

Q.1) What does the term “Draas” refer to in geomorphology?

- a) Karst landform
- b) Erosional landform carved by glaciers.
- c) Wave landform
- d) Aeolian landform

Q.1) Solution (d)

Basic Information:

Draas:

- Draas are very large-scale dune bedforms, they may be tens or a few hundreds of metres in height, kilometres wide, and hundreds of kilometres in length.
- After a draas has reached a certain size, it generally develops superimposed dune forms. They are thought to be more ancient and slower-moving than smaller dunes, and to form by vertical growth of existing dunes.
- Draas are widespread in sand seas and are well-represented in the geological record.

Q.2) Which meridian forms the boundary line between the Indian Ocean and the Pacific Ocean?

- a) The meridian of Cape of Tasmania
- b) The meridian of Cape Town
- c) The meridian of Wellington
- d) The meridian of Perth

Q.2) Solution (a)

Basic Information:

Extending southward from the Tasman Basin (between New Zealand and eastern Australia) is the Macquarie Ridge, which forms a major boundary between the deep waters of the Pacific and Indian oceans.

Q.3) With reference to “vertical temperature distribution of ocean”, consider the following statements:

1. Surface zone of temperate ocean water is narrower than that of equatorial waters.
2. Thermocline is steeper for equatorial waters than mid-latitude waters.

Which of the following statements is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2 is correct.

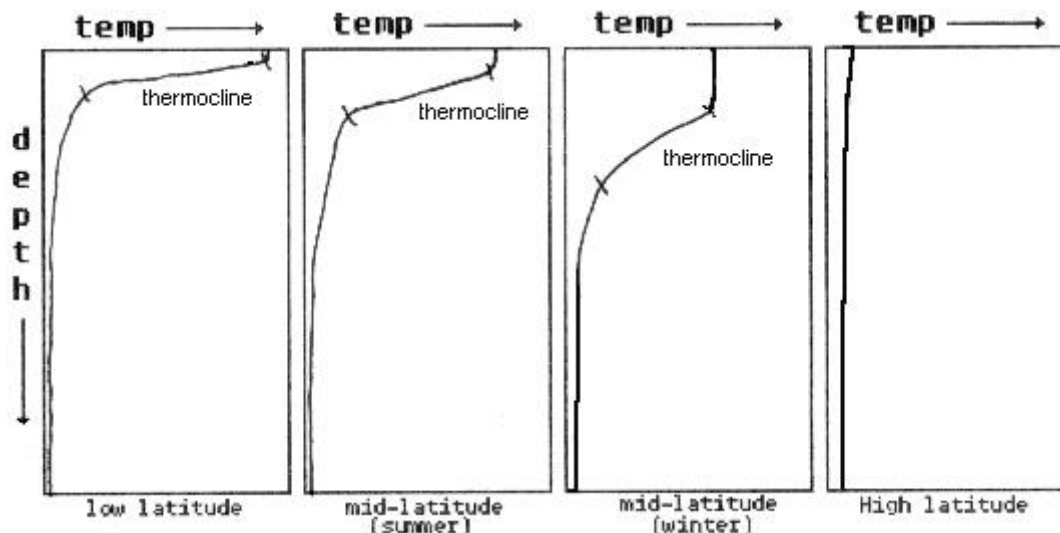
Q.3) Solution (b)

Basic Information:

Vertical Distribution of Temperature:

On the basis of the temperature, the ocean depths may be divided into the following three zones:

- **Surface Zone or Mixed Zone:** This is also known as the Photic zone or Euphoric zone. It is the upper layer of the ocean. In this layer, the temperature and salinity are relatively constant. It contains about 2 percent of the total volume of water in the ocean. It is limited to a depth of about 100 meters.
- **Thermocline:** It lies between 100 metres and 1000 metres. It contains about 18 percent of the total volume of water in the ocean. There is a steep fall in temperature in this zone. The density of water increases with increasing depth.
- **Deep Zone:** This zone lies below 1000 metres in the mid-latitudes. This zone contains about 80 percent of the total volume of water in the ocean. The temperature in this zone remains constant. The ocean bottom always has a temperature which is one or two degrees Celsius above the freezing point.



Statement Analysis:

Statement 1	Statement 2
Incorrect	Correct
<p>Surface zone of temperate ocean water is deeper than that of equatorial waters.</p> <p>Turbulence in mid-latitudes due to waves leads to constant mixing and hence the temperature does not change.</p> <p>Whereas, at equators the water is dead calm leading to less turbulent water and thus narrower surface zone.</p>	<p>Refer to the diagram.</p>

Q.4) Consider the following features of the Red and Yellow soil:

1. It develops a reddish color when it is in a hydrated form.
2. They are derived from both igneous and metamorphic rocks.
3. These soils are poor growing soils, low in nutrients and humus and difficult to cultivate because of its lower water holding capacity.

Which of the above statements are correct?

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

Q.4) Solution (b)

Basic Information:

Red and Yellow Soils:

- Seen mainly in low rainfall area.
- Also known as **Omnibus group**.
- Porous, friable structure.
- Absence of lime, kankar (impure calcium carbonate)
- Deficient in lime, phosphate, manganese, nitrogen, humus and potash.
- Colour: Red because of Ferric oxide. The lower layer is reddish yellow or yellow.
- Texture: Sandy to clay and loamy.
- Wheat, cotton, pulses, tobacco, oilseeds, potato etc. are cultivated.
- Locally called 'Chalka' in Andhra Pradesh.

Statement Analysis:

Statement 1	Statement 2	Statement 3
Incorrect	Correct	Correct
<p>The soil develops a reddish colour due to a wide diffusion of iron in crystalline and metamorphic rocks.</p> <p>It looks yellow when it occurs in a hydrated form. Often, their upper layer is red and the lower layer is</p>	<p>This soil in India, also known as the omnibus group, have been developed over Archaean granite, gneiss and other crystalline rocks, the sedimentaries of the Cuddapah and Vindhayan basins and mixed Dharwarian group of rocks.</p>	<p>Red soil is not fertile, but it does respond to fertilizer.</p>

yellow.		
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Q.5) The "Forchhammer's Principle" is related with?

- a) Coral bleaching
- b) Diurnal tides
- c) Salinity of seawater
- d) Ocean waves

Q.5) Solution (c)

Explanation:

- Forchhammer's Principle refers to the chemical composition of ocean water.
- In 1865, the Danish geologist and mineralogist **Johan Georg Forchhammer**, collected numerous samples of seawater from the Northern Atlantic and the Arctic Ocean. He wanted to determine why the salinity (or "saltiness") of seawater varies in different areas of the ocean.
- Forchhammer put the samples through a detailed series of chemical analyses and found that the proportions of the major salts in seawater stay about the same everywhere. This **constant ratio** is known as **Forchhammer's Principle**, or the **Principle of Constant Proportions**. In addition to this principle, Forchhammer is credited with **defining** the term **salinity** to mean the concentration of major salts in seawater.
- Forchhammer's discovery helped scientists understand that salinity levels in seawater vary due to the **addition or removal of fresh water, rather than differing amounts of salt minerals in the water**. The principle is still applied today in marine research, and provides a simple way to estimate salinity and trace the mixing of water masses in the global ocean.

Q.6) Consider the following statements:

1. Parallels of latitudes are equal in length.
2. In January, the isotherms deviate to the north over the ocean and to the south over the continent.

Which of the above statements is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 and 2

Q.6) Solution (b)

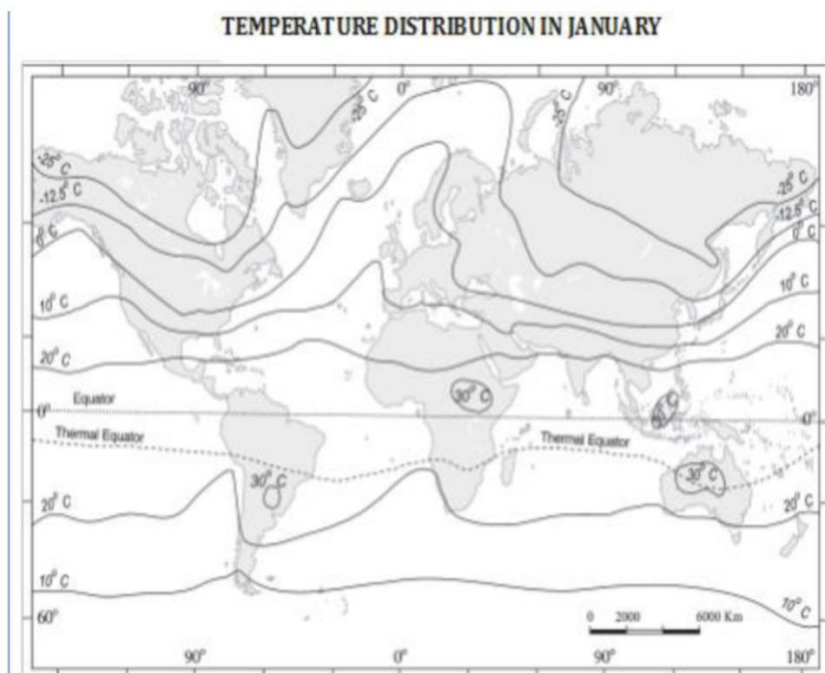
Basic Information:

Parallel of latitude:

- Path traced by complete one rotation of the earth.
- The circle is known as parallel of latitude.
- Earth's longest parallel of latitude lies midway between the two poles and called as equator.
- East-West lines.

Isotherms during January:

- In January, the isotherms deviate to the **north over the ocean** and to the **south over the continent**. This can be seen on the North Atlantic Ocean.
- The presence of warm ocean currents like Gulf Stream and North Atlantic drift, make the Northern Atlantic Ocean warmer and the isotherms bend towards the north.
- Over the land the temperature decreases sharply and the **isotherms bend towards south** in Europe. It is much pronounced in the Siberian plain.
- As the air over the ocean is warmer than that over the landmasses in the northern hemisphere, the isotherms bend equator ward while crossing the landmasses and poleward while crossing the oceans.
- Therefore, the isotherms bend equator ward while crossing the oceans and pole ward while crossing the landmasses.



Statement Analysis:

Statement 1	Statement 2
Incorrect	Correct
<p>Parallels of latitudes are not equal in length.</p> <p>As we move away from the equator the length of parallel of latitudes decreases.</p>	<p>Refer the diagram.</p>

Q.7) With reference to corals, consider the following statements:

1. Coral reefs cannot be formed on submergent coast.
2. Snowflake coral is an invasive species reported from Gulf of Mannar and Gulf of Kutch.
3. Raja Ampat archipelago of Indonesia is considered as world's coral diversity bull's eye.

Which of the above statements is/are correct?

- a) 1 and 2 only
- b) 2 only

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

Q.7) Solution (c)

Basic Information:

Snowflake coral:

- The snowflake coral is an invasive species from Hawaii and native of the tropical Western Atlantic and Caribbean. Since 1972 when it was first described as an invasive species, it has spread to Australia, Thailand, Indonesia and the Philippines. It is considered an invasive species because it has capacity to dominate space and crowd out other marine organisms.
- It is known to inhabit reefs and underwater structures such as piers and shipwreck. It can also attach itself to metal, concrete and even plastic. In India, it has been reported from Andaman and Nicobar Islands, Gulf of Mannar (Tamil Nadu), Gulf of Kutch (Gujarat) and Goa.

Coral Triangle:

- The Coral Triangle is a marine region that spans those parts of Indonesia, Malaysia, Papua New Guinea, the Philippines, the Solomon Islands and Timor-Leste with at least 500 species of reef-building corals. The Coral Triangle encompasses portions of 2 biogeographic regions: the Indonesian-Philippines Region, and the Far Southwestern Pacific Region.



- 76% (605) of the world's coral species (798) are found in the Coral Triangle, the highest coral diversity in the world.

Statement Analysis:

Statement 1	Statement 2	Statement 3
Incorrect	Correct	Correct
Coral reefs are found on western coast of India which is a submergent coast.	Snowflake coral (Carrijoa riisei), an invasive species. In India, it has been reported from the Gulf of Mannar, the Andaman and Nicobar Islands, Gulf of Kutch and Goa.	The epicenter of that coral diversity is found in the Bird's Head Peninsula of Indonesian Papua, which hosts 574 species (95% of the Coral Triangle, and 72% of the world's total). Within the Bird's Head Peninsula, the Raja Ampat archipelago is the world's coral diversity bull's eye with 553 species.

Q.8) Which of the following are periglacial landforms?

- Pingo
- Involution
- Hummock
- Thermokarst
- Palsa

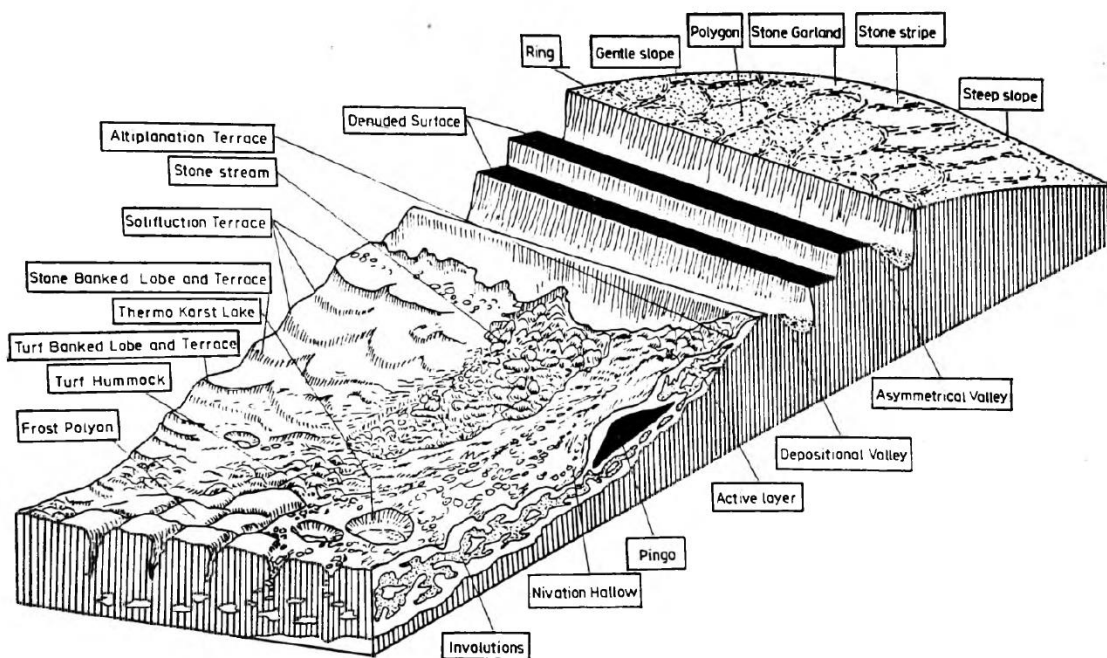
Choose the correct option:

- 1, 2 and 3 only
- 1, 2 and 4 only
- 2 and 5 only
- 1, 2, 3, 4 and 5

Q.8) Solution (d)

Basic Information:

- Periglacial areas are those which are in permanently (perennially) frozen condition but without permanent ice cover on the ground surface.
- A periglacial landform is a feature resulting from the action of intense frost, often combined with the presence of permafrost.
- Periglacial landforms are restricted to areas that experience cold but essentially nonglacial climates.
- Processes unique to periglacial environments include the formation of permafrost, the development of thermal-contraction cracks, the thawing of permafrost (the formation of thermokarst), the formation of wedge and injection ice, and certain mass movement processes that are enhanced by the presence of permafrost (eg, active-layer detachment failures).



Q.9) With reference to “tsunami”, consider the following statements:

1. Tsunamis are giant tidal waves.

2. Earthquakes of magnitude below 6.5 are very unlikely to trigger a tsunami.
3. The speed of tsunami waves depends on ocean depth rather than the distance from the source of the wave.

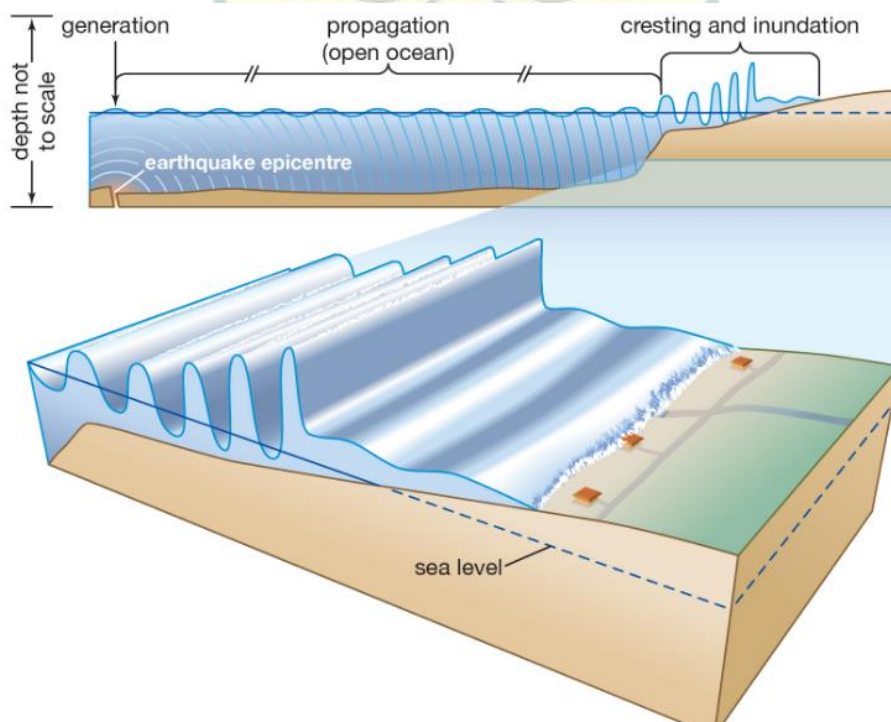
Which of the above statements is/are not correct?

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

Q.9) Solution (a)

Basic Information:

Tsunamis are giant waves caused by earthquakes or volcanic eruptions under the sea. Out in the depths of the ocean, tsunami waves do not dramatically increase in height. But as the waves travel inland, they build up to higher and higher heights as the depth of the ocean decreases.



Statement Analysis:

Statement 1	Statement 2	Statement 3
Incorrect	Correct	Correct
<p>The term tidal wave is frequently used for such a wave, but it is a misnomer, for the wave has no connection with the tides.</p> <p>Although both are sea waves, a tsunami and a tidal wave are two different and unrelated phenomena. A tidal wave is a shallow water wave caused by the gravitational interactions between the Sun, Moon, and Earth ("tidal wave" was used in earlier times to describe what we now call a tsunami.) A tsunami is an ocean wave triggered by large earthquakes that occur near or under the ocean, volcanic eruptions, submarine landslides, or by onshore landslides in which large volumes of debris fall into the water.</p>	<p>Magnitudes below 6.5: Earthquakes of this magnitude are very unlikely to trigger a tsunami.</p> <p>Magnitudes between 6.5 and 7.5: Earthquakes of this size do not usually produce destructive tsunamis. However, small sea level changes might be observed in the vicinity of the epicenter.</p> <p>Magnitudes between 7.6 and 7.8: Earthquakes of this size might produce destructive tsunamis, especially near the epicenter.</p> <p>Magnitude 7.9 and greater: Destructive local tsunamis are possible near the epicenter, and significant sea level changes and damage might occur in a broader region.</p>	<p>The speed of tsunami waves depends on ocean depth rather than the distance from the source of the wave.</p>

Q.10) Consider the following statements:

1. Lithification is a process of porosity destruction.
2. Chert and Dolomite are clastic sedimentary rocks.

Which of the above statements is/are correct?

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

Q.10) Solution (a)

Statement Analysis:

- Sediments are a result of denudation as well as lithification.
- Lithification is the process that turns loose, unconsolidated sediment into solid sedimentary rock through compaction, cementation, and recrystallization.

There are three subclasses of sedimentary rocks:

- Clastic: composed of rock and mineral fragments. Example: sandstone, siltstone, conglomerate etc.
- Chemically precipitated: formed by chemical precipitation from sea water or salty inland lakes. Example: limestone, dolomite, chert, evaporate etc.
- Organic: formed from organic minerals. Example: Coal, petroleum, natural gas

Statement Analysis:

Statement 1	Statement 2
Correct	Incorrect
Essentially, lithification is a process of porosity destruction through compaction and cementation.	Chert and Dolomite are chemically precipitated sedimentary rocks.

Q. 11) Consider the following statements about diastrophic forces:

1. Process of orogeny may cause the crust to severely deform into folds, while during epeirogeny, there may be simple deformation.
2. Both orogenic processes and epeirogenic processes can cause metamorphism of rocks.

Which of the following statements is/are correct?

- a) 1 only

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

Q.11) Solution (c)

Basic Information:

- All processes that move, elevate or build up portions of the earth's crust come under diastrophism. They include:
 - I. orogenic processes involving mountain building through severe folding and affecting long and narrow belts of the earth's crust;
 - II. epeirogenic processes involving uplift or warping of large parts of the earth's crust;
 - III. earthquakes involving local relatively minor movements;
 - IV. 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. Through the processes of orogeny, epeirogeny, earthquakes and plate tectonics, there can be faulting and fracturing of the crust.
- All these processes cause pressure, volume and temperature (PVT) changes which in turn induce metamorphism of rocks.

Statement Analysis:

Statement 1	Statement 2
Correct	Correct
Orogenic process leads to mountain building, while epeirogenic process leads to formation of batholiths and cratons.	These processes cause pressure, volume and temperature (PVT) changes which in turn induce metamorphism of rocks.

Q.12) Consider the following statements about chemical processes:

1. *Solution* process involves removal of solids in solution in water or weak acids.

2. Sodium chloride is a rock forming mineral, but is not susceptible to this process of *solution*.
3. Through the process of *hydration*, minerals get disintegrated to form water molecules.

Which of the following statements is/are correct?

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

Q.12) Solution (a)

Basic Information:

- 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 clastic state through chemical reactions by oxygen, surface and/or soil water and other acids. Water and air (oxygen and carbon dioxide) along with heat must be present to speed up all chemical reactions. Over and above the carbon dioxide present in the air, decomposition of plants and animals increases the quantity of carbon dioxide underground.
 - **Solution**
When something is dissolved in water or acids, the water or acid with dissolved contents is called solution. This process involves removal of solids in solution and depends upon solubility of a mineral in water or weak acids. Common salt (sodium chloride) is also a rock forming mineral and is susceptible to this process of solution.
 - **Hydration**
Hydration is the chemical addition of water. Minerals take up water and expand; this expansion causes an increase in the volume of the material itself or rock. Calcium sulphate takes in water and turns to gypsum, which is more unstable than calcium sulphate. This process is reversible and long, continued repetition of this process causes fatigue in the rocks and may lead to their disintegration.

Statement Analysis:

Statement 1	Statement 2	Statement 3
Correct	Incorrect	Incorrect
This process involves removal	Sodium Chloride is common salt	In hydration, minerals take

of solids in solution and depends upon solubility of a mineral in water or weak acids.	which is soluble in water.	up water and expand.
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Q.13) Consider the following statements about sunspots:

1. Sunspots are areas of weak magnetic activity.
2. Sunspots can cause a sudden explosion of energy called a solar flare.

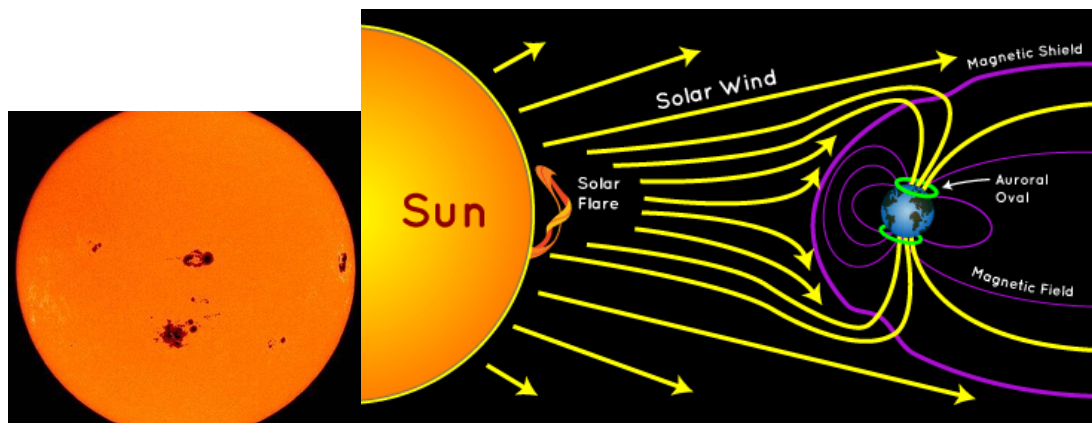
Which of the following statements is/are correct?

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

Q.13) Solution (b)

Basic Information:

- Sunspots (some as large as 50,000 km in diameter) are areas that appear dark on the surface of the Sun (photosphere). They appear dark because they are cooler than other parts of the Sun's surface.
- They are relatively cool because they form at areas where magnetic fields are particularly strong. These magnetic fields are so strong that they keep some of the heat within the Sun from reaching the surface.
- In every solar cycle, the number of Sunspots increases and decreases.
- The current solar cycle, which began in 2008, is in its 'solar minimum' phase, when the number of Sunspots and solar flares is at a routine low.
- The magnetic field lines near sunspots often tangle, cross, and reorganize. This can cause a sudden explosion of energy called a solar flare.



Statement Analysis:

Statement 1	Statement 2
Incorrect	Correct
Sunspots are areas of high magnetic activity.	They cause solar flares.

Q.14) Which one of the following is not a minor relief feature in the oceans?

- a) Seamount
- b) Oceanic Deep
- c) Atoll
- d) Mid oceanic ridge

Q.14) Solution (b)

Basic Information:

- **Minor Relief Features**

Apart from the above mentioned major relief features of the ocean floor, some minor but significant features predominate in different parts of the oceans.

- Mid oceanic ridges
- Seamount
- Submarine Canyons
- Guyots
- Atolls

Q.15) Consider the following statements about soils:

1. Urvaran soils are sterile soils, while usara soils are fertile.
2. Ideal ratio of N, P and K in soil should be 4:3:1.
3. Residual soils are generally found in areas where transportation of weathered material has not taken place.

Which of the following statements is/are correct?

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

Q.15) Solution (c)

Basic information:

- Ideal ratio of N, P and K should be 4:2:1 but India its 8:4:1. Urea is out of Nutrient based subsidy and so is misused. Due to the high misuse of urea there is nitrate pollution in ground and water.
- Soil Classification – Urvara vs Usara
In India, soil had been classified from the ancient period itself even though it was not as detail as the modern classifications.
In the ancient period, the classification was based on only two things; whether the soil is fertile or sterile. Thus the classifications were:
Urvara [fertile]
Usara [sterile]
- Residual soil is the material resulting from the in situ weathering of the parent rock.

Statement Analysis:

Statement 1	Statement 2	Statement 3
Incorrect	Incorrect	Correct
The definition is reversed. Uravara is fertile and usara is	Ideal ratio of N, P and K should be 4:2:1.	Black soil is a residual soil in India, alluvial soil is not.

sterile.		
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Q.16) Consider the following statements:

1. Polar vortex in northern hemisphere rotates in anti-clockwise direction.
2. Polar Easterlies in northern hemisphere rotate in clockwise direction.

Which of the following statements is/are correct?

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

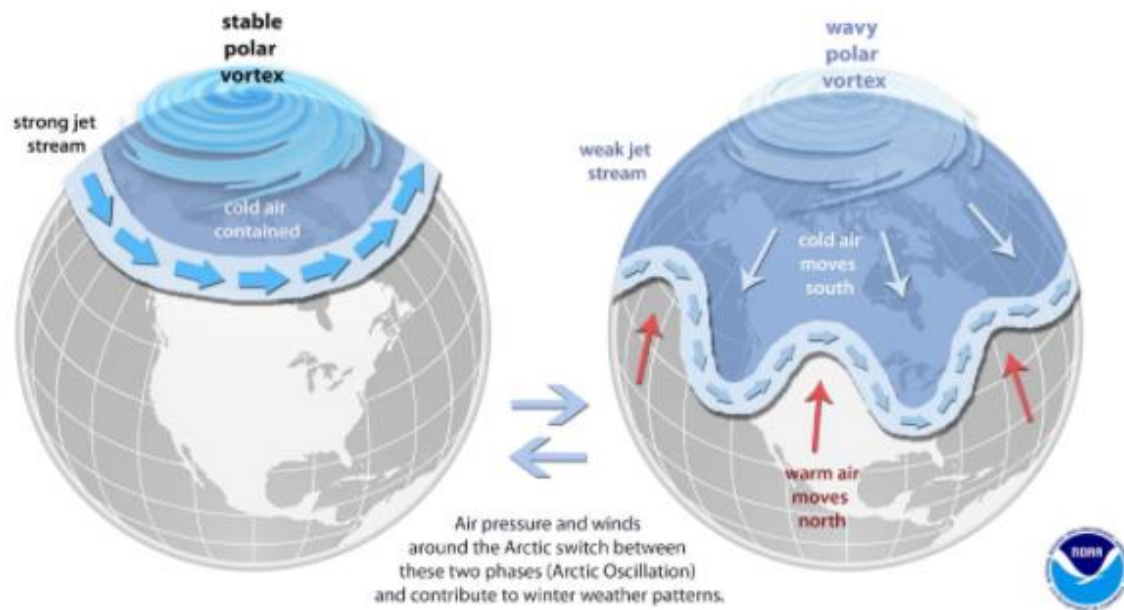
Q.16) Solution (c)

Basic information:

- The polar vortex is a large area of low pressure and cold air surrounding both of the Earth's poles. It was also known as the Polar Pig.
- The term "vortex" refers to the counterclockwise flow of air that helps keep the colder air near the Poles. It always exists near the poles, but weakens in summer and strengthens in winter.
- However, many times during winter in the northern hemisphere, the polar vortex will expand, sending cold air southward. This occurs fairly regularly during wintertime and is often associated with large outbreaks of Arctic air in the United States and portions of Europe and Asia.
- It is also not a feature that exists at the Earth's surface, rather it exists tens of thousands of feet up in the atmosphere.
- By itself, the only danger to humans is the magnitude of how cold temperatures will get when the polar vortex expands, sending Arctic air southward into areas that are not typically that cold.

The Science Behind the Polar Vortex

The polar vortex is a large area of low pressure and cold air surrounding the Earth's North and South poles. The term vortex refers to the counterclockwise flow of air that helps keep the colder air close to the poles (left globe). Often during winter in the Northern Hemisphere, the polar vortex will become less stable and expand, sending cold Arctic air southward over the United States with the jet stream (right globe). The polar vortex is nothing new — in fact, it's thought that the term first appeared in an 1853 issue of E. Littell's *Living Age*.



Statement Analysis:

Statement 1	Statement 2
Correct	Correct
Aloft pressure condition above poles is low. When winds converge at this low pressure they move counter-clockwise in the northern hemisphere.	Polar Easterlies rotate in clockwise direction as winds diverge from polar surficial high pressure area.

Q.17) Consider the following statements about dense fog conditions in northern plains during late February in India:

1. This fog has occurred due to anticyclone build up.
2. Lack of western disturbances has amplified the occurrence of fog.

Which of the following statements is/are correct?

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

Q.17) Solution (c)

Basic Information:

- Fog during time of the year for long 5 days is not common in northern plains.
- According to IMD officials, lack of western disturbances and build-up of an anti-cyclonic type of condition in the northern plains are the reasons.
- Anti-cyclone causes air to calm down, such calm air conditions lead to formation of advection fogs.
- The easterly winds blowing in this part of India provided the moisture which condensed to form dense fogs.

Mercury rising but city continues to see dense fog

EXPRESS NEWS SERVICE
NEW DELHI, FEBRUARY 19

DENSE FOG has hit Delhi several times over the past 10 days, in what meteorologists are calling a "unique" event. Dense fog events are not common in the second and third week of February, as temperatures start rising.

IMD officials said moist easterly winds, low wind speed, lack of western disturbances, and an easterly system over central India are responsible for the weather event, which has affected Delhi, Punjab and Haryana.

On Friday, flight departures were stopped between 7:15 am

and 8:30 am and around 70 flights were delayed. As airlines have many pilots trained to land in very low visibility conditions, only departures were affected, not arrivals, airport officials said.

In the last 10 days, at least 15 flights have been affected each day due to low visibility levels, the official said. "Unusual and very dense fog coverage over the Delhi-Haryana-Punjab and Lahore-Amritsar-Hisar-Delhi belts has been seen persistently at the airport as well as in satellite data. It is an unusual spell in terms of its duration. It lasted over Punjab, especially at Amritsar, airport from 7-8 pm till around 10:30 am the next morning. In Delhi, it has caused



February has seen 5 hours of very dense fog. Praveen Khanna

very dense fog on 3-4 mornings. Never has there been such dense fog over large areas simultane-

ously for long durations daily for so many days, after February 10 in any winter. Dense fog in February

is normal, but only in the first week. This year, this spell has occurred when night temperatures were 2 to 3 degrees Celsius above normal. This is unique," said RK Jenamani, DGM, National Weather Forecasting Centre.

According to officials, while very dense fog (visibility dropping to zero) was seen in December for only 1.5 to 2 hours, in February, there have already been 5 hours with very dense fog.

Among the main reasons for this trend, Jenamani said, was the absence of an active western disturbance affecting the plains: "This caused an anti-cyclone high pressure belt. Anti-cyclone causes stable boundary layer and

inversion and calm winds at lower levels — the number one criteria for dense fog to persist."

High pollution levels — Delhi's air quality on Friday was very poor with the AQI at 311 — also contribute to fog formation.

Easterly wind patterns over central India have also contributed to bringing more moisture in Delhi's air. Usually at this time of the year, dry wind blows in from the west or northwest region. Moisture is a prerequisite for fog. On Thursday and Friday, the highest humidity recorded was 100% (during morning hours).

IMD has forecast moderate to dense fog on Saturday, and moderate fog on Sunday and Monday.

Statement Analysis:

Statement 1	Statement 2
Correct	Correct

Stable conditions will result in more radiation loss of heat, leading to formation of fogs.

Western disturbances can also cause fogs, but not during this time of the year.

Q.18) Consider the following statements about ozone holes:

1. It refers to a region in the stratosphere where the ozone layer becomes non-existent in certain months.
2. Arctic ozone hole is larger than the Antarctic ozone hole.
3. Ozone hole deteriorates in summer season to more profound effect of global warming.

Which of the following statements is/are incorrect?

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

Q.18) Solution (d)

Basic Information:

Ozone Hole:

- Ozone hole refers to a region in the stratosphere where the concentration of ozone becomes extremely low in certain months.
- Ozone (chemically, a molecule of three oxygen atoms) is found mainly in the upper atmosphere, an area called the stratosphere, between 10 and 50 km from the earth's surface.
- Ozone absorbs the harmful UltraViolet (UV) radiations from the sun eliminating a big threat to life forms on earth.
- The ozone holes most commonly refer to the depletions over Antarctica, forming each year in the months of September, October and November.
- In spring, temperatures begin to rise, the ice evaporates, and the ozone layer starts to recover.
- Arctic temperatures do not usually fall as low as in Antarctica, but sometimes, powerful winds flowing around the North Pole trap cold air within what is known as the polar

vortex— a circling whirlpool of stratospheric winds. This led to formation of ozone hole in the Arctic region.

- However, the size of hole was still small compared to that usually observed in the southern hemisphere.

Statement Analysis:

Note: Incorrect statements are asked.

Statement 1	Statement 2	Statement 3
Incorrect	Incorrect	Incorrect
Ozone layer thins considerably, but doesn't become non-existent.	Antarctic ozone hole is larger and permanent. Arctic is smaller and temporary.	Global warming has an effect on ozone layer, but ozone hole is more profound during polar winters.

Q.19) Consider the following statements:

1. Denmark Strait is the widest strait in the world.
2. Strait of Malacca lies in between Singapore and Borneo.
3. English Channel lies between England and Belgium.

Which of the following statements is/are correct?

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

Q.19) Solution (a)

Basic Information:

- Widest strait of world – Denmark strait (or Greenland strait) which separates Greenland from Iceland. It is 290 km wide at the narrowest point. Narrowest strait of world – Bosphorus strait, at the narrowest point the width is 800 m.



- The Strait of Malacca or Straits of Malacca is a narrow stretch of water, 580 mi in length, between the Malay Peninsula and the Indonesian island of Sumatra. As the main shipping channel between the Indian Ocean and the Pacific Ocean, it is one of the most important shipping lanes in the world.



- The English Channel, also called simply the Channel, is an arm of the Atlantic Ocean that separates Southern England from northern France and links to the southern part of the North Sea by the Strait of Dover at its northeastern end. It is the busiest shipping area in the world.



Statement Analysis:

Statement 1	Statement 2	Statement 3
Correct	Incorrect	Incorrect
It is a fact.	It lies between Malaysia and Singapore on one side and Sumatra on the other side.	Dover strait lies between UK and France.

Q.20) Consider the following statements:

1. Geosynclines are narrow oceanic tracts that can be associated with orogeny.
2. Ancient Tethys Sea can be understood as a geosyncline.

Which of the following statements is/are correct?

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

Q.20) Solution (c)

Basic Information:

- Rigid masses representing the ancient nuclei of the present continents have remained stable for considerably longer periods of time.
- These rigid masses are supposed to have been surrounded by mobile zones of water characterized by extensive sedimentation. These mobile zones of water have been termed 'geosynclines' which have now been converted by compressive forces into folded mountain ranges.
- On an average, a geosyncline means a water depression characterized by sedimentation. It has now been accepted by majority of the geologists and geographers that all the mountains have come out of the geosynclines and the rocks of the mountains originated as sediments were deposited and later on consolidated in sinking seas, now known as geosynclines.

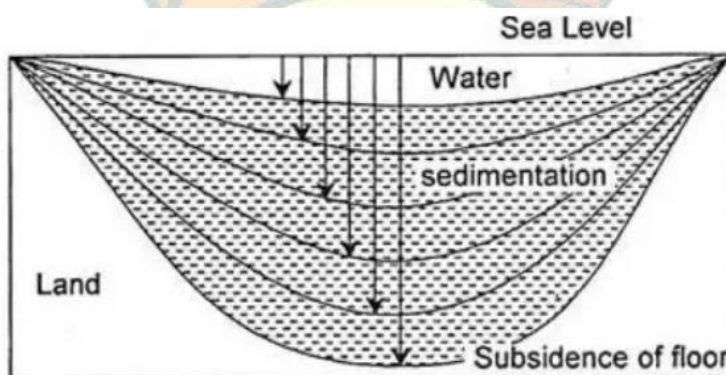


Fig. 11.2 : Sinking beds of geosynclines due to sedimentation and subsidence.

- Himalayan mountains have come out of a great geosyncline called the Tethys Sea and that the uplift has taken place in different phases.

Statement Analysis:

Statement 1	Statement 2
Correct	Correct
Orogeny can be explained on the basis of geosynclines.	Himalayas have originated from Tethys Sea, a geosyncline.

Q.21) Consider the following statement about 'Olive Ridley Turtles':

1. They inhabit both warm and cold water of Pacific, Atlantic, Indian and Arctic Ocean.
2. Robert Island on the coast of Odisha is also one of their nesting sites.
3. They are categorised under Schedule 1 of the Wildlife Protection Act, 1972.

Which of the given statements is/are correct?

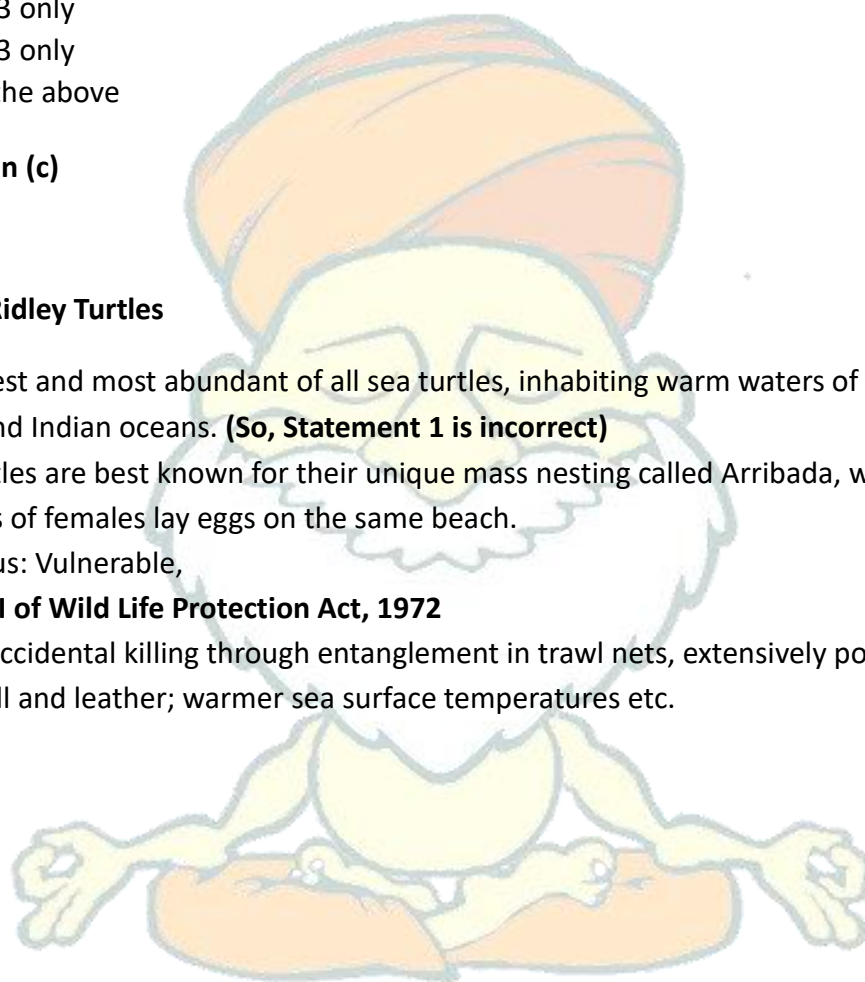
- a) 1 and 2 only
- b) 1 and 3 only
- c) 2 and 3 only
- d) All of the above

Q.21) Solution (c)

Explanation

About Olive Ridley Turtles

- It is smallest and most abundant of all sea turtles, inhabiting warm waters of the Pacific, Atlantic and Indian oceans. **(So, Statement 1 is incorrect)**
- These turtles are best known for their unique mass nesting called Arribada, where thousands of females lay eggs on the same beach.
- IUCN status: Vulnerable,
- **Schedule-I of Wild Life Protection Act, 1972**
- Threats: Accidental killing through entanglement in trawl nets, extensively poached for their meat, shell and leather; warmer sea surface temperatures etc.





Q.22) Consider the following statements regarding 'Positron':

1. They are known as anti-particle of electron.
2. Except electronic charge, all features of positron and electron are same..

Which of the above given statement is/is/are correct?

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

Q.22) Solution (c)

Explanation:

About Positron

- The positron is the antiparticle or the antimatter counterpart of the electron.
- The positron has an electric charge of $+1 e$, a spin of $1/2$ (the same as the electron), and has the same mass as an electron.
- Also known as anti-electron, it has the same properties as the electron with the exception of electric charge.
- Electron has a negative charge while the positron has a positive charge.

Q.23) As per Supreme Court judgements which of the following conditions needed for an act to be seditious?

1. Disrespect of Government of India
2. Disruption of public order
3. Attempt to violently overthrow a lawful government
4. Threatening the security of State or of public

Choose the correct option:

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

Q.23) Solution (d)

Explanation:

Various verdicts in Romesh Thappar case, Kedar Nath Singh case, Kanahiya Kumar case re-defined a seditious act only if it had essential ingredients as

- Disruption of public order
- Attempt to violently overthrow a lawful government
- Threatening the security of State or of public

Q.24) Consider the following statement 'Cantonment Board':

1. It is established for the administration of all military personal in the cantonment area.
2. These are set up by the act of state government, where cantonment area is established.
3. It is administered by Ministry of Home Affairs as that is responsible for internal security.

Which of the above statement is/are incorrect?

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

Q.24) Solution (d)

Explanation

About Cantonment Board

- Cantonment board is established for **administration for civilian population** in the cantonment area.
- Cantonment Board is **set up under Cantonment Act 2006**.
- It works under administrative control of **defence ministry of Central government**.
- The board comprises elected members besides ex-officio and nominated members as per the Cantonments Act, 2006.
- The term of office of a member of a board is five years.
- A cantonment board consists of eight elected members, three nominated military members, three ex-officio members (station commander, garrison engineer and senior executive medical officer), and one representative of the district magistrate.
- There are 64 Cantonment Boards in India.

Q.25) Operation Samudra Setu II is related to :

- a) Joint military exercise between Indian Navy and US Navy
- b) Mission to repatriate Indian Citizen from Overseas
- c) Shipment of Oxygen Cylinders to India
- d) International aid by India to Covid-19 affected Nations

Q.25) Solution (c)

Explanation:

About Operation Samudra Setu II

- Indian Navy has launched Operation Samudra Setu-II for shipment of Oxygen-filled containers to India.
- Seven Indian Naval ships viz. Kolkata, Kochi, Talwar, Tabar, Trikand, Jalashwa and Airavat have been deployed for shipment of liquid medical oxygen-filled cryogenic containers and associated medical equipment from various countries.

Operation Samudra Setu was launched in May 2020 as part of the national effort to repatriate Indian citizens from overseas during the Covid-19 pandemic.

Q.26) Match the following Alternative Investment Fund Category with Examples:

1. AIF Category I	A. Hedge Fund
2. AIF Category II	B. Venture Capital Fund
3. AIF Category III	C. Private Capital Fund

Which of the given statement are correct?

- a) 1- A, 2- B, 3- C
- b) 1- B, 2- C, 3- A
- c) 1- B, 2- A, 3- C
- d) 1- C, 2- A, 3- B

Q.26) Solution (b)

Explanation:

Alternative Investment Funds (AIF)

- It's a technical classification by SEBI:
- A. AIF Category I:** They generate positive spill over effects on the economy. Example: Venture Capital Funds, Angel investors fund, SME Funds, social venture fund, Infrastructure funds. SEBI keeps relaxed / lighter norms on them.
- B. AIF Category II:** Neither in Cat-1 nor in Cat-3 E.g. Private Equity or Debt Fund.
- C. AIF Category III:** They undertake excessive risk to generate high returns in short period of time. E.g. Hedge Funds. SEBI norms are stricter/heavier on them, because otherwise they may destabilize the capital market.

Q.27) Consider the following statement about 'Network for Greening the Financial System (NGFS)':

1. The NGFS is an inter-governmental body comprising of both governmental and private members.

2. It was launched at Paris one Planet One Summit, 2017.

Which of the following statement is/are correct?

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

Q.27) Solution (b)

Explanation:

About NGFS:

- The NGFS is a **group of Central banks and supervisors** willing to share the best practices and contribute to the development of the environment and climate risk management in the financial sector. (So, Statement 1 is incorrect)
- **The System was launched at the Paris One Planet Summit in December 2017.** (So, statement 2 is correct.)
- According to its charter, the purpose of the NGFS is "is to define, promote and contribute to the development of best practices to be implemented within and outside of the Membership of the NGFS and to conduct or commission analytical work on green finance."
- The network was launched by 8 founding central banks.

Q.28) Consider the following agency related to '5Gi technology':

1. 5Gi technology is Indian version of 5G technology, which has smaller reach than 5G Technology.
2. It has been developed by Centre for Development of Telematics (C- DOT).

Which of the given statement is/are correct?

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

Q.28) Solution (d)

Explanation:

5G Trials in India

- The Centre said that the telcos will be encouraged to conduct trials using 5Gi technology in addition to the already known 5G Technology.
- The International Telecommunications Union (ITU) has also approved the **5Gi technology, which facilitates a much larger reach of the 5G towers and Radio networks.**
- **The IIT Madras, Centre of Excellence in Wireless Technology (CEWiT), and IIT Hyderabad have developed the 5Gi technology.**

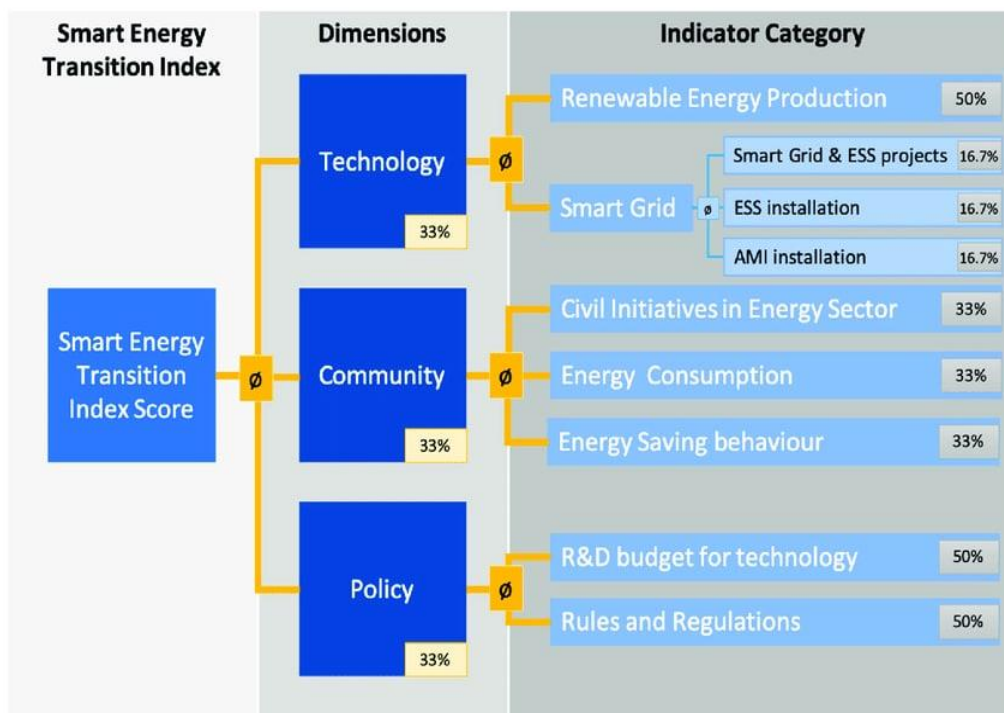
Q.29) 'Global energy transition index' is released by:

- a) International Energy Agency (IEA)
- b) Organization of the Petroleum Exporting Countries(OPEC)
- c) World economic forum (WEF)
- d) Organisation for Economic Co-operation and Development (OECD)

Q.29) Solution (c)

About Global energy transition index

- It is released by World economic forum.
- Sweden is in the first position followed by Norway (2nd) and Denmark (3rd).India ranks 87th
- India has targeted improvements through subsidy reforms and rapidly scaling energy access, with a strong political commitment and regulatory environment for the energy transition.



Q.30) Consider the following statement about 'India-United Kingdom Relation':

1. India is largest investor in United Kingdom and UK is 2nd largest investor in India.
2. Indian Companies has created more than 1,10,000 jobs in United Kingdom

Choose the correct option:

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

Q.30) Solution (b)

Explanation:

Statement 1: India is the **second largest foreign investor in the UK**. While UK ranks 18th as a trading partner of India and third after Mauritius and Singapore as an investor in India. There are many bilateral trade agreements between the two nations designed to strengthen ties. **(So, Statement 1 is incorrect)**

Statement 2: India continued to be the 2nd largest investor in the UK and emerged as the

second largest international job creator with Indian companies having created over 110,000 jobs in the UK.

Directions for the following 3 (three) questions:

Study the problem statements given below and answer the questions that follow.

Five boys Ashwin, Dipesh, Eshan, Chetan and Bipin and five girls Parul, Komal, Radha, Savita and Vimala sit in two rows facing towards each other. All the boys are in one row and all the girls in the other row

Eshan who is to the immediate right of Bipin and opposite to Parul is not at any end.

Radha, who is immediate to the right of Komal and opposite to Chetan, is at one of the ends

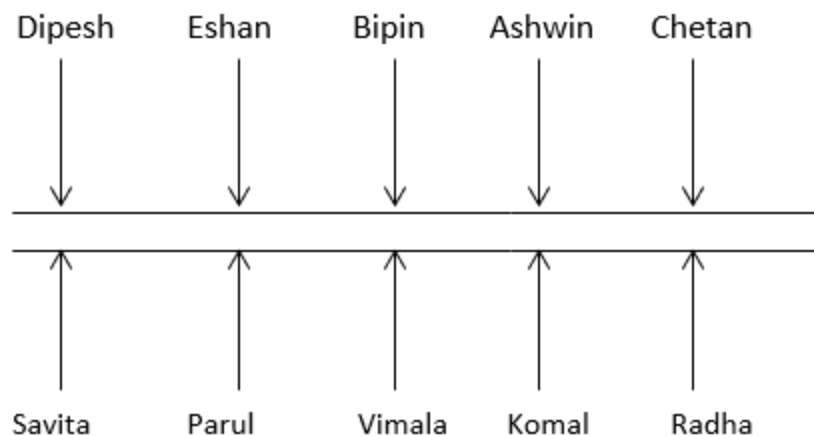
Ashwin is opposite to Komal who is the third to the right of Savita.

Dipesh and Vimala are not opposite each other

Q.31) Who is in the middle of the row of boys?

- a) Ashwin
- b) Bipin
- c) Dipesh
- d) None of the above

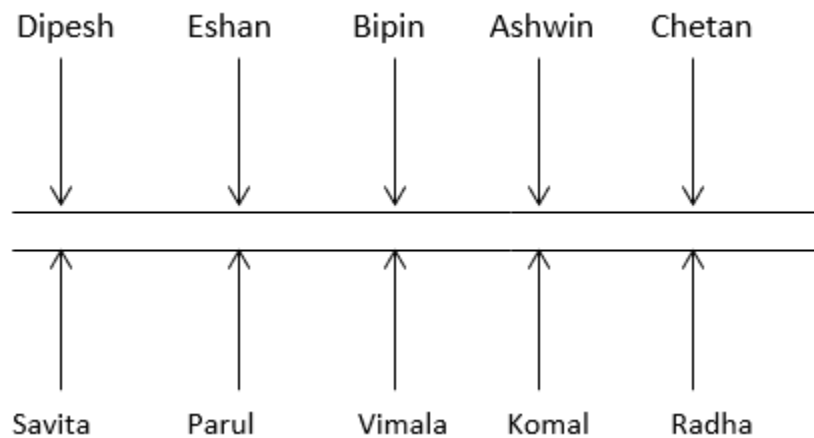
Q.31) Solution (b)



Q.32) Who is opposite of Dipesh?

- a) Komal
- b) Savita
- c) Parul
- d) Radha

Q.32) Solution (b)

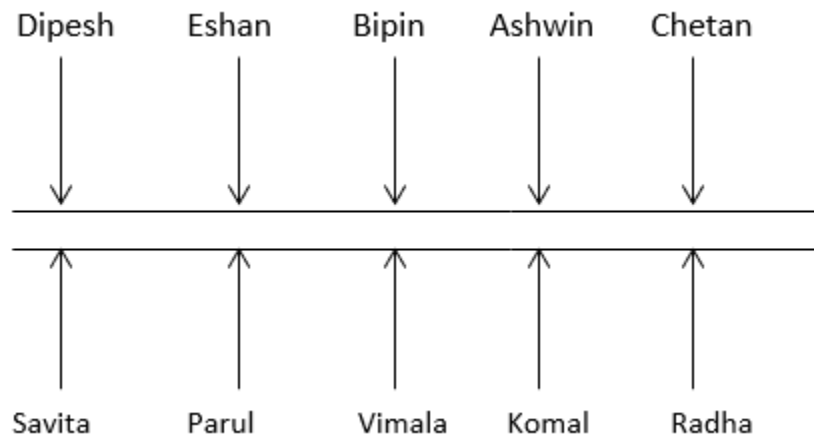


Q.33) Who is immediately to the right of Parul?

- a) Radha
- b) Savita
- c) Vimala
- d) Komal

Q.3) Solution (c)





Q.34) A rectangular field is to be fenced on three sides leaving a side of 20 feet uncovered. If the area of the field is 680 sq. feet, how many feet of fencing will be required?

- a) 34 m
- b) 40 m
- c) 60 m
- d) 88 m

Q.34) Solution (d)

We have: $l = 20$ ft. and $lb = 680$ sq ft.

So, $b = 34$ ft.

Length of fencing = $(l + 2b) = (20 + 68)$ ft. = 88 ft.

Q.35) A clock loses 5 minutes every hour and was set right at 11AM on a Monday. When will it show the correct time again?

- a) 11 AM on Sunday
- b) 11 AM on Tuesday
- c) 11 AM on Wednesday
- d) 11 AM on Saturday

Q.35) Solution (a)

A faulty clock will show correct time when it loses or gains 12 Hours.

In the given problem, clock loses 5 Minutes in an hour. So, 1 Minute lost in every 12 minutes (60 minutes / 5 minutes = 12 minutes).

Now, for losing 12 hours i.e. 720 Minutes ($12 \times 60 = 720$) it will take $720 \times 12 = 8640$ Minutes = 144 Hours = 6 Days.

So, Clock will show correct time after 6 days from 11AM Monday.

Thus, Answer is 11AM on Sunday.

