north-south direction along India's border with Myanmar are collectively known as the Purvanchal.

These are known by various local names such as **Patkai Bum, Naga hills, Kohima hills, Manipur hills, Mizo hills (previously known as the Lushai hills), Tripura hills and Barail range**.

Q.25) Which of the following statements are correct regarding Himalayan ranges?

1. The northern slopes have steep gradients and southern slopes have comparatively gentler slopes.
2. Himalayan ranges fall in the jurisdiction of India and Nepal Only.
3. Shivalik range runs from the Potwar Plateau to the Brahmaputra valley.

Select the code from following:

a) Only 1
b) Only 2,3
c) Only 3
d) None of the above

Q.25) Solution (c)

Explanation: The southern slopes have steep gradients and northern slopes have comparatively gentler slopes.
Most of the Himalayan ranges fall in India, Nepal and Bhutan. The northern slopes are partly situated in Tibet (trans-Himalayas) while the western extremity lies in Pakistan, Afghanistan and Central Asia.

Q.26) Which of the following are correctly matched?

	Name of Shiwaliks	**Region**
1.	Dafla, Miri and Abor	a. Nepal
2.	The Dhang Range, Dundwa range	b. Arunachal Pradesh
3.	Churia Ghat hills.	c. Uttarakhand

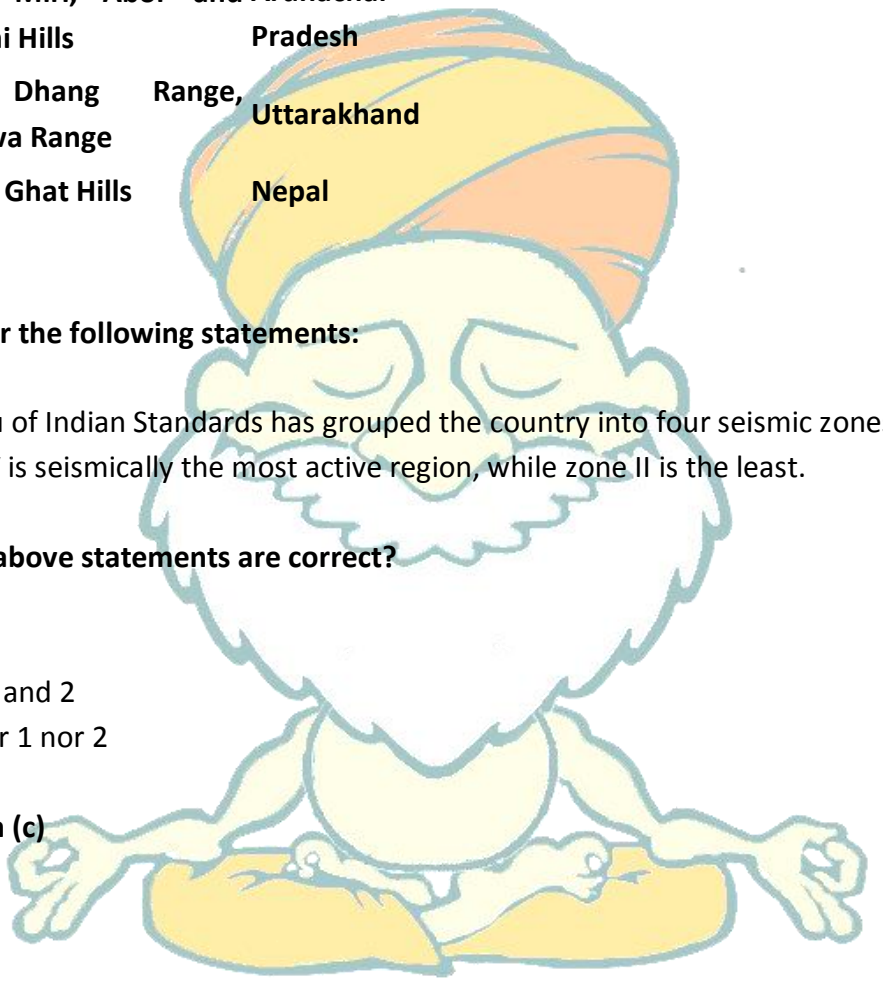
Match the name of Shivaliks with the regions in which they lie and choose which of the options is correct?

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

Q.26) Solution (c)

The partlying between Tista and Dihang rivers isknown as Assam Himalayas. They lie in Arunachal Pradesh and contains Dafla, Miri, Abor and Mishmi ranges.

Region	Name of Shiwaliks
• Jammu Region	Jammu Hills
• Dafla, Miri, Abor and Mishmi Hills	Arunachal Pradesh
• The Dhang Range, Dundwa Range	Uttarakhand
• Churia Ghat Hills	Nepal



Q.27) Consider the following statements:

1. Bureau of Indian Standards has grouped the country into four seismic zones
2. Zone V is seismically the most active region, while zone II is the least.

Which of the above statements are correct?

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

Q.27) Solution (c)

Seismic Zones

Earthquake - prone areas of the country have been identified on the basis of scientific inputs relating to seismicity, earthquakes occurred in the past and tectonic setup of the region. Based on these inputs, Bureau of Indian Standards [IS 1893 (Part I):2002], has grouped the country into four seismic zones, viz. Zone II, III, IV and V. Of these, Zone V is seismically the most active region, while zone II is the least.

- Broadly, Zone - V comprises entire northeastern India, parts of Jammu and Kashmir, Himachal Pradesh, Uttaranchal, Rann of Kutch in Gujarat, part of North Bihar and Andaman & Nicobar Islands.
- Zone - IV covers remaining parts of Jammu and Kashmir and Himachal Pradesh, National Capital Territory (NCT) of Delhi, Sikkim, Northern Parts of Uttar Pradesh, Bihar and West Bengal, parts of Gujarat and small portions of Maharashtra near the west coast and Rajasthan.
- Zone – III comprises Kerala, Goa, Lakshadweep islands, remaining parts of Uttar Pradesh, Gujarat and West Bengal, Parts of Punjab, Rajasthan, Madhya Pradesh, Bihar, Jharkhand, Chhattisgarh, Maharashtra, Orissa, Andhra Pradesh, Tamilnadu and Karnataka.
- Zone - II covers remaining parts of country.

http://pib.nic.in/newsite/mbErel.aspx?relid=168661

Q.28) Consider the Following statements:

1. Mt K2, the highest peak of India lies in Greater Himalayas.
2. The northern most range of the Trans-Himalayan Ranges in India is the the Krishnagiri range.

Which of the above statements is/are incorrect?

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

Q.28) Solution (a)

Note: Incorrect options have been asked.

Explanation:

K2 also known as Mount Godwin-Austen at 8,611 metres (28,251 ft) above sea level, is the second highest mountain in the world, after Mount Everest at 8,848 metres (29,029 ft). It lies in PoK, and is the highest peak of Karakoram range.

The northern most range of the Trans-Himalayan Ranges in India is the **the Krishnagiri range.**

Q.29) Consider the following statements regarding Karewa soils:

1. Karewas are lacustrine deposits (deposits in lakes) in the Valley of Kashmir and in Bhaderwa Valley of the Jammu Division.
2. The karewas are mainly devoted to the cultivation of saffron, almond, walnut, apple and orchards.
3. It comprises of unconsolidated gravel and mud and do not contain any organic content.

Which of the above statements are correct?

a) Only 1,2
b) Only 1,3
c) Only 2
d) Only 3

Q.29) Solution (a)

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.

The karewas have been elevated, dissected and removed by subaerial denudation to be in the present position.

The Karewa deposits in the Kashmir valley have been conventionally divided into two stages, lower and upper, representing argillaceous and arenaceous facies respectively. The upper Karewas are less fossiliferous than the lower Karewas. The entire belt touching the foothills of the Pirpanjal represents the lower Karewas, which has been exposed to the rivers starting from the south such as Veshav, Rembiara, Romushu, Dodhganga, Shaliganga, Boknag nar and Ningli. Lower Karewa sections at Aharbal, Anantnag, Arigam, Baramulla have been exposed by these rivers.

They are highly fertile and mainly devoted to the cultivation of saffron, almond, walnut, apple and orchards.

Q.30) Which pass provides passage between Ladakh and Lhasa?

a) Lanak la
b) Khardungla
c) Changla
d) Qara tag la

Q.30) Solution (a)

Explanation:

Lanak la is a pass that provides passage between Ladakh and Lhasa. A road to connect Xinjiang Province with Tibet has been constructed by the Chinese. It connects India and China (Akasai-Chin area of Jammu and Kashmir).

India protested against the construction of this road and cited it as one of the reason for not joining Silk road project of China.

Q.31) The forest department is all set to give the rare myristica swamps the status of a sanctuary. Which of the statements regarding these swamps are correct?

1. The name of the swamps comes from a group of myristica species of trees which grows there.
2. Forest floor is always water logged and in all seasons in these swamps.
3. They are found in small pockets in Eastern Himalayas

Select the code from following:

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

Q.31) Solution (a)

Explanation:

The forest department is all set to give the rare myristica swamps, found only in a few pockets in the Western Ghats, the status of a sanctuary.

The name of the swamps comes from a group of myristica species of trees which grows there. The swamps are full of water and these trees have stilt and knee roots. The forest floor is always water logged and in all seasons.

The myristica swamps are the habitats of rare species of frogs, insects and plants. Nowhere in the world are such patches of forests found.

Q.32) Which of the following statements are correct?

1. The only river between Yamuna and the Satluj is Gandak
2. The Kosi river has long been called the 'Sorrow of Bihar'.

3. The eastern part of the Thar Desert up to the Aravali Range is a semi-arid plain known as Rajasthan Bagar.

Select the code from following:

a) Only 1,2
b) Only 2,3
c) Only 1,3
d) None of the above

Q.32) Solution (b)

Explanation: The only river between the Yamuna and the Satluj is the Ghaggar which is considered to be the present day **Successor of the legendary Saraswati River.**

"Bagri region" or Bagar tract is long strip of shifting sand dunes called tibba and relatively semi-fertile lands between them called lal along the western border of Haryana and eastern border of Rajasthan.

Q.33) Consider following statements regarding Indo Gangetic Brahmaputra plains:

1. Indo-Gangetic-Brahmaputra Plain is the largest alluvial tract of the world.
2. The northern boundary is well marked by the Shiwaliks
3. The western border is marked by Sulaiman and Kirthar ranges.
4. On the eastern side, the plains are bordered by Purvanchal hills.

Which of the above statements are correct?

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

Q.33) Solution (d)

Explanation:

Indo-Gangetic-Brahmaputra Plain is the largest alluvial tract of the world. It stretches for about 3,200 km from the mouth of the Indus to the mouth of the Ganga. Indian sector of the plain accounts for 2,400 km.

The northern boundary is well marked by the Shiwaliks and the southern boundary is a wavy irregular line along the northern edge of the Peninsular India. The **western border** is marked by **Sulaiman and Kirthar ranges**. On the **eastern side,** the plains are bordered by **Purvanchal hills.**

Q.34) Which of the following statements regarding Northern Plains are correct?

1. The Bhabhar area is not suitable for agriculture and only big trees with large roots thrive in this belt.
2. The Terai region provides shelter to a variety of wildlife.
3. The khadar is the older alluvium along the river beds forming terraces higher than the floodplain.
4. Bhangar is new layer of alluvium deposited by river flood almost every year.

Which of the above statements are correct?

A. Only 1 and 3
B. Only 2 and 4
C. Only 1 and 2
D. Only 1 and 4

Q.34) Solution (c)

Explanation:

From North to South, the northern plains of India are divided into Bhabar, Tarai, Bhangar and Khadar plains.

Bhabar plain starts from the foothills of Siwalik when rivers deposits their load due to sudden change of slope. Coarse boulders get deposited and soil formation is low. Small strams penetrate the surface and region is not suitable for cultivation. Only large trees with long tap roots can thrive.

Tarai is the second belt of plains where submerged rivers rises to the surface once again. This is a region of dense forests due to dampness and provides ideal conditions for the survival of wildlife.

The Bhangar is the older alluvium along the river beds forming terraces higher than the floodplain.

The Khadar is composed of newer alluvium and forms the flood plains along the river banks. A new layer of alluvium is deposited by river flood almost every year. This makes them the **most fertile soils of Ganges.**

Q.35) Consider following statements regarding peninsular plateau:

1. The Peninsular Plateau is a one of the oldest landforms of earth.
2. Most of the peninsular rivers flow east to west indicating its general slope.
3. Narmada-Tapti are exceptions which flow from west to east in a rift valley.
4. It is a highly stable block composed mostly of the Archaean gneisses and schists

Which of the above statements are incorrect?

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

Q.35) Solution (b)

Explanation:
The Deccan Plateau is a large plateau in western and southern India. It rises to 100 metres (330 ft) in the north, and to more than 1,000 metres (3,300 ft) in the south, forming a raised triangle within the South-pointing triangle of the Indian subcontinent's coastline. Geologically it is one of the oldest parts of the earth. It was a part of Gondwana land and got drifted away from African plate. It is largely made of Archean gneiss.
Most of the peninsular rivers flow west to east indicating its general slope. Narmada-Tapti are the exceptions which flow from east to west in a rift (rift is caused by divergent boundary.)

Q.36) Consider the following statements regarding Chotanagpur plateau

1. Chotanagpur plateau represents the north-western projection of the Indian Peninsula.
2. It lies mostly in Jharkhand, Northern part of Chhatisgarh and Purulia district of West Bengal.
3. Son River flows in the north-west of the plateau and joins Ganga.
4. This plateau is largely composed of Gondwana rocks.

Which of the above statements are correct?

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

Q.36) Solution (b)

Explanation: Chotanagpur plateau represents the **north-eastern projection** of the Indian Peninsula.
Mostly in Jharkhand, northern part **of Chhatisgarh and Purulia district of West Bengal.** The Son River flows in the north-west of the plateau and joins the Ganga. The average elevation of the plateau is 700 m above sea level. This plateau is composed mainly of **Gondwana rocks.** Gondwana formations are known for coal formation.

Q.37) Tropic of Cancer passes through which of the following group of Indian States:

a) Gujarat, UP, Chattisgarh, Meghalaya
b) Rajasthan, Jharkhand, West Bengal, Mizoram
c) UP, Punjab, Bihar, Jharkhand
d) Maharashtra, Chattisgarh, UP, Andhra Pradesh

Q.37) Solution (b)

Explanation: The Tropic of Cancer divided India into almost 2 equal parts. It passes through 8 Indian States of India – **Gujarat, Rajasthan, MP, Chhattisgarh, Jharkhand, West Bengal, Tripura and Mizoram.**

Q.38) The famous hill-station 'Kodaikanal' lies in:

a) Palani hills
b) Nilgiri hills
c) Cardamom hills
d) Javadi hills

Q.38) Solution (a)

Kodaikanal is a city near Palani in the hills of the Dindigul district in the state of Tamil Nadu, India. Its name in the Tamil language means "The Gift of the Forest". Kodaikanal is referred to as the "Princess of Hill stations" and has a long history as a retreat and popular tourist destination.
In News: It was recently in news as High Court has ordered to removed around 1500 construction due to illegal encroachment. Unplanned development and uncontrolled tourism has adversely effected the ecosystem of Kodaikanal.

Q.39) Consider the following statements about East Coast of India:
It extends from the Ganges delta and ends at Kanyakumari.

It is marked by deltas of rivers like the Mahanadi, Narmada, the Godavari, the Krishna and the Cauvery.
The Chilka lake and the Pulicat Lake are the important lagoon lakes on the eastern coast

Which of the above statements is/are incorrect?

A. Only 1,2
B. Only 2
C. Only 1,3
D. None of the above

Q.39) Solution (b)

Explaination: East Coast of India lies between the Eastern Ghats and the Bay of Bengal. It extends from the Ganga delta to Kanniyakumari. It is marked by deltas of rivers like the Mahanadi, the Godavari, the Krishna and the Cauvery.
Note: Delta of Narmada is on West Coast.

Chilka Lake and the Pulicat Lake (lagoon) are the important geographical features of east coast
In Orissa (Odisha) it is known as Utkal coast.

- From the southern limit of the Utkal plain, stretch the Andhra coast.
- In the south of the Andhra plain is the Tamil Nadu coast.
- The Tamil Nadu coast and parts of Andhra coast together are known as Coromandel Coast or Payan Ghat

Q.40) Which of the following statements regarding Lakshdweep islands is not correct?

a) The Lakshadweep Islands is an archipelago of 36 atolls and coral reefs.
b) Amindivi Islands are the northernmost while the Minicoy Island is the southernmost.
c) It largely consists of islands of volcanic origin which are dormant now.
d) These islands topography is flat and relief features such as hills, streams, valleys, etc. are absent.

Q.40) Solution (c)

Explanation:

Lakshadweep is a tropical archipelago of 36 atolls and coral reefs in the Laccadive Sea, off the coast of Kerala, India. Not all of the islands are inhabited, and only a few are open to visitors (permits required). Kavaratti, one of the more developed islands, is home to dozens of mosques, including the ornately decorated Ujra Mosque, as well as Kavaratti Aquarium, showcasing regional fish, shark and coral species.

Note: It does not contain island of volcanic origin.

Lakshadweep was in news

Four islands in the Andamans and three in Lakshadweep have been identified for seaplane operations, while private sector participation has been invited for tourism-based projects. Key infrastructure projects such as operationalisation of the Diglipur airport for civilian aircraft and the construction of a **new airport on Minicoy Island** have been accorded high priority by the government, while **Coastal Regulation Zone clearance (CRZ) has been accorded for 'Middle Strait Bridge' on Andaman Trunk Road.**