Prelims Refresher Programme: Day 21-Test 6

QUESTION 1:

Which of the following statements is/are correct with reference to 'Earthquake waves':

1. Body waves and surface waves are the two types of Earthquake waves.
2. Surface waves are more destructive than Body waves.
3. Secondary waves can travel through gaseous, liquid and solid materials.

Select the correct answer using the code given below:

(A) 1 and 2 only
(B) 1 and 3 only
(C) 2 and 3 only
(D) 1, 2 and 3

Answer: A

Explanation

- An earthquake is the shaking of the earth. It is caused due to the release of energy, which generates waves that travel in all directions.
- 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**
  - Surface waves travel only through the crust**. Hence, statement 1 is correct.**
- Surface waves are of a lower frequency than body waves and are easily distinguished on a seismogram as a result.
  - They cause displacement of rocks and hence, are almost **entirely responsible for the damage and destruction** associated with earthquakes. **Hence, statement 2 is correct**
- Body waves are of two types-Primary (P) and secondary (S) waves.
  - The P-waves are similar to sound waves. They travel through gaseous, liquid and solid materials.
  - However, **S-waves can travel only through solid materials.**
  - **Hence, statement 3 is not correct.**

QUESTION 2:

With reference to the internal structure of the earth, consider the following statements:

1. Oceanic crust is thinner than the continental crust.
2. Moho discontinuity forms the boundary between the core and mantle.
3. The inner core is in solid-state owing to high pressure due to gravity.

Which of the statements given above is/are correct?

(A) 1 and 2 only
(B) 1 and 3 only
(C) 2 and 3 only
(D) 1, 2 and 3

Answer: B

Explanation

- The internal structure of the earth can be categorised into 3 layers-the Crust, the Mantle and the core.

- **Core**: It is the outermost solid part of the earth. It is brittle in nature. **Oceanic crust is thinner as compared to the continental crust.**
  - The mean thickness of oceanic crust is 5 km whereas that of the continental is around 30 km. The continental crust is thicker in the areas of major mountain systems. It is as much as 70 km thick in the Himalayan region. **Hence, statement 1 is correct.**
- The portion of the interior beyond the crust is called the mantle. Mohorovicic (Moho) discontinuity forms the boundary **between the crust and the asthenosphere** (**upper reaches of the mantle**) where there is a discontinuity in the seismic velocity. **Hence, statement 2 is not correct.**
- The outer core is in liquid state while the inner core is in solid state. The outer core is a liquid because the temperatures there are adequate to melt the iron-nickel alloy.
  - However, the inner core is a solid even though its temperature is higher than the outer core. Here, **tremendous pressure, produced by the weight of the overlying rocks due to gravitational pull, is strong** enough to crowd the atoms tightly together.. **Hence, statement 3 is correct.**

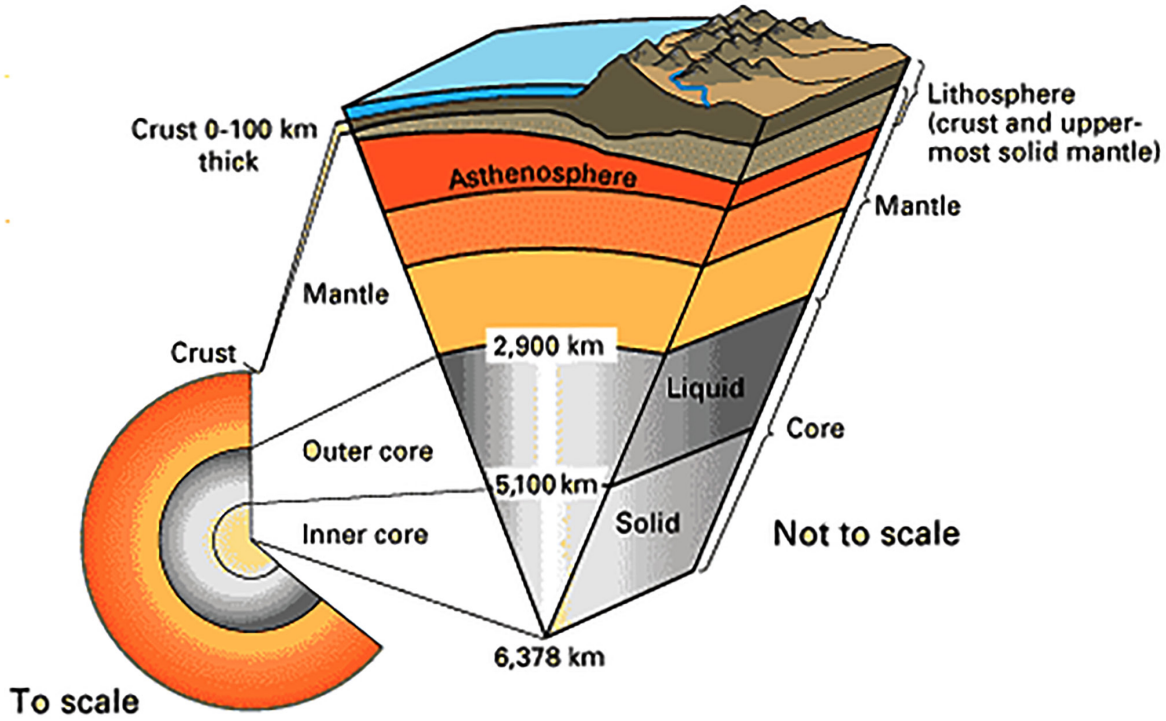


Fig: Internal layers of the earth

QUESTION 3:

With reference to Volcanic intrusive landforms, consider the following pairs:

	Intrusive form	Pattern
1.	Batholiths	Large domes
2.	Lacoliths	Saucer shape
3.	Phacoliths	Wavy mass of intrusive rocks
4.	Dykes	Near horizontal bodies of intrusive rocks

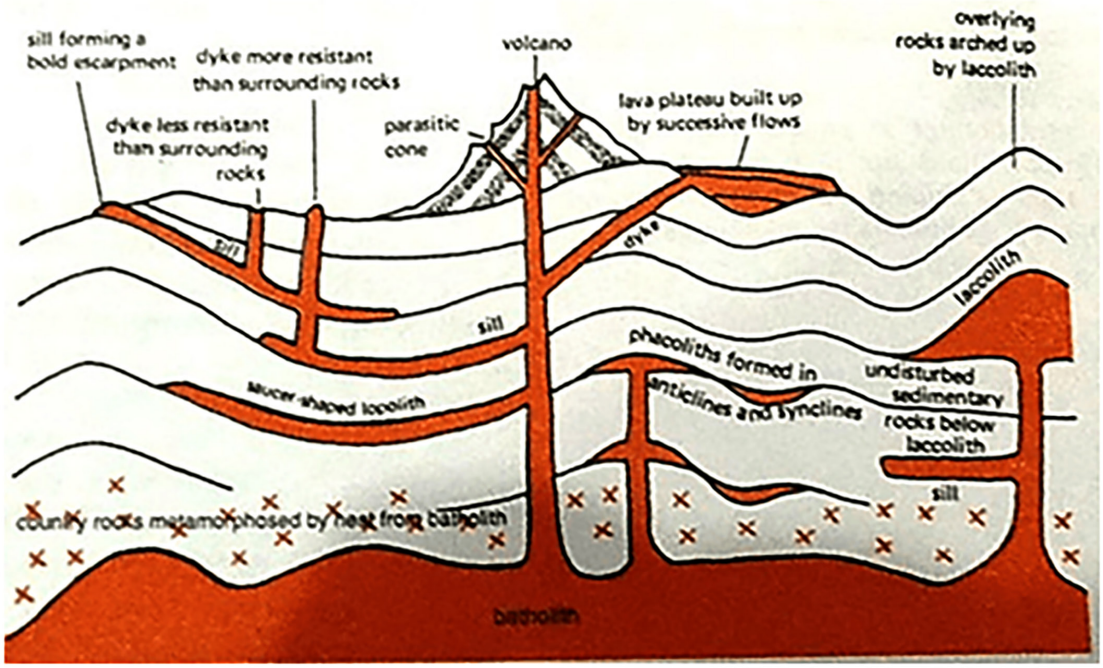
Which of the pairs given above is/are correctly matched?

(A) 1 and 3 only
(B) 1, 2 and 3 only
(C) 1, 2, and 4 only
(D) 1, 2, 3 and 4

Answer: A

Explanation

- The lava that is released during volcanic eruptions on cooling develops into igneous rocks. The lava that cools within the crustal portions assumes different forms. These forms are called intrusive forms.
- **Batholiths**: A large body of magmatic material that cools in the deeper depth of the crust develops **in the form of large domes**. They cover large areas, and at times, assume depth that may be several kms. These are granitic bodies. **Hence, pair 1 is correctly matched.**
- **Lacoliths:** These are large dome-shaped intrusive bodies with a **level base and connected by a pipe-like conduit from below**. It can be regarded as the localised source of lava that finds its way to the surface.



- **Lapolith**: The molten lava after cooling off takes a form of saucer shaped mass of intrusive rocks is called Lapolith. **Hence, pair 2 is not correctly matched.**
  - **A wavy mass of intrusive rocks,** at times, is found at the base of synclines or at the top of anticlines in folded igneous country. Such wavy materials have a definite conduit to source beneath in the form of magma chambers (batholiths). These are called the **phacoliths**. **Hence, pair 3 is correctly matched.**
  - **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. While a v**ertical or wall-like intrusive mass is known as Dykes**. **Hence, pair 4 is not correctly matched.**

QUESTION 4:

With reference to the Soil-forming Factors, consider the following statements:

1. Parent material is a passive factor while Topography is an active factor in the process of soil formation.
2. Time determines maturation of soils and profile development.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: B

Explanation

- Five basic factors control the formation of soils: (i) parent material; (ii) topography; (iii) climate; (iv) biological activity; (v) time.
- They can be divided into Passive and Active control factors depending upon their direct influence on the soil.
  - **'Climate' and 'biological activity' are "active" factors** of soil formation because their **influence over soil development can be directly observed**. For example, rain, heat, cold, wind, microorganisms (algae, fungi), earthworms, and burrowing animals can be directly observed influencing soil development.
  - **Time, topography, and parent material are "passive" factors** because their **effects are not immediately observed.** The passive factors can, however, control how climate and organisms affect soil development and formation. **Hence, statement 1 is not correct.**
- The length of **time determines the maturation of soils and profile development.** A soil becomes mature when all soil-forming processes act for a sufficiently long time, developing a profile.
  - Soils developing from recently deposited alluvium or glacial till are considered young and they exhibit no horizons or only poorly developed horizons. However, no specific length of time in absolute terms can be fixed for soils to develop and mature. **Hence, statement 2 is correct.**

QUESTION 5:

Which of the following conditions is/are favourable for a river to meander:

1. Propensity of water flowing over very gentle gradients to work laterally on the banks.
2. Consolidated nature of alluvial deposits.
3. Coriolis force acting on the water.

Select the correct option using the code given below?

(A) 1 and 2 only
(B) 1 and 3 only
(C) 3 only
(D) 1, 2 and 3

Answer: B

Explanation

- In large flood and delta plains, rivers rarely flow in straight courses. Loop-like channel patterns called meanders develop over flood and delta plains.

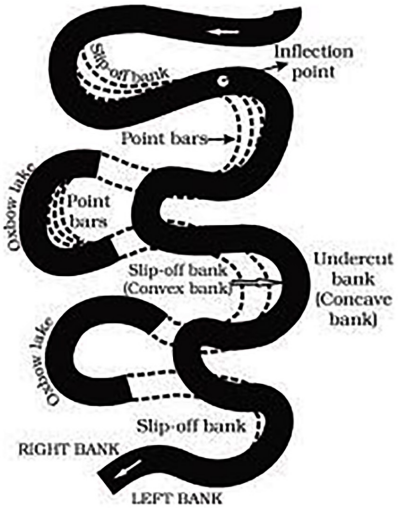


Fig: Meander growth and cut-off loops and slip-off and undercut banks

- Meander is not a landform but is only a type of channel pattern. Following are the various reasons that promote meandering:
  - The propensity of water flowing over very gentle gradients to work laterally on the banks. **Hence, statement 1 is correct.**
  - **Unconsolidated nature of alluvial deposits** making up the banks with many irregularities which can be used by water exerting pressure laterally. **Hence, statement 2 is not correct.**
  - **Coriolis force acting** on the water deflecting it like it deflects the wind. **Hence, statement 3 is correct.**

QUESTION 6:

Consider the following statements:

1. River Terraces are depositional features.
2. Alluvial fans are erosional features.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: D

Explanation

- **River terraces** are surfaces marking old valley floor or floodplain levels. They may be bedrock surfaces without any alluvial cover or alluvial terraces consisting of stream deposits. River terraces are basically **products of erosion** as they result due to vertical erosion by the stream into its own depositional floodplain.
- Alluvial fans a**re depositional features** formed when streams flowing from higher levels break into foot slope plains of low gradient. Normally very coarse load is carried by streams flowing over mountain slopes.
  - This load becomes too heavy for the streams to be carried over gentler gradients and gets dumped and spread as a broad low to a high cone shaped deposit called alluvial fan. **Hence, statement 2 is not correct.**
- Some other features:

Depositional	Erosional
Deltas	Valley
Meanders, Floodplains, Natural Levees and Point Bars	Potholes and Plunge Pools
Braided Channels	Incised or Entrenched Meanders

QUESTION 7:

With reference to Equatorial Indian Ocean Monsoon Oscillation (EQUINOO), consider the following statements:

1. It signifies enhanced cloud formation and rainfall over the Eastern Equatorial Indian Ocean compared to Western Equatorial Indian Ocean.
2. The positive phase of EQUINOO enhances the Indian monsoon.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only

(C) Both 1 and 2

(D) Neither 1 nor 2

Answer: B

Explanation

- EQUINOO is an oscillation between enhanced cloud formation and rainfall over the **Western Equatorial Indian Ocean (WEIO)** and suppressed clouding over the Eastern Equatorial Indian Ocean (EEIO), **west of Sumatra**. **Hence, statement 1 is not correct.**
- A positive EQUINOO phase is when the surface sea temperature in WEIO is above 27.5 degree Celsius leading to enhanced clouding, which is then suppressed in the eastern equatorial Indian Ocean.
- The positive phase of the '**Equatorial Indian Ocean Oscillation (EQUINOO)**enhances cloud formation and rainfall in the western part of the equatorial ocean near the African coast, whereas this activity is suppressed near Sumatra.
  - This increased cloud formation throughout monsoon season is the main reason for the above-average rainfall in India
  - This phase produces good rains over India. **Hence, statement 2 is correct.**

QUESTION 8:

Which of the following countries are member states of the Eurasian Economic Union?

1. Armenia
2. Belarus
3. Turkmenistan
4. Kazakhstan
5. Russia

Select the correct option using the code given below:

(A) 3, 4 and 5

(B) 2, 3 and 5 only

(C) 1, 2, 4 and 5

(D) 1, 2 3, 4 and 5

Answer: C

Explanation

Eurasian Economic Union (EAEU)

- The Eurasian Economic Union is an international organization for regional economic integration that came into existence on **1st January 2015.**
- The EAEU provides for free movement of goods, services, capital, and labour within its borders.
- It pursues, coordinates, & harmonizes the policies in the sectors determined by the Treaty and international agreements within the Union.
- The **member states** of the Eurasian Economic Union are,
  - **The Republic of Armenia,**
  - **The Republic of Belarus,**
  - **The Republic of Kazakhstan,**
  - The Kyrgyz Republic, and
  - **The Russian Federation.**
- **Hence, option C is correct.**

QUESTION 9:

With reference to the Sixth Schedule of the Indian Constitution, consider the following statements:

1. It contains special provisions for the administration of tribal areas in the four north-eastern states of Assam, Meghalaya, Tripura and Mizoram.
2. The inclusion of an area in the Sixth schedule is done through the executive action.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: A

Explanation

- The Constitution, under **Sixth Schedule**, contains special provisions for the administration of tribal areas in the four north-eastern states of **Assam, Meghalaya, Tripura and Mizoram. Hence, statement 1 is correct.**
- The **District Council** and the **Regional Council** under the Sixth Schedule have real power to make laws, possibly on the various legislative subjects, receiving grants-in-aid from the Consolidated Fund of India to meet the costs of schemes for development, health care, education, roads and regulatory powers to state control.
- The mandate towards devolution, deconcentration and divestment determines the protection of their customs, better economic development and most importantly ethnic security.
- Inclusion of any area into the sixth schedule has to be done by constitutional amendment by the Parliament and not by mere executive action. **Hence, statement 2 is not correct.**

QUESTION 10:

With reference to 'Samudrayaan Project', consider the following statements:

1. The project proposes to send a submersible vehicle to a depth of about 4500 metres to carry out deep underwater studies.
2. The project has been undertaken by the National Institute of Ocean Technology (NIOT).

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: B

Explanation

- India's ambition to send men to the deep sea in a submersible vehicle is likely to be a reality in 2021-22 with the 'Samudrayaan' project.
- The project proposes to send a submersible vehicle with three persons to a depth of **about 6000 metres to carry out deep underwater studies. Hence, statement 1 is not correct.**
- Similar to ISRO's plan to carry persons on a space mission, **National Institute of Ocean Technology (NIOT)** has undertaken Samudrayaan project. **Hence, statement 2 is correct.**

QUESTION 11:

Which of the following statements is/are correct regarding the Red Data Book?

1. Records of all the Endemic Species of a region are maintained.
2. It is maintained by the International Union for Conservation of Nature (IUCN).

Select the correct option from the codes given below:

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: B

Explanation

- **Red Data book** is a book which maintains a **record of all the endangered species**. There are separate Red Data Books for plants, animals and other organisms. **Hence, statement 1 is not correct.**
- The endangered species are protected in Wildlife sanctuaries. Large and small, all types of animals are protected in these sanctuaries, because their contribution to the ecosystem cannot be ignored. Small organisms face the danger of extinction much more than larger animals.
- The I**nternational Union for Conservation of Nature maintains the Red Data Book**. IUCN is the world's most detailed inventory centre of the global conservation status of biological species.
  - The IUCN was founded in 1964 with an aim to maintain a complete record of every species that ever lived. **Hence, statement 2 is correct.**

QUESTION 12:

Consider the following statements:

1. Strait is a narrow strip of land that connects two larger landmasses.
2. Isthmus is a narrow body of water that connects two larger bodies of water.

Which of the statements given above is / are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: D

Explanation

- A strait is a narrow body of water that connects two larger bodies of water. **Hence statement 1 is not correct.**
- An isthmus is a narrow strip of land that connects two larger landmasses and separates two bodies of water. **Hence statement 2 is not correct.**

QUESTION 13:

In the context of Pacific Decadal Oscillation (PDO), consider the following statements:

1. It is a long-term ocean fluctuation of the Pacific Ocean.
2. It is another name of ENSO in the western Pacific Ocean.
3. It enhances the Indian Monsoon and causes excess rainfall.

Which of the statements given above is / are correct?

(A) 1 only

(B) 1 and 3 only
(C) 2 and 3 only
(D) 1, 2 and 3

Answer: A

Explanation

- **Pacific decadal oscillation (PDO)** is a **long-term ocean fluctuation of the Pacific Ocean,** which waxes and wanes approximately every 20 to 30 years. **Hence, statement 1 is correct.**
  - Just like El Nino/La Nina in the tropical Pacific, PDO has a signature for a longer time (on the decadal scale) in the sea surface temperatures and its interaction with the atmosphere, which in turn affects the northeast Indian summer monsoon.
- PDO is a pattern of Pacific climate variability similar to **El Nino-Southern Oscillation (ENSO)** in character, but which varies over a much longer time scale. The PDO can remain in the same phase for 20 to 30 years, while ENSO cycles typically only last 6 to 18 months. **Hence, statement 2 is not correct.**
- It is found that rainfall in the region is largely dependent on monsoon rainfall and the impact of **Pacific decadal oscillation (PDO)** clearly visible in the region in the form of deficit rainfall over the years.
- Decreasing monsoon rainfall is associated with **natural changes in the subtropical Pacific Ocean. Hence, statement 3 is not correct.**

QUESTION 14:

In the context of the REPLAN project, consider the following statements:

1. This initiative is launched by the Ministry of Rural Development.
2. The objective of revamp the rural road infrastructure.

Which of the statements given above is / are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: D

Explanation

- Project REducing PLAstic in Nature (REPLAN) is launched by Khadi and Village Industries Commission (KVIC), **Ministry of Micro, Small and Medium Enterprises**. **Hence, statement 1 is not correct.**
- Under the project REPLAN, waste plastic is collected, cleaned, chopped, beaten, treated and mixed with the paper raw material in a ratio of 80 % (pulp) and 20% (plastic waste) to make carry bags and handmade paper. **Hence, statement 2 is not correct**.

QUESTION 15:

Consider the following statements:

1. The Atlantic Meridional Overturning Circulation (AMOC) carries colder water from the North Atlantic into the warm tropics.
2. AMOC leads to lesser precipitation and higher salinity in the Atlantic Ocean.

Which of the statements given above is / are correct?

(A) 1 only
(B) 2 only

(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: B

Explanation

- **Atlantic meridional overturning circulation (AMOC)** is also referred to as the **"Atlantic conveyor belt"**. It is one of the Earth's largest water circulation systems where ocean **currents move warm and salty water from the tropics to northwards into the North Atlantic. Hence, statement 1 is not correct.**
- Warming in the Indian Ocean generates additional precipitation, which, in turn, draws more air from other parts of the world, including the Atlantic.
- With so much precipitation in the Indian Ocean, there will be less precipitation in the Atlantic Ocean.
  - **Lesser precipitation leads to higher salinity in the waters of the tropical portion of the Atlantic – because there won't be as much rainwater to dilute it.**
  - This saltier water in the Atlantic, as it comes north via AMOC, will get cold much quicker than usual and sink faster.
    - The above process would act as a jump start for AMOC, intensifying the circulation. **Hence, statement 2 is correct.**
- But if other tropical ocean's warming, especially the Pacific's, catches up with the Indian Ocean, the advantage of intensification for AMOC may stop.
- Moreover, it isn't clear whether the slowdown of AMOC is caused by global warming alone or it is a short-term anomaly related to natural ocean variability.
- It ensures the oceans are continually mixed, and heat and energy are distributed around Earth.

QUESTION 16:

Consider the following statements:

1. The NIRVIK scheme aims to boost exports by easing the loan lending process.
2. It is the scheme of the Ministry of Corporate Affairs.

Which of the statements given above is / are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: A

Explanation

- NIRVIK scheme aims to boost exports by enhancing the loan availability and easing the lending process. **Hence, statement 1 is correct.**
- It is the scheme of the **Ministry of Commerce & Industry** that was introduced by Export Credit Guarantee Corporation of India (ECGC). **Hence, statement 2 is not correct.**

QUESTION 17:

If you want to see gharials in their natural habitat, which one of the following is the best place to visit? (2017)

(A) Bhitarkanika Mangroves
(B) Chambal River
(C) Pulicat Lake
(D) Deepor Beel

Answer: (b)

Explanation

- National Chambal Sanctuary, also called the National Chambal Gharial Wildlife Sanctuary, is a 5,400 sq km tri-state, namely MP, Rajasthan and UP protected area in northern India for the protection of the critically endangered gharial, the red-crowned roof turtle and the endangered Ganges river dolphin.
- The gharial (Gavialis gangeticus), also known as the gavial, and fish-eating crocodile is a crocodilian in the family Gavialidae, and is native to the northern part of the Indian subcontinent.
- The global wild gharial population is estimated at fewer than 235 individuals, which are threatened by loss of riverine habitat, depletion of fish resources, and entanglement in fishing nets. As the population has declined drastically since the 1930s, the gharial is listed as critically endangered on the IUCN Red List. **option B is correct.**

QUESTION 18:

In India, if a species of tortoise is declared protected under Schedule I of the Wildlife (Protection) Act, 1972, what does it imply? (2017)

(A) It enjoys the same level of protection as the tiger.
(B) It no longer exists in the wild, a few individuals are under captive protection; and now it is impossible to prevent its extinction.
(C) It is endemic to a particular region of India.
(D) Both (b) and (c) stated above are correct in this context.

Answer: A

Explanation

- Wildlife Protection Act, 1972 (WPA) provides for 6 schedules and each Schedule guarantees varying degrees of protection to animals and plants. Animals include insects, reptiles, fishes, birds and mammals.
- Schedule I and part II of Schedule II lists animals which are provided with absolute protection. Offences against animals of these schedules are prescribed with the highest penalties.
- Schedule III and Schedule IV also protect some animals, but in case of offences against these animals, the penalties are lower as compared to Schedule I and part II of Schedule II.
- Schedule V animals are called “vermin” which can be hunted. According to Section 62 of WPA, the Central Government may, by notification, declare any wild animal other than those specified in Schedule I and part II of Schedule II to be vermin for any area and for such period as may be specified therein.
- Schedule VI was inserted via amendment to WPA in 1991 to prohibit cultivation, collection, extraction, trade, etc., of plants and its derivatives in the list.
- Tiger is enlisted in Schedule I of WPA, 1972. Thus, if a species of tortoise is declared protected under this Schedule, it will enjoy the same level of protection as that of the tiger. **Hence, option (a) is the correct.**

QUESTION 19:

Tides occur in the oceans and seas due to which among the following? (2015)

1. Gravitational force of the Sun
2. Gravitational force of the Moon
3. Centrifugal force of the Earth

Select the correct answer using the code given below:

(A) only 1
(B) only 2 and 3

(C) only 1 and 3 only

(D) 1, 2 and 3

Answer: D

Explanation

- Tides refer to the periodic rise and fall of large amounts of ocean water caused by the gravitational pull of the Moon and the Sun and the rotation of the Earth. Hence, statements 1 and 2 are correct.
- The Moon's gravity has a larger effect on tides than the Sun. The Moon, although much smaller than the Sun, is much closer to the Earth, which is why the gravitational pull of the Moon is relatively high.
- Another factor is centrifugal force, which is the force that acts to counter the force of gravity. Together, the gravitational pull and the centrifugal force are responsible for creating the two major tidal bulges on the Earth. Hence, statement 3 is correct. Therefore, option (d) is the correct answer.

QUESTION 20:

What explains the eastward flow of the equatorial counter-current? (2015)

(A) The Earth's rotation on its axis

(B) Convergence of the two equatorial currents

(C) Difference in salinity of water

(D) Occurrence of the belt of calm near the equator

Answer: B

Explanation

- The Equatorial Counter-current is an eastward flowing, wind-driven current in the Atlantic, Indian, and Pacific Oceans.
- There are two Equatorial Current flowing from east to west – the North Equatorial Current and South Equatorial Current. In between the two, there flows an Equatorial counter current in the opposite direction, i.e., from west to east.
- The North Equatorial Counter Current flows west-to-east at about 3-10°N in the Atlantic, Indian Ocean and Pacific basins, between the North Equatorial Current and the South Equatorial Current.
- Due to trade winds, the ocean water is piled up in the west through North and South Equatorial Currents.
- Owing to the higher level of ocean water in the west, water flows eastward in the form of counter equatorial currents. Thus, it can be assumed that convergence of the two Equatorial currents gives rise to the counter equatorial current. **Option B is correct.**

QUESTION 21:

Consider the following statements with reference to the characteristics of tropical evergreen forests:

1. These thick forests occur in the regions near the equator and close to the tropics.
2. The thick canopies of the closely spaced trees followed by a tall variety of trees.
3. The trees of these forests shed their leaves in the autumn.

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

Answer: A

Explanation

- Tropical evergreen forests are found near the **equator and close to the tropics** and in India, these are found in the western slope of the Western Ghats, hills of the northeastern region and the Andaman and Nicobar Islands. **Hence, statement 1 is correct.**
  - They are found in warm and humid areas with annual precipitation of over 200 cm and mean annual temperature above 22^0(C)
- Tropical evergreen forests are well stratified, with layers closer to the ground and are covered with shrubs and creepers, with short structured trees followed by a tall variety of trees. In these forests, trees reach great heights up to 60 m or above. **Hence, statement 2 is correct.**
- There is no definite time for trees to shed their leaves, flowering and fruition. As such these forests appear green all the year-round. Species found in these forests include rosewood, mahogany, aini, ebony, etc. As there is **no particular dry season, the trees do not shed their leaves altogether**. **Hence, statement 3 is not correct.**

QUESTION 22:

Consider the following statements:

1. The moisture retention property of black soil is good for cotton agriculture.
2. The richness of iron oxide and potash in laterite soil makes it suitable for cultivation.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: A

Explanation

- **Black soil** covers most of the Deccan Plateau which include parts of **Maharashtra, Madhya Pradesh, Gujarat, Andhra Pradesh and some parts of Tamil Nadu**. In the upper reaches of the Godavari and the Krishna, and the north the western part of the Deccan Plateau, the black soil is very deep.
  - These soils are also known as the **'Regur Soil' or the 'Black Cotton Soil'**. The black soils are generally clayey, deep and impermeable.
  - They swell and become sticky when wet and shrink when dried. So, during the dry season, these soil develop wide cracks. Thus, there occurs a kind of 'self ploughing'. Because of this **character of slow absorption and loss of moisture, the black soil retains the moisture for a very long time**, which helps the crops, especially, the rain-fed ones, to sustain even during the dry season. **Hence, statement 1 is correct.**
- Laterite has been derived from the Latin word 'Later' which means brick. The laterite soils **develop in areas with high temperature and high rainfall**.
  - These are the result of intense leaching due to tropical rains. With rain, lime and silica are leached away, and soils rich in iron oxide and aluminium compounds are left behind.
  - Humus content of the soil is removed fast by bacteria that thrive well in high temperature.
  - These soils are **poor in organic matter, nitrogen, phosphate and calcium**, while **iron oxide and potash are in excess**. Hence, **laterites are not suitable for cultivation**; however, the application of manures and fertilisers are required for making the soils fertile for cultivation. **Hence, statement 2 is not correct.**
  - The laterite soils are commonly found in Karnataka, Kerala, Tamil Nadu, Madhya Pradesh and the hilly areas of Odisha and Assam.

QUESTION 23:

With reference to the salinity of the soil, consider the following statements:

1. The saline soil is infertile due to the larger proportion of sodium, potassium and magnesium.
2. The saline soil is only found in the coastal region of India.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: A

Explanation

- **Saline Soils** are also known as **Usara soils**. Saline soils contain a **larger proportion of sodium, potassium and magnesium**, and thus, they are infertile and d**o not support any vegetative growth. Hence, statement 1 is correct.**
  - They have more salts, largely because of the dry climate and poor drainage.
  - They occur in arid and semi-arid regions, and in waterlogged and swampy areas. Their structure ranges from sandy to loamy.
  - They lack **nitrogen and calcium**. Saline soils are more widespread in western Gujarat, deltas of the eastern coast and in Sundarban areas of West Bengal.
    - In the **Rann of Kachchh**, the **Southwest Monsoon brings salt particles** and deposits there as a crust. Seawater intrusions in the deltas promote the occurrence of saline soils.
    - In the areas of **intensive cultivation** with excessive use of irrigation, especially in **areas of the green revolution, the fertile alluvial soils are becoming saline.**
    - **Excessive irrigation** with dry climatic conditions promotes capillary action, which results in the deposition of salt on the top layer of the soil. In such areas, especially in **Punjab and Haryana, farmers are advised to add gypsum to solve the problem of salinity in the soil. Hence, statement 2 is not correct.**

QUESTION 24:

What can be the consequences of deforestation?

1. Greenhouse Gas Emissions
2. Loss of biodiversity
3. Disturbance in the hydrologic cycle
4. Soil erosion

Which of the statements given above is/are correct?

(A) 1, 2 and 3
(B) 1, 2 and 4
(C) 2, 3 and 4
(D) 1, 2, 3 and 4

Answer: D

Explanation

- **Greenhouse gases** such as methane and carbon dioxide are gases that trap heat in Earth's atmosphere, leading to global climate change.
  - In addition to releasing oxygen and water into the atmosphere, trees also absorb carbon dioxide. While trees are still living, they function as efficient greenhouse gas filters.

- The moment trees are cut down, the carbon dioxide that was stored in their trunks and leaves is released into the atmosphere, further contributing to the buildup of greenhouse gases. After trees are removed from a large piece of land, the carbon dioxide in that area can no longer be absorbed as it was before.

- The **water cycle** is the process by which all water on earth is distributed. Water from Earth's oceans as well as from the surface of bodies of freshwater evaporates and condenses into clouds.
  - Trees and other plants also extract groundwater and release that water into the atmosphere during photosynthesis. Clouds then produce rain, which becomes both groundwater and – eventually ocean water again.
- **Biodiversity loss: Deforestation alters land too quickly for plants and animals to cope**, which means that many of them do not survive. If enough deforestation occurs, entire species can be wiped out.
- Plants keep soils bound in locks of roots, and thus, prevent erosion. They also add humus to the soil by shedding leaves and twigs. Forests have been denuded practically in most parts of India but their effect on soil erosion is more in hilly parts of the country.
  - **Soil erosion** issues caused by deforestation lead to farming problems and loss of reliable electric power. In some areas, eroding soil can lead to disastrous mudslides. Large amounts of soil can wash into local streams and rivers, clogging waterways and causing damage to hydroelectric structures and irrigation infrastructure.
- **Hence, option D is correct**.

QUESTION 25:

Consider the following statements with reference to the 'Social Forestry':

1. It is the practice of forestry on lands outside the conventional forest area.
2. The National Commission on Agriculture first used the term 'social forestry' in 1976.
3. It aims to reduce the pressure off the forests and make use of all unused and fallow land.

Which of the following statements given above is/are correct?

(A) 1 only
(B) 1 and 2 only
(C) 2 and 3 only
(D) 1, 2 and 3

Answer: D

Explanation

- **Social forestry** is the practice of forestry on lands outside the conventional forest area for the benefit of the rural and urban communities, with objectives to supply fuel wood, small timber for housing and agricultural implements and fodder for cattle of the rural population, protection of agriculture by creation of diverse ecosystem and arresting wind and water erosion, provide raw material for village cottage industries and improve scenic value in rural and urban area. **Hence, statement 1 is correct.**
- The term was coined by **J.(C) Westoby**. In India, the **National Commission on Agriculture (NCA-1976) first** used the term 'social forestry' in 1976. NCA-1976 was the first to recognize social forestry as an important component of forestry for meeting rural needs. **Hence, statement 2 is correct.**
- Some of the objectives of social forestry are:
  - To fulfill the basic and economic needs of the community
  - **To reduce the pressure off the forests and making use of all unused and fallow land**
  - To increase the forest area by rehabilitating wastelands while producing biomass both for industrial and local uses
  - **Hence, statement 3 is correct.**

QUESTION 26:

Which of the following is/are Biotic factors affecting distribution of plants and animals:

1. Predation
2. Soil
3. Human
4. Disease
5. Temperature

Select the correct option using the code given below.

(A) 2, 3 and 4 only
(B) 1, 3 and 4 only
(C) 1, 2, 3 and 4 only
(D) 1, 2, 3, 4 and 5

Answer: B

Explanation

- **Biotic factors** affecting distribution of plants and animals are **Predation, Human and Disease**. Others such as **Soil and Temperature are Abiotic factors**. **Hence, Option B is correct.**
- **Predation-**Predation affects the global distribution and abundance of plant and animal species, the strength and direction of energy flow within a system and the diversity and composition of communities. Predators also play an essential role in evolution.
- **Human-**Man contributes to the global distribution of plant animals through urbanization and agricultural activity, these developments have displaced both animals and plants from their natural habitats and some plant and animal species are forced to move to a new and strange environment since they can't cope with the harsh condition, while others have gone into extinction.
- **Disease-**If a population becomes diseased, the population may decrease and the population of animals that eat the diseased animals will also decrease.
- Rocks, Water, **Soil**, **Temperature**, Food, Air and Light are the abiotic factors affecting the distribution of plants and animals.

QUESTION 27:

With reference to the Agro forestry, which of the following statements are correct:

1. It integrates trees and shrubs on farmlands and rural landscapes.
2. It is practiced only in irrigated fields.
3. It has the potential to enhance ecosystem services through carbon storage.

Select the correct answer using the code given below:

(A) 1 and 2 only
(B) 1 and 3 only
(C) 2 and 3 only
(D) 1, 2 and 3

Answer: B

Explanation

- Agro forestry is defined as a land use system which i**ntegrates trees and shrubs on farmlands and rural landscapes to enhance productivity**, profitability, diversity and ecosystem sustainability.
  - It is a dynamic, ecologically based natural resource management system that through integration of trees and shrubs on farms and in the agricultural landscape diversifies and sustains production and builds social institutions. **Hence, statement 1 is correct.**

- Agro forestry systems include both traditional and modern land-use systems where trees are managed together with crops and or/animal production systems in agricultural settings.
  - **It is practiced in both irrigated and rain fed conditions** where it produces food, fuel, fodder, timber, fertilizer and fibre, contributes to food, nutritional and ecological security, sustains livelihoods, alleviates poverty and promotes productive and resilient cropping and farming environments. **Hence, statement 2 is not correct.**
- Agro forestry also has t**he potential to enhance ecosystem services through carbon storage, prevention of deforestation, biodiversity conservation, and soil and water conservation.**
  - In addition, when strategically applied on a large scale, with appropriate mix of species, agro forestry enables agricultural land to withstand extreme weather events, such as floods and droughts, and climate change. **Hence, statement 3 is correct.**

QUESTION 28:

With reference to Olive Ridley Turtles, consider the following statements:

1. They are the least abundant sea turtles in the world.
2. They are protected under Schedule I of the Wildlife Protection Act, 1972.
3. Coast of Odisha is the largest mass nesting site for olive ridleys.

Which of the statements given above is/are correct?

(A) 1 and 2 only
(B) 2 and 3 only
(C) 3 only
(D) 1, 2 and 3 only

Answer: B

Explanation

- The Olive ridley turtles are the smallest and most abundant of all sea turtles found in the world, inhabiting warm waters of the Pacific, Atlantic and Indian oceans. **Hence, statement 1 is not correct.**
  - They are best known for their unique mass nesting called Arribada, where thousands of females come together on the same beach to lay eggs.
- The species is listed as Vulnerable in the IUCN Red List, Appendix 1 in CITES, and Schedule I of Wildlife Protection Act, 1972. **Hence, statement 2 is correct.**
  - Olive-ridleys face serious threats across their migratory route, habitat and nesting beaches, due to human activities such as unfriendly turtle fishing practices, development, and exploitation of nesting beaches for ports, and tourist centers.
- The coast of Odisha in India is the largest mass nesting site for the Olive-ridley, followed by the coasts of Mexico and Costa Rica.
  - Mass nesting occurs at the **Gahirmatha coast (Bhitarkanika National Park)** of Odisha. **Hence, statement 3 is correct.**

QUESTION 29:

With reference to the 'Indian pangolin', consider the following statements:

1. It is hunted for traditional medicine.
2. It is listed under Schedule I of the Wildlife (Protection) Act, 1972.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only

(C) Both 1 and 2

(D) Neither 1 nor 2

Answer: C

Explanation

- Indian Pangolin is widely distributed in India, except the arid region, high Himalayas and the North-East.
- **Threats to Pangolins in India**: Hunting and poaching for local consumptive use (e.g. as a protein source and traditional medicine) and international trade for its meat and scales in East and South East Asian countries, particularly China and Vietnam. **Hence, statement 1 is correct.**
- Protection Status
  - IUCN Red List
    - Indian Pangolin: Endangered
    - Chinese Pangolin: Critically Endangered
  - Both these species are listed under Schedule I, Part I of the Wildlife (Protection) Act, 1972. **Hence, statement 2 is correct.**

QUESTION 30:

With reference to the 'Gangetic Dolphin', consider the following statements:

1. It is blind and uses echolocation to navigate and hunt.
2. It's presence indicates the health of the riverine ecosystem.
3. It is listed as critically endangered in the IUCN Red List.

Which of the statements given above is/are correct?

(A) 1 and 2 only

(B) 1 and 3 only

(C) 2 and 3 only

(D) 1, 2 and 3

Answer: A

Explanation

- Gangetic Dolphin is India's **national aquatic animal**. It is also called a **blind dolphin** because it doesn't have an eye lens and uses **echolocation** to navigate and hunt. **Hence, statement 1 is correct.**
- The Gangetic river dolphin is India's national aquatic animal and is popularly known as 'Susu'. It is among the four freshwater dolphins in the world-the other three are:
  - The 'Baiji' now likely extinct from the Yangtze River in China,
  - The 'Bhulan' of the Indus in Pakistan, and
  - The 'Boto' of the Amazon River in Latin America.
  - These four species live only in rivers and lakes.
- Its presence indicates the health of the riverine ecosystem. **Hence, statement 2 is correct.**
- **Protection Status**
  - **IUCN Status: Endangered**
  - It is listed on CITES Appendix-I.
  - It is classified under Schedule 1, Wildlife (Protection) Act, 1972 providing absolute protection as offences under these are prescribed the highest penalties. **Hence, statement 3 is not correct.**
- **Vikramshila Gangetic Dolphin Sanctuary (VGDS)** in Bihar's Bhagalpur district is India's only sanctuary for its national aquatic animal.

QUESTION 31:

Consider the following pairs:

	Projects	River
1.	Pakal Dul	Jhelum River
2.	Mullaperiyar Dam	Pamba River
3.	Polavaram project	Godavari River

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

(A) 1 and 2 only

(B) 2 only

(C) 3 only

(D) 1, 2 and 3

Answer: C

Explanation

- The proposed 1,000 megawatt **Pakal Dul hydroelectric power project** is on Marusadar River, a tributary of Chenab River, in Jammu and Kashmir. It will be completed in 66 months and will provide 12 per cent free power to the state. **Hence, pair 1 is not correctly matched.**
- **MullaPeriyar Dam**: It is a gravity dam on the **Periyar River** in Idukki district of Kerala but it is owned and operated by the **Tamil Nadu government**.
  - There is an ongoing contention between Kerala and Tamilnadu governments over the height of the dam.
- **Hence, pair 2 is not correctly matched.**
- **Polavaram project**: It is an under-construction multi-purpose National project on the **Godavari River** in the West Godavari District and East Godavari District in Andhra Pradesh.
  - The project will submerge villages in Chhattisgarh and Odisha.
  - **Hence, pair 3 is correctly matched.**

QUESTION 32:

Which of the following African countries border the Mediterranean Sea?

1. Algeria
2. Egypt
3. Libya
4. Morocco

Select the correct answer using the code given below:

1. 1 and 2 only
2. 2 and 3 only
3. 3 only
4. 1, 2, 3 and 4

Answer: D

Explanation

- The Mediterranean Sea is a large body of water located between Europe to the north, northern Africa to the south, and southwestern Asia to the east.
- Five African countries border the Mediterranean Sea: **Tunisia, Libya, Algeria, Morocco, and Egypt**. **Hence, Option D is correct.**

QUESTION 33:

India recently established a Strategic Partnership Council (SPC) with which one of the following?

(A) UAE
(B) Qatar
(C) Saudi Arabia
(D) Israel

Answer: C

Explanation

- Recently the Prime Minister of India visited the Kingdom of Saudi Arabia and attended the 'Future Investment Initiative (FII)' held in Riyadh from October 29 to 31.
- One of the major outcomes of the visit was the establishment of a Strategic Partnership Council (SPC).
- **India to become the fourth country to sign such an agreement with Saudi Arabia.** The SPC will have two parallel tracks:
  - Political, security, culture and society, headed by Foreign Ministers of both the countries;
  - Economy and investment, headed by India's Commerce Minister and Saudi's Energy Minister.
  - **Hence, option C is correct**

QUESTION 34:

With reference to the 'Absentee voters', consider the following statements:

1. Article 326 of the Constitution of India deals with "Absentee voters" for the members of the armed forces among others.
2. It also includes Persons with Disabilities and Senior citizens.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: B

Explanation

- The Election Commission of India has recently made efforts to ensure that the electors who are unable to come to **polling booths/ absentee voters** are facilitated in every way to ensure their wider participation in the electoral process. The Government amended the **Representation of the People's Act, 1951 (RP Act)**, and the **Conduct of Election Rules, 1961**. **Hence, statement 1 is not correct.**
- A concept of 'absentee voter' has been introduced and defined for the elections;
  - **'Absentee voter'** means a person belonging to such class of persons as may be notified, under **clause (c) of section 60 of the RP Act, 1951** and who is **employed in essential services as mentioned in the said notification**, and includes an elector belonging to the class of senior citizens or persons with disabilities;
    - **'person with disability'** means a person flagged as a person with a disability in the database for the electoral roll;
    - **'senior citizen'** means an elector belonging to the class of absentee voters and is above 80 years of age;
    - These two categories of voters – 'senior citizen' and 'PwD electors' can vote either as an absentee voter or as a regular voter on the poll day.
    - **Hence, statement 2 is correct.**

QUESTION 35:

Consider the following statements:

1. The existing National Education Policy was framed in 2009.
2. The draft new education policy is framed by the K Kasturirangan committee.
3. Education is a part of the State List in the 7th schedule of the Constitution.

Which of the statements given above is/are correct?

(A) 1 and 2 only
(B) 2 only
(C) 3 only
(D) 1, 2 and 3 only

Answer: B

- The existing National Education Policy (NEP) was framed in 1986 and revised in 1992. **Hence, statement 1 is not correct.**
- The draft NEP was submitted by a group of experts, led by former ISRO chief K Kasturirangan, to the Minister of Human Resource Development. **Hence, statement 2 is correct.**
- The **42nd Amendment Act**, **1976** restructured the Seventh Schedule ensuring that State List subjects like education, forest, protection of wild animals and birds, administration of justice, and weights and measurements were transferred to the Concurrent List. **Hence, statement 3 is not correct.**

QUESTION 36:

Recently there was a cyberattack on the Kudankulam Nuclear Power Plant. Identify the spyware-

(A) Wannacry
(B) Petya
(C) Dtrack
(D) Osiris

Answer: C

Explanation

- Cyberattack is a malicious and deliberate attempt by an individual or organization to breach the information system of another individual or organization. There are various types of cyber attacks like malware, phishing, denial of service attacks, etc.
- Recently, the **Nuclear Power Corporation of India Ltd. (NPCIL)** has confirmed that **malware named 'Dtrack'** had infected its system at the **Kudankulam Nuclear Power Plant (KKNPP).**
  - **Dtrack** is a new spyware tool that is believed to be actively targeting a large number of Indian institutions, in order to steal confidential data as well as a remotely downloading malicious tool-tracking key logs and monitoring IP (internet protocol) traffic.
  - Dtrack was originated in North Korea by the hackers' group Lazarus.
- The recent cyberattack revived the memories of the Stuxnet virus attack on an Iranian nuclear facility in 2018. **Hence, Option C is correct**

QUESTION 37:

The term "sixth mass extinction/sixth extinction" is often mentioned in the news in the context of the discussion of **(2018)**

(A) Widespread monoculture practices in agriculture and large-scale commercial farming with indiscriminate use of chemicals in many parts of the world that may result in the loss of good native ecosystems.

(B) Fears of a possible collision of a meteorite with the Earth in the near future in the manner it happened 65 million years ago that caused the mass extinction of many species including those of dinosaurs.

(C) Large scale cultivation of genetically modified crops in many parts of the world and promoting their cultivation in other parts of the world which may cause the disappearance of good native crop plants and the loss of food biodiversity.

(D) Mankind's over-exploitation/misuse of natural resources, fragmentation/loss of natural habitats, destruction of ecosystems, pollution and global climate change.

Answer: D

Explanation

- **Sixth Mass Extinction/Sixth Extinction** is the extinction of a large number of species within a relatively short period of geological time, thought to be, due to factors such as a catastrophic global event or widespread environmental change that occurs too rapidly for most species to adapt.
- Natural disasters have triggered at least five mass extinctions in the past 500 million years, each of which wiped out between 50% and 90% of all species on the planet. The most recent extinction occurred about 65 million years ago, when an asteroid ended the reign of dinosaurs and opened new doors for mammals.
- The recent studies reported that the sixth mass extinction of Earth's wildlife is already underway as there is killing of large ocean dwellers (like sharks, whales, giant clams, sea turtles and tuna) in disproportionately greater numbers than smaller animals. The striking difference between the previous mass extinctions and the anticipated sixth mass extinction is the cause of its occurrence. It is anticipated that sixth mass extinction is due to mankind's over-exploitation/misuse of natural resources, fragmentation/loss of natural habitats, and destruction of ecosystems, pollution and global climate change. **Hence, option (d) is correct.**

QUESTION 38:

In the context of mitigating the impending global warming due to anthropogenic emissions of carbon dioxide, which of the following can be the potential sites for carbon sequestration? **(2017)**

1. Abandoned and uneconomic coal seams

2. Depleted oil and gas reservoirs
3. Subterranean deep saline formations

Select the correct answer using the code given below:

(A) 1 and 2 only
(B) (b) 3 only
(C) 1 and 3 only
(D) 1, 2 and 3

Answer: D

Explanation

- Carbon sequestration is the process of trapping CO_2 from the atmosphere and then storing it in leak proof containers. Geological formations like coal seams, depleted oil and gas reserves, subterranean deep saline formations, etc., offer a great capacity for Carbon sequestration. **Hence, 1 and 3 are correct.**
- Injection of CO_2 in uneconomic or depleted hydrocarbon reserves can provide additional benefits in terms of enhanced recovery of the traces left in the reservoirs and formation of coal bed methane in coal seams. **Hence, 2 is correct. Therefore, option (d) is the correct answer.**

QUESTION 39:

Which of the following best describes/describe the aim of 'Green India Mission' of the Government of India? **(2016)**

1. Incorporating environmental benefits and costs into the Union and State Budgets thereby implementing the 'green accounting'.
2. Launching the second green revolution to enhance agricultural output so as to ensure food security to one and all in the future.
3. Restoring and enhancing forest cover and responding to climate change by a combination of adaptation and mitigation measures.

Select the correct answer using the code given below:

(A) 1 only
(B) 2 and 3 only
(C) 3 only
(D) 1, 2 and 3

Answer: C

Explanation

- **National Mission for a Green India**, also known as **Green India Mission (GIM)**, is one of the eight missions outlined under India's National Action Plan on Climate Change. It was launched in February 2014.
- Goals of Mission
  - To **increase forest/tree cover** to the extent of 5 million hectares (mha) and improve the quality of forest/tree cover on another 5 mha of forest/ non-forest lands. Separate sub-targets exist for different forest types and ecosystems (eg., wetland, grassland, dense forest, etc.). **Hence, statement 3 is correct.**
  - Improvement in quality of forest cover and ecosystem services of forests/non-forests, including moderately dense, open forests, degraded grassland and wetlands (5 mha).
  - Eco-restoration/afforestation of scrub, shifting cultivation areas, cold deserts, mangroves, ravines and abandoned mining areas (1.8 mha) with separate sub–targets for each one of those.

- Improvement in forest and tree cover in urban/ peri-urban lands (0.20 mha).
- Improvement in forest and tree cover on marginal agricultural lands/fallows and other non-forest lands under agroforestry/social forestry (3 mha).
- To improve/enhance ecosystem services like carbon sequestration and storage (in forests and other ecosystems), hydrological services and biodiversity; along with provisioning services like fuel, fodder, and timber and non-timber forest produces (minor forest produces or MFPs) etc., which are expected to result from the treatment of 10 mha.
- To increase forest based livelihood income for about 3 million households in and around these forest areas; and enhanced annual CO2 sequestration by 50 to 60 million tonnes in the year 2020.

■ Launching the 2nd Green Revolution and incorporating green accounting in the Union and State budget are not the objectives of Green India Mission. **Hence, statement 1 and 2 are not correct.**

QUESTION 40:

"Momentum for Change: Climate Neutral Now" is an initiative launched by **(2018)**

(A) The Intergovernmental Panel on Climate Change
(B) The UNEP Secretariat
(C) The UNFCCC Secretariat
(D) The World Meteorological Organisation

Answer: C

Explanation

■ **"Momentum for Change: Climate Neutral Now"**, is an initiative launched by the UNFCCC secretariat in 2015. The initiative is a pillar under Momentum for Change which seeks to achieve climate neutrality.

■ Climate neutrality is a three step process, which requires individuals, companies and governments to: measure their climate footprint; reduce their emissions as much as possible and Offset what they cannot reduce with UN certified emission reductions. **Therefore, option (c) is correct.**

QUESTION 41:

With reference to "the invisible hand of markets", consider the following statements:

1. It is an unobservable market force that helps demand and supply of goods to reach equilibrium.
2. No government intervention is permitted to alter this market force.
3. With increasing economic openness, the invisible hand of markets strengthen.

Which of the statements given above is/are correct?

(A) 1 only
(B) 1 and 2 only
(C) 1 and 3 only
(D) 1, 2 and 3

Answer: C

Explanation

■ The unobservable market force that **helps the demand and supply of goods** in a free market to **reach equilibrium automatically** is the invisible hand of markets.

- The phrase 'invisible hand' was introduced by Adam Smith in his book 'The Wealth of Nations'. **Hence, statement 1 is correct.**

- The invisible hand needs to be strengthened by promoting pro-business policies to
  - Provide equal opportunities for new entrants, enable fair competition and ease doing business.
  - Enable trade for job creation.
  - Efficiently scale up the banking sector to be proportionate to the size of the Indian economy.
  - **Eliminate policies that undermine markets through government intervention even where it is not necessary.** Thus, government intervention is permitted if it leads to the strengthening of the invisible hand of markets. **Hence, statement 2 is not correct.**
- The Invisible hand of the market reflected in openness in economic transactions. The increase in economic openness leads to the strengthening of the invisible hand of markets. **Hence, statement 3 is correct.**

QUESTION 42:

Consider the following statements:

1. India has the largest entrepreneurship ecosystem in the world in 2018 as per the World Bank.
2. The number of new firms registered in the formal sector has steadily increased in the last decade.

Which of the statements given above is/are correct?

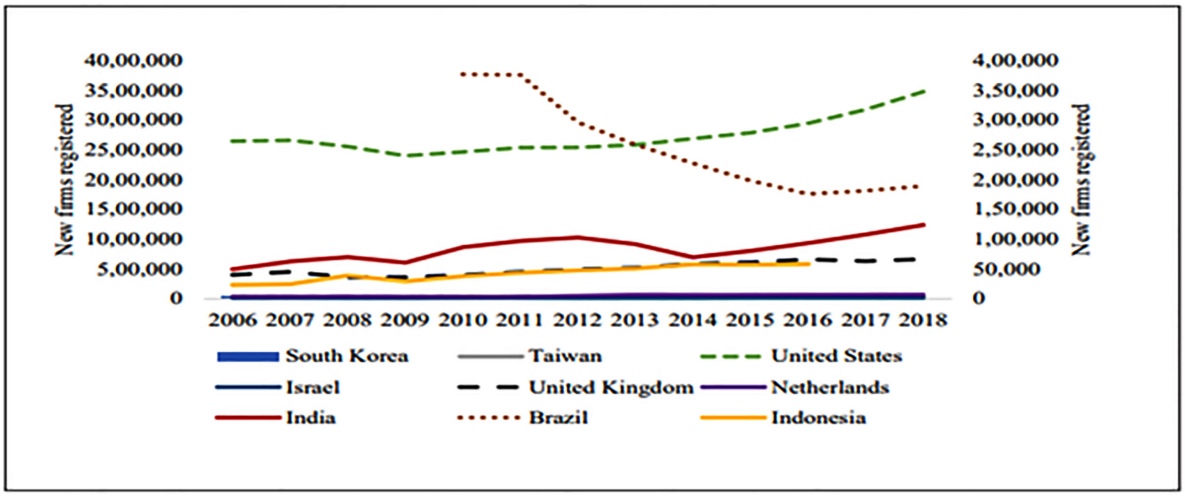
(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: D

Explanation

- Entrepreneurship as a strategy to fuel productivity growth and wealth creation. India has the **3rd largest entrepreneurship ecosystem** in the world. **Hence, statement 1 is not correct.**

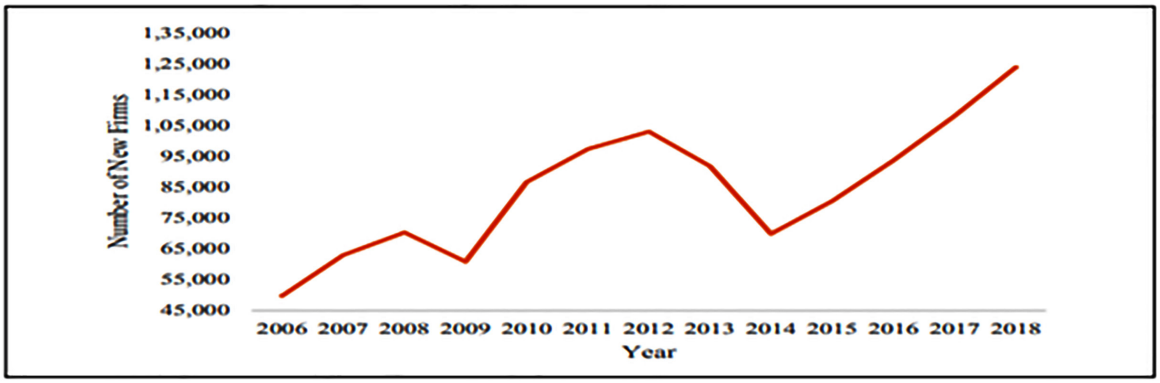
Figure 1: Comparison of entrepreneurial activity (new firms) across countries



Source: World Bank's EODB Entrepreneurship Data, Business Formation Statistics of the U.S. Census Bureau and Survey Calculations
Note: Secondary axis for India, Brazil and, Indonesia

- The number of new firms registered in the formal sector **has not steadily increased in the last decade**. It grew at a cumulative annual growth rate of **3.8 per cent from 2006-2014**, the **growth rate from 2014 to 2018 has been 12.2 per cent**. There has been a **steady increase** in the registration of n**ew firms since 2014.**

Figure 2a: Growth in new firms over time in India



Above figure shows, there has been a sharp fall in the registration of the new firm in 2009 and 2014. **Hence, statement 2 is not correct.**

QUESTION 43:

The Corruption Perception Index which ranks countries "by their perceived levels of public sector corruption" is prepared by:

(A) World Bank
(B) Transparency International
(C) The United Nations Conference on Trade and Development (UNCTAD)
(D) The World Trade Organization (WTO)

Answer: B

Explanation

- The Corruption Perceptions Index (CPI) is an index published annually by **Transparency International** since 1995 which ranks countries "by their perceived levels of public sector corruption, as determined by expert assessments and opinion surveys." **Hence, option B is correct.**

QUESTION 44:

Which of the following commodity group (s) is/are included in the Essential Commodities Act, 1955?

1. Petroleum products
2. Drugs
3. Jute textile
4. Organic fertilizer

Select the correct answer using the code given below:

(A) 1 and 2 only
(B) 2 and 3 only
(C) 1 only
(D) 1, 2, 3 and 4

Answer: D

Explanation

- Department of Consumer Affairs administers 'The Essential Commodities Act, 1955 (EC Act)' and 'Prevention of Blackmarketing and Maintenance of Supplies of Essential Commodities Act, 1980 (PBMMSEC Act)'.

- The Central Government consistently follows the policy of removing all unnecessary restrictions on movement of goods across the State boundaries as part of the process of globalization simultaneously with the pruning of the list of essential commodities under the said Act to promote consumer interest and free trade.
- At present, there are seven (7) commodities scheduled under the EC Act, 1955 as essential.
    1. **Drugs;**
    2. **Fertilizer, whether inorganic, organic or mixed;**
    3. Foodstuffs, including edible oilseeds and oils;
    4. Hank yarn made wholly from cotton;
    5. **Petroleum and petroleum products;**
    6. **Raw jute and jute textile;**
    7. Seeds of food-crops and seeds of fruits and vegetables; seeds of cattle fodder; and jute seeds; cottonseed.
- **Hence, option D is correct.**

QUESTION 45:

Consider the following pairs:

	Scheme	Ministry
1.	Kisan Rail	Ministry of Agriculture & Farmers' Welfare
2.	Krishi Udan	Ministry of Civil Aviation
3.	PM KUSUM	Ministry of New and Renewable Energy

Which of the pairs given above are correctly matched?

(A) 1 and 2 Only

(B) 1 and 3 Only

(C) 2 and 3 Only

(D) 1, 2 and 3

Answer: C

Explanation

- **Kisan Rail** to be set up by **Indian Railways** through Public-Private Partnership (PPP):
    - To build a seamless national cold supply chain for perishables (milk, meat, fish, etc.
    - Express and Freight trains to have refrigerated coaches. **Hence, pair 1 is not correctly matched.**
- **Krishi Udaan** to be launched by the **Ministry of Civil Aviation**:
    - Both international and national routes to be covered.
    - North-East and tribal districts to realize Improved value of agri-products. **Hence, pair 2 is correctly matched.**
- Pradhan Mantri Kisan Urja Suraksha even Utthan Mahabhiyan **(PM KUSUM)** Scheme has been launched by the **Ministry of New and Renewable Energy (MNRE)**.
    - It is for farmers for installation of solar pumps and grid-connected solar and other renewable power plants in the country.
    - The scheme aims to add solar and other renewable capacities of 25,750 MW by 2022. **Hence, pair 3 is correctly matched.**

QUESTION 46:

Consider the following pairs:

	Branch of Knowledge	Subject Matter
1.	Varta	Philosophical and ethical framework
2.	Dandaneeti	Law and enforcement
3.	Anvikshiki	Economic policy
4.	Trayi	Cultural context

Which of the pairs given above are correctly matched?

(A) 1 and 2 Only
(B) 2 and 4 Only
(C) 1, 2 and 4 Only
(D) 1, 2, 3 and 4

Answer: B

Explanation

- **Kautilya** is often presented as the Machiavelli of India. He wrote the book Arthashastra which literally means "**The Treatise on Wealth"** and it extensively discusses issues ranging from urban governance to tax administration and commerce.
- The book explicitly presents its intellectual framework right in the beginning by stating that good governance is based on the following branches of knowledge:
  - **Varta** (economic policy), **Dandaneeti** (law and enforcement), **Anvikshiki** (philosophical and ethical framework) and **Trayi** (cultural context). **Hence, pair 2 and 4 are correctly matched.**

QUESTION 47:

With reference to the term 'Thalinomics', consider the following statements:

(1) It is an attempt to quantify what a common person pays for a plate of food across India.
(2) The absolute prices of a vegetarian thali plate have increased significantly since 2015-16.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: A

Explanation

- The Economic survey 2019-2020 presents a chapter on Thalinomics. Thalinomics refers to the economics of a plate of food in India.
- Thalinomics is an attempt to quantify what a common person pays for a Thali across India. **Hence, statement 1 is correct.**
- According to the Survey, both across India and the four regions – North, South, East and West – the absolute prices of a vegetarian Thali have **decreased significantly since 2015-16,** though the price has **increased during 2019-20**. **Hence, statement 2 is not correct.**
- After 2015-16, the average household gained Rs.10887 on average per year from the moderation in prices in the case of vegetarian Thali. Similarly, an average household that consumes two non-vegetarian Thalis gained around Rs.11787 on average per year during the same period.
- Using the annual earnings of an average industrial worker, the survey finds that affordability of vegetarian Thalis improved 29 per cent from 2006-07 to 2019-20 while that for nonvegetarian Thalis improved by 18%.

QUESTION 48:

The term 'Debt overhang' was used in Economic Survey 2019-20, which of the following best describes the term?

(A) It is the availability of fresh loans from Public sector banks with government guarantee.

(B) It is a situation where a nation has both a current account deficit and a budget deficit.

(C) It is a situation where all current income of the borrower gets used up in repaying the accumulated debt.

(D) It is a condition where a large number of loans are defaulted in a short period.

Answer: C

Explanation

- Debt overhang refers to a debt burden so large that an entity cannot take on additional debt to finance future projects. This includes entities that are profitable enough to be able to reduce indebtedness over time.
- It refers to a situation where **all current income gets used up in repaying the accumulated debt,** leaving little incentives to invest either in physical or human capital.
  - Debt overhang leads to abandonment of beneficial investment and hence reduces social welfare.
- Hence, option C is correct.

QUESTION 49:

With reference to spatial heterogeneity in distribution of Entrepreneurial Activity in India, consider the following statements:

1. Entrepreneurial activity in the Agriculture sector is highest in Punjab, Haryana and Uttar Pradesh.
2. Entrepreneurial activity in the Manufacturing sector is highest in the regions of Gujarat, Meghalaya, Puducherry and Rajasthan.

Which of the statements given above is/are correct?

(A) 1 only

(B) 2 only

(C) Both 1 and 2

(D) Neither 1 nor 2

Answer: B

Explanation

- There exists a spatial heterogeneity in distribution of Entrepreneurial Activity in India i.e. varied level of entrepreneurial activity across the districts. According to the Economic Survey 2019-2020, all regions demonstrate strong growth in entrepreneurial activity over time with the exception of the Eastern states.
- States in the highest quintile of relative entrepreneurial activity in the **Agriculture sector** are **Manipur, Meghalaya, Madhya Pradesh, Assam, Tripura and Odisha**. **Hence, statement 1 is not correct.**
- Entrepreneurial activity in the **Manufacturing sector** is highest in the regions of **Gujarat, Meghalaya, Puducherry, Punjab and Rajasthan. Hence, statement 2 is correct.**
- Entrepreneurial activity in the **services sector** is highest in the regions of **Delhi, Mizoram, Uttar Pradesh, Kerala, Andaman and Nicobar, and Haryana**.

QUESTION 50:

With reference to Peste des petits ruminants (PPR), consider the following statements:

1. It is a viral disease that can infect humans along with animals.
2. The Government has targeted to eliminate PPR by 2025.

Which of the statements given above is/are correct.

(A) 1 only
(B) 2 only
(C) Neither 1 nor 2
(D) Both 1 and 2

Answer: (b)

Explanation

- **Peste des Petits Ruminants (PPR)**, also known as sheep and goat plague, is a highly contagious animal disease affecting small ruminants. Once introduced, the virus can infect up to 90 percent of an animal heard, and the disease kills anywhere from 30 to 70 percent of infected animals. The PPR virus **does not infect humans**. **Hence, statement 1 is not correct.**
- The Finance Minister in Union Budget 2020-21 has reiterated its commitment of doubling farmers" income by 2022. The diseases like **Foot and Mouth disease, brucellosis in cattle** and **peste des petits ruminants (PPR)** in sheep and goats is to be eliminated by 2025. **Hence, statement 2 is correct.**

QUESTION 51:

Which of the following statements is/ are correct?

1. The process of primary succession is quicker than the secondary succession.
2. Volcanic lava and debris are potential sites for primary succession.
3. Microbes and lichens are examples of pioneer species.

Select the correct answer using the code given below:

(A) 1 and 2 only
(B) 2 and 3 only
(C) 1 only
(D) 1, 2 and 3

Answer: B

Explanation

- **Secondary succession** is the series of community changes which take place on a previously colonized, but disturbed or damaged habitat.
  - Examples include areas which have been cleared of **existing vegetation (such as after tree-felling in a woodland) and destructive events such as fires**.
- **Secondary succession** is usually **much quicker than primary succession** for the following reasons:
  - There is already an existing **seed bank of suitable plants** in the soil.
  - Root systems undisturbed in the soil, stumps and other plant parts from previously existing plants can rapidly regenerate.
  - The **fertility and structure of the soil** have also already been substantially modified by previous organisms to make it more suitable for growth and colonization.
  - **Hence, statement 1 is not correct.**
- **Primary succession** is the series of community changes which occur on an entirely new habitat which has never been colonized before.
  - Examples of such habitats would include newly exposed or deposited surfaces, such as landslip, **volcanic lava and debris**, elevated sandbanks and dunes, quarried rock faces. **Hence, statement 2 is correct.**

- A number of stages will take place in which an **initial or 'pioneer' community** will gradually develop through a number of different communities into a **'climax' community**, which is the final stage.
  - The first colonizers are referred to as the pioneer community. These can include **lichens, mosses, ferns, and bacteria** – all organisms with **low nutrient requirements.**
  - As they colonize, they break the weathered rock surface, which helps to create the first thin layer of soil. **Hence, statement 3 is correct.**

QUESTION 52:

Which of the following form 'The Evil Quartet' for biodiversity losses:

1. Habitat loss and fragmentation
2. Over-exploitation
3. Alien species invasions

Select the correct answer using the code given below:

(A) 1 and 2 only
(B) 2 and 3 only
(C) 1 and 3 only
(D) 1, 2 and 3

Answer: D

Explanation

The accelerated rates of species extinctions that the world is facing now are largely due to human activities. There are four major causes (' The Evil Quartet ' is the sobriquet used to describe them).

- **Habitat loss and fragmentation**: This is the most important cause driving animals and plants to extinction. The most dramatic examples of habitat loss come from tropical rainforests. Besides total loss, the degradation of many habitats by pollution also threatens the survival of many species. When large habitats are broken up into small fragments due to various human activities, mammals and birds requiring large territories and certain animals with migratory habits are badly affected, leading to population declines.
- **Over-exploitation**: Humans have always depended on nature for food and shelter, but when 'need' turns to 'greed', it leads to overexploitation of natural resources. Many species extinctions in the last 500 years (Steller's sea cow, passenger pigeon) were due to overexploitation by humans.
- **Alien species invasions**: When alien species are introduced unintentionally or deliberately for whatever purpose, some of them turn invasive, and cause decline or extinction of indigenous species. **Hence, option (d) is correct.**
- **Co-extinctions**: When a species becomes extinct, the plant and animal species associated with it also become extinct. When a host fish species becomes extinct, its unique assemblage of parasites also meets the same fate. Another example is the case of a coevolved plant-pollinator mutualism where extinction of one invariably leads to the extinction of the other.

QUESTION 53:

Consider the following pairs:

Match 1		Match 2
1. Commensalism	:	one species is harmed whereas the other is unaffected.
2. Amensalism	:	one species is benefitted and the other is neither benefited
3. Predation	:	only one species benefits other is harmed

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

(A) 3 only
(B) 1 and 2 only
(C) 2 and 3 only
(D) 1, 2 and 3

Answer: A

Explanation

- There is natural habitat on earth that is inhabited just by a single species. For any species, the minimal requirement is one more species on which it can feed.
  - Even a plant species, which makes its own food, cannot survive alone; it needs soil microbes to break down the organic matter in soil and return the inorganic nutrients for absorption.
- Interspecific interactions arise from the interaction of populations of two different species. They could be beneficial, detrimental or neutral (neither harm nor benefit) to one of the species or both.
- Both the species benefit in **mutualism** and both lose in competition in their interactions with each other. In both **parasitism and Predation** only one species benefits (parasite and predator, respectively) and the interaction is detrimental to the other species (host and prey, respectively).
  - The interaction where one species is benefitted and the other is neither benefited nor harmed is called **commensalism.**
  - In **amensalism** on the other hand one species is harmed whereas the other is unaffected. **Hence, pair 3 is correctly matched.**

QUESTION 54:

Which one of the following best describes the main objective of SRISTI Scheme?

(A) It aims to promote primary education among girls.
(B) The scheme is launched to tackle solid waste, especially in industrial towns.
(C) It provides financial assistance for the implementation of rooftop solar projects.
(D) It aims to assist farmers in managing an efficient irrigation system.

Answer: C

Explanation

- The **'Sustainable Rooftop Implementation for Solar Transfiguration of India (SRISTI)'** scheme has been launched by the **Ministry of New and Renewable Energy (MNRE),** with a view to accelerate the deployment of rooftop solar power in the country.
- The scheme is a part of the **larger grid-connected Rooftop Solar (RTS)** power programme, it aims to bring discoms to the forefront in the implementation of rooftop solar projects by providing them financial support which will be linked to their performance in facilitating the deployment of RTS. **Hence, option C is correct.**

QUESTION 55:

With reference to Dead Zones in oceans, consider the following statements:

1. These are areas in the sea where lack of oxygen makes it difficult for organisms to survive.
2. Pollution through nutrient overload by humans is one of the causes of their formation.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: C

Explanation

- Dead Zones also known as Hypoxic zones are areas of the sea where the lack of oxygen makes it difficult for organisms to survive. **Hence, statement 1 is correct.**
- There are many physical, chemical, and biological factors that combine to create dead zones, but nutrient pollution is the primary cause of those zones created by humans. **Hence, statement 2 is correct.**

QUESTION 56:

With reference to ozone pollution, consider the following statements:

1. The excess ozone in the stratosphere causes global warming.
2. Kigali agreement is a legally binding agreement to phase-down hydrofluorocarbons (HFCs).
3. The ozone in the troposphere is a result of the reaction between sunlight and vehicular emissions.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 and 3 only
(C) 1 and 2 only
(D) 1, 2 and 3

Answer: B

Explanation

- In the stratosphere, ozone molecules play an **important role – absorbing ultraviolet radiation from the Sun** and shielding Earth from dangerous rays. It is not responsible for global warming. **Hence, statement 1 is not correct.**
- Hydrofluorocarbons (HFCs) are used as replacements of hydrochlorofluorocarbons (HCFCs) and chlorofluorocarbons (CFCs), however they are powerful greenhouse gases.
- The Kigali Amendment aims for the phase-down of HFCs by cutting their production and consumption. The **Kigali Amendment to the Montreal Protocol is legally binding** and is in force since January 1, 2019. **Hence, statement 2 is correct.**
    - **Montreal Protocol** is an environmental treaty signed by countries to phase out Ozone Depleting Substances (ODSs) from the earth's atmosphere.
- In the Earth's lower atmosphere (troposphere) near ground level, ozone is formed when **pollutants emitted by cars, power plants, industrial boilers**, refineries, chemical plants, and other sources **react chemically in the presence of sunlight.** Surface level Ozone is a harmful air pollutant. **Hence, statement 3 is correct.**

QUESTION 57:

Which of the following has/have shrunk immensely/dried up in the recent past due to human activities? (2018)

1. Aral Sea
2. Black Sea
3. Lake Baikal

Select the correct answer using the code given below:

(A) 1 only
(B) 2 and 3
(C) 2 only
(D) 1 and 3

Answer: A

Explanation

- **Aral Sea:** It lies between Kazakhstan and Uzbekistan. It has been **shrinking steadily since the 1960s** after its tributaries were diverted by Soviet irrigation projects. By 2007, the lake had declined to 10% of its original size and had split into four separate lakes.
- **Black Sea:** It is also known as Euxine Sea. It is one of the major water bodies and a famous inland sea of the world. The countries sharing a border with the Black Sea include Romania, Turkey, Bulgaria, Ukraine, Russia, and Georgia. There has **been no dramatic shrinkage** of the Black Sea in the recent past.
- **Lake Baikal:** Located in Siberian Russia, this UNESCO World Heritage site **has not undergone any dramatic shrinkage in the recent past**. One of the most recognizable shifts affecting Lake Baikal is the rapidly increasing number of Spirogyra, a diverse form of algae. **Hence, option A is correct.**

QUESTION 58:

Which of the following is/are the possible consequence/s of heavy sand mining in riverbeds? (2018)

1. Decreased salinity in the river
2. Pollution of groundwater
3. Lowering of the water-table

Select the correct answer using the code given below:

(A) 1 only
(B) 2 and 3 only
(C) 1 and 3 only
(D) 1, 2 and 3

Answer: B

Explanation

- Sand mining is the process of extracting sand from the river bed or from the coastal region.
- Excessive sand mining results in pollution of river water by lowering the pH value of water, mixing of various metal oxides, reduction of oxygen and thus, increasing the Biological Oxygen Demand (BOD). Polluted river water causes pollution of groundwater. **Hence, statement 2 is correct.**
- Due to increased metal oxides and their mixing in river water, the salinity of the water increases. **Hence, statement 1 is not correct.**
- Volume of water flow in the river is decreased, thus it results in lowering of the water table. **Hence, statement 3 is correct.**

QUESTION 59:

Lichens, which are capable of initiating ecological succession even on a bare rock, are actually a symbiotic association of (2014)

(A) algae and bacteria
(B) algae and fungi
(C) bacteria and fungi
(D) fungi and mosses

Answer: B

Explanation

- Lichen is not a single organism. Rather, it is a symbiosis between different organisms – a fungus and an alga or cyanobacterium. Cyanobacteria are sometimes referred to as 'blue-green algae', though they are quite distinct from the algae.

- Lichens are amongst the first organisms to colonize the barren surfaces (e.g., road cuttings, rock outcrops and volcanic ash) and prepare these areas for later plants by trapping moisture and windblown organic debris and then contributing to the organic deposits when they themselves die and decay. **Hence, option B is correct.**

QUESTION 60:

Consider the following statements: (2018)

1. The Earth's magnetic field has reversed every few hundred thousand years.
2. When the Earth was created more than 4000 million years ago, there was 54% oxygen and no carbon dioxide.
3. When living organisms originated, they modified the early atmosphere of the Earth.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 and 3 only
(C) 1 and 3 only
(D) 1, 2 and 3

Answer: C

Explanation

- Earth's Magnetic Field is a magnetic dipole, tilted 11° from the Earth's axis of rotation. The magnetic North Pole is a point on Ellesmere Island in North Canada, while the magnetic South Pole is off the coast of Antarctica between Adelie Land and Wilkes Land.
- Magnetic fingerprints locked in ancient rocks show that over the last 20 million years, magnetic North and South have flipped roughly every 200,000 to 300,000 years. The last of these major reversals occurred about 780,000 years ago, although the Poles do wander around in between these larger flips. **Hence, statement 1 is correct.**
- When the Earth formed 4.6 billion years ago from a hot mix of gases and solids, it had almost no atmosphere. The surface was molten. As the Earth cooled, an atmosphere formed mainly from gases spewed from volcanoes. It included Hydrogen Sulphide, Methane, and 10 to 200 times as much Carbon Dioxide as today's atmosphere. **Hence, statement 2 is not correct.**
- Around 2.5 million years ago, the amount of Oxygen available in the atmosphere started to rise due to the evolution of photosynthetic organisms that produced oxygen. These organisms were oceanic cyanobacteria. Over time, aerobic organisms evolved and consumed some of the oxygen produced. **Hence, statement 3 is correct.**

QUESTION 61:

Consider the following statements:

1. The variation of ocean temperature is due to the unequal distribution of land and water in the northern and southern hemispheres.
2. The highest temperature in the oceans is recorded at the equator.

Which of the statements given above is / are correct?

(A) 1 only
(B) 2 only
(C) Both 1 aur 2
(D) Neither 1 nor 2

Answer: A

Explanation

- The average temperature of surface water of the oceans is about 27°C and it gradually decreases from the equator towards the poles. The rate of decrease of temperature with increasing latitude is generally 0.5°C per latitude. The average temperature is around 22°C at 20° latitudes, 14° C at 40° latitudes and 0° C near poles.
  - The oceans in the northern hemisphere records relatively higher temperatures than in the southern hemisphere.
  - The average annual temperatures for the northern and southern hemisphere are around 19° C and 16° C respectively. This variation is due to the unequal distribution of land and water in the northern and southern hemispheres. **Hence, statement 1 is correct.**
  - The highest temperature is **not recorded at the equator but slightly towards north of it.** It is due to the prevalence of convectional rainfall in the equatorial regions.
- In these, the warm air rises up and expands then reaches at a cooler layer and saturates, then condenses mainly in the form of cumulus or cumulonimbus clouds. The precipitation due to convectional rainfall occurs in the afternoon.
  - The maximum temperature of the oceans is always at their surfaces because they directly receive the heat from the sun and the heat is transmitted to the lower sections of the oceans through the process of convection.
  - It results in a decrease of temperature with the increasing depth, but the rate of decrease is not uniform throughout. The temperature falls very rapidly up to the depth of 200 m and thereafter, the rate of decrease of temperature is slowed down. **Hence, statement 2 is not correct.**

QUESTION 62:

Which of the following best describes the term thermocline?

(A) It is a region of constant temperature in the ocean near the equator.

(B) It is a zone in the polar region where seawater reaches the freezing point.

(C) The region in the intertidal zone, in the open ocean, which has fairly low biodiversity.

(D) The layer characterised by a rapid decrease in temperature with increasing depth of the ocean.

Answer: D

Explanation

- The temperature-depth profile for the ocean water shows how the temperature decreases with the increasing depth. The profile shows a boundary region between the surface waters of the ocean and the deeper layers.
- The boundary usually begins around 100 – 400 m below the sea surface and extends several hundred metres downward.
  - This boundary region, from where **there is a rapid decrease of temperature, is called the thermocline.** About 90 per cent of the total volume of water is found below the thermocline in the deep ocean.
  - In this zone, temperatures approach 0° (C) The temperature structure of oceans over middle and low latitudes can be described as a three-layer system from surface to the bottom.
  - The **first layer** represents the top layer of warm oceanic water and it is about 500m thick with temperatures ranging between 20° and 25° (C) This layer, within the tropical region, is present throughout the year but in mid-latitudes, it develops only during summer.
    - The **second layer** called the thermocline layer lies below the first layer and is characterised by a rapid decrease in temperature with increasing depth. The thermocline is 500-1,000 m thick.
    - The **third layer** is very cold and extends up to the deep ocean floor.

- In the Arctic and Antarctic circles, the surface water temperatures are close to 0° C and so the temperature change with the depth is very slight. Here, only one layer of cold water exists, which extends from surface to deep ocean floor.

- **Hence, option D is correct.**

QUESTION 63:

Consider the following statements:

1. The increase in salinity of seawater leads to decrease in density.
2. The salinity in the Bay of Bengal is higher than the Arabian Sea.

Which of the statements given above is / are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: D

Explanation

Distribution of Ocean Salinity

- Salinity changes with depth, but the way it changes depends upon the location of the sea. Salinity at the ocean surface increases when surface water is converted to ice or it evaporates and decreases with the input of freshwaters from the rivers.
- Salinity at depth is very much fixed because there is no way that water is 'lost', or the salt is 'added.' There is a marked difference in the salinity between the surface zones and the deep zones of the oceans.
  - The l**ower salinity water rests above the higher salinity dense water**. Salinity generally increases with depth and there is a distinct zone called the **halocline,** where salinity increases sharply.
  - Other factors being constant, **increasing salinity of seawater causes its density to increase**. High salinity seawater, generally, sinks below the lower salinity water. This leads to stratification by salinity. **Hence, statement 1 is not correct.**
  - The average salinity of the Indian Ocean is 35 parts per thousand (o/oo) or ppt. The **low salinity trend is observed in the Bay of Bengal due to the influx of river water.** On the contrary, the **Arabian Sea shows higher salinity due to high evaporation and a low influx of freshwater. Hence, statement 2 is not correct.**

QUESTION 64:

With reference to the dissolved salts in Seawater, arrange the following in its decreasing order:

1. Magnesium
2. Chlorine
3. Potassium
4. Sodium

Which of the following is the correct sequence?

(A) 4-3-2-1
(B) 2-3-4-1
(C) 3-4-1-2
(D) 2-4-1-3

Answer: D

Explanation

Dissolved Salts in Seawater (gm of Salt per kg of Water)

Chlorine	18.97
Sodium	10.47
Sulphate	2.65
Magnesium	1.28
Calcium	0.41
Potassium	0.38
Bicarbonate	0.14
Bromine	0.06
Borate	0.02
Strontium	0.01

Share of different salts

- Sodium chloride – 77.7%
- Magnesium chloride – 10.9%
- Magnesium sulphate –.4.7%
- Calcium sulphate – 3.6%
- Potassium sulphate – 2.5%

Hence, option D is correct.

QUESTION 65:

In the context of tides, consider the following statements:

1. The tidal bulges occur under the influence of both gravitational pull as well as centrifugal force.
2. The position of the sun, moon and earth in a straight line leads to spring tides.

Which of the statements given above is / are correct?

(A) 1 only
(B) 2 only
(C) Both 1 aur 2
(D) Neither 1 nor 2

Answer: C

Explanation

- The periodical rise and fall of the sea level, once or twice a day, mainly due to the attraction of the sun and the moon, is called a tide. Movement of water caused by meteorological effects (winds and atmospheric pressure changes) are called surges. Surges are not regular like tides.
- The study of tides is very complex, spatially and temporally, as it has great variations in frequency, magnitude and height. The moon's gravitational pull to a great extent and to a lesser extent the sun's gravitational pull, are the major causes for the occurrence of tides.
    - Another factor is **centrifugal force**, which is the force that acts to counterbalance gravity. Together, the **gravitational pull and the centrifugal force are responsible for creating the two major tidal bulges on the earth. Hence, statement 1 is correct.**
    - On the side of the earth facing the moon, a tidal bulge occurs while on the opposite side though the gravitational attraction of the moon is less as it is farther away, the centrifugal force causes tidal bulge on the other side.
    - **Spring tides**: The position of both the sun and the moon in relation to the earth has direct bearing on tide height. When **the sun, the moon and the earth are in a straight line, the height of the tide will be higher.**

- These are called **spring tides** and they occur twice a month, one on full moon period and another during new moon period. **Hence, statement 2 is correct.**
- **Neap tides** : Normally, there is a seven day interval between the spring tides and neap tides. At this time the sun and moon are at right angles to each other and the forces of the sun and moon tend to counteract one another.
  - The Moon's attraction, though more than twice as strong as the sun's, is diminished by the counteracting force of the sun's gravitational pull.

QUESTION 66:

Which of the following factors are directly responsible for the flow of ocean currents?

1. Expansion of water
2. Differences in water density
3. Gravitational pull of moon
4. Coriolis force

Select the correct answer using the code given below:

(A) 1 and 2 only
(B) 2 and 3 only
(C) 3 and 4 only
(D) 1, 2 and 4

Answer: D

Explanation

- Ocean currents are like river flow in oceans. They represent a regular volume of water in a definite path and direction. Ocean currents are influenced by following forces namely :
- **Heating by solar energy**: Heating by solar energy causes the **water to expand**. That is why, near the equator the ocean water is about 8 cm higher in level than in the middle latitudes. This causes a very slight gradient and water tends to flow down the slope.
  - **Wind**: Wind blowing on the surface of the ocean pushes the water to move. Friction between the wind and the water surface affects the movement of the water body in its course.
  - **Gravity**: Gravity tends to pull the water down the pile and create gradient variation.
  - **Coriolis force**: Coriolis force intervenes and causes the water to move to the right in the northern hemisphere and to the left in the southern hemisphere. These large accumulations of water and the flow around them are called Gyres. These produce large circular currents in all the ocean basins.
  - **Differences in water density:** It affects vertical mobility of ocean currents. Water with high salinity is denser than water with low salinity and in the same way cold water is denser than warm water. Denser water tends to sink, while relatively lighter water tends to rise.
  - Cold-water ocean currents occur when the cold water at the poles sinks and slowly moves towards the equator. Warm-water currents travel out from the equator along the surface, flowing towards the poles to replace the sinking cold water.
    - The gravitational pull of the Moon and the Sun makes the water in the oceans bulge, causing a continuous change between high and low tide in the ocean. It **doesn't have any impact on the ocean current. Hence, option D is correct.**

QUESTION 67:

With reference to Global Forest Watch, consider the following statements:

1. It is an open-source web application to monitor global forests in near real-time.
2. It is an initiative of the World Resources Institute.

Which of the statements given above is / are correct?

(A) 1 only

(B) 2 only

(C) Both 1 and 2

(D) Neither 1 nor 2

Answer: C

Explanation

- **Global Forest Watch (GFW)** is an **open-source web application** to monitor global forests in near real-time. GFW is an initiative of the **World Resources Institute (WRI)**, with **partners including Google, USAID, the University of Maryland (UMD)**, Esri, Vizzuality and many other academic, **non-profit, public, and private organizations. Hence, statements 1and 2 are correct.**
- The **World Resources Institute (WRI)** is a global research **non-profit organization** that was established in 1982 with funding from the **MacArthur Foundation**.
- WRI partners with **local and national governments, private companies**, publicly held corporations, and other non-profits, and offers services including global climate change issues, sustainable markets, ecosystem protection, and environmental responsible governance services.

QUESTION 68:

Consider the following statements:

1. Biosphere reserves are areas comprising terrestrial, marine and coastal ecosystems.
2. Biosphere reserves are nominated by national governments and remain under the sovereign jurisdiction of the states where they are located.
3. The transition area of a Biosphere reserve adjoins the core areas, and is used for activities compatible with sound ecological practices.

Which of the statements given above is / are correct?

(A) 1 and 2 only

(B) 1 and 3 only

(C) 2 and 3 only

(D) 1, 2 and 3

Answer: A

Explanation

- **Biosphere reserves** are areas comprising **terrestrial, marine and coastal ecosystems.** Each reserve promotes solutions reconciling the conservation of biodiversity with its sustainable use. **Hence, statements 1 is correct.**
  - The reserves are nominated by national governments and remain under the sovereign jurisdiction of the states where they are located. **Hence, statements 2 correct.**
- A biosphere reserve is divided into three zones: **Core zone, Buffer zone, Transition zone**.
  - The **buffer zone** surrounds or adjoins the core areas, and is used for activities **compatible with sound ecological practices.**
  - **Transition area** is the part of the reserve where the greatest activity is allowed, **fostering economic and human development** that is socio-culturally and ecologically sustainable.
  - **Hence, statement 3 is not correct.**

QUESTION 69:

Which of the following are examples of Ex-situ conservation?

1. Zoological parks
2. botanical gardens
3. Seed banks
4. Protecting the the entire forest to save the tiger

Select the correct answer using the code given below:

(A) 2 and 4 only
(B) 1 and 4 only
(C) 1, 2 and 3
(D) 1, 2, 3 and 4

Answer: C

Explanation

- When we conserve and protect the whole ecosystem, its biodiversity at all levels is protected – we save the entire forest to save the tiger. This approach is called **in situ (on site) conservation.**
- **Ex situ Conserve Wildlife** safari parks**tion** – In this approach, threatened animals and plants are taken out from their natural habitat and placed in special settings where they can be protected and given special care.
- Zoological parks, botanical gardens and serve this purpose. There are many animals that have become extinct in the wild but continue to be maintained in zoological parks.
- In recent years ex situ conservation has advanced beyond keeping threatened species in enclosures. Now gametes of threatened species can be preserved in viable and fertile condition for long periods using cryopreservation techniques, eggs can be fertilised in vitro, and plants can be propagated using tissue culture methods.
- Seeds of different genetic strains of commercially important plants can be kept for long periods in seed banks. **Hence, option C is correct.**

QUESTION 70:

Which of these biodiversity hotspots are found in India?

1. Western Ghats and Sri Lanka
2. Indo-Burma
3. Himalaya
4. Sundaland

Select the correct answer using the code given below:

(A) 3 and 4 only
(B) 2 and 3 only
(C) 2, 3 and 4
(D) 1, 2, 3 and 4

Answer: D

Explanation

- On a global basis, the problem of protection of biodiversity has been addressed by eminent conservationists.
- They identified for maximum protection certain 'biodiversity hotspots' regions with very high levels of species richness and high degree of endemism (that is, species confined to that region and not found anywhere else).

- Initially 25 biodiversity hotspots were identified but subsequently more have been added to the list, bringing the total number of biodiversity hotspots in the world to 36. These hotspots are also regions of accelerated habitat loss. Four of these hotspots – Western Ghats and Sri Lanka, Indo-Burma, Sundaland and Himalaya – cover our country's exceptionally high biodiversity regions.
    1. **Himalaya:** Includes the entire Indian Himalayan region (and that falling in Pakistan, Tibet, Nepal, Bhutan, China and Myanmar)
    2. **Indo-Burma:** Includes entire North-eastern India, except Assam and Andaman group of Islands (and Myanmar, Thailand, Vietnam, Laos, Cambodia and southern China).
    3. **Sundalands:** Includes Nicobar group of Islands (and Indonesia, Malaysia, Singapore, Brunei, Philippines).
    4. **Western Ghats and Sri Lanka:** Includes entire Western Ghats (and Sri Lanka).
- Hence, option D is correct.

QUESTION 71:

With reference to 'Hangul', which of the following statements is/are correct?

1. It is a subspecies of the European red deer.
2. It is listed as Vulnerable in the IUCN Red List.
3. It is the state animal of Jammu and Kashmir.

Select the correct answer using the code given below:

(A) 1 only
(B) 2 only
(C) 1 and 3 only
(D) 2 and 3 only

Answer: C

Explanation

- **Kashmir Stag** locally known as **Hangul** is a subspecies of the European red deer, found in Kashmir.
    - Although Hangul is limited to the **Dachigam Wildlife Sanctuary** near Srinagar, a small population has also been witnessed in Overa-Aru Wildlife Sanctuary in South Kashmir. **Hence, statement 1 is correct.**
- **Hangul** is the only surviving species of red deer in India. It is listed as a **critically endangered species** in the IUCN Red List.
    - It has been listed under **Schedule-I of the Wildlife (Protection) Act, 1972** and **J&K Wildlife (Protection) Act, 1978**. It also has been listed among the top 15 species of high conservation priority by the Central Government. **Hence, statement 2 is not correct.**
- **Hangul** is the state animal of **Jammu and Kashmir. Hence, statement 3 is correct.**

QUESTION 72:

With reference to the National Tiger Conservation Authority (NTCA), consider the following statements:

1. It is a statutory body created under the Wildlife (Protection) Act, 1972.
2. NTCA is headed by the Prime Minister of India.
3. TRAFFIC is a programme started by NTC(A)

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) 2 and 3 only
(D) 1,2 and 3

Answer: A

Explanation

- **National Tiger Conservation Authority (NTCA)** is a **statutory body** of the **Ministry of Environment, Forest and Climate Change**, with an overarching supervisory/coordination role, performing functions as provided in the **Wildlife (Protection) Act, 1972. Hence, statement 1 is correct.**
- The NTCA was established in December 2005 following a recommendation of the Tiger Task Force, constituted by the Prime Minister of India for reorganised management of Project Tiger and the many Tiger Reserves in India.
  - The NTCA is headed by the **Minister Environment, Forest and Climate Change (MoEFCC). Hence, statement 2 is not correct.**
- TRAFFIC, the wildlife trade monitoring network, is a **joint program of WWF and IUCN – the International Union for Conservation of Nature.**
  - TRAFFIC works to ensure that trade in wild plants and animals is not a threat to the conservation of nature. TRAFFIC has gained its greatest reputation from supporting CITES, the Convention on International Trade in Endangered Species. **Hence, statement 3 is not correct.**

QUESTION 73:

With reference to Convention on the conservation of migratory species of wild animals, consider the following statements:

1. It is a treaty under the aegis of the United Nations Environment Programme.
2. The 13th Conference of Parties of the Convention was hosted in India.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: C

Explanation

- Convention on the **conservation of migratory species of wild animals (CMS)** is an environmental treaty under the aegis of the **United Nations Environment Programme,** CMS (also referred to as the **Bonn Convention**) provides a global platform for the conservation and sustainable use of migratory animals and their habitats. **Hence, statement 1 is correct.**
- The **13th Conference of Parties (COP)** of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) was hosted by India in February, 2020 at Gandhinagar in Gujarat. **Hence, statement 2 is correct.**

QUESTION 74:

The term Kappaphycus alvarezii, recently in news, is related to:

(A) It is an indigenous herb with the special medicinal value found in Arunachal Pradesh.
(B) It is an invasive seaweed which kills coral reefs in the Gulf of Mannar.
(C) It is a parasite that spreads malaria in tropical regions.
(D) It is a rare species of lizard found in western ghats.

Answer: B

Explanation

- **Kappaphycus alvarezii**, an invasive seaweed which smothers and kills coral reefs, has spread its wings to coral reef areas in Valai island in the Gulf of Mannar (GoM) and is set to invade new coral colonies in the Marine National Park. **Hence, option B is correct.**

QUESTION 75:

The term 'Hagibis' was recently in news, it is –

(A) The oldest rock fragments found in Japan

(B) One of the strongest typhoons to hit Japan

(C) Hurricane in the Caribbean island

(D) The Oldest fossil found on Africa continent

Answer: B

Explanation

- **Typhoon Hagibis** is one of the strongest storms to hit Japan since Typhoon Ida (known as the "Kanogawa Typhoon" in Japanese) in 1958.
  - Hagibis, which means "speed" in the Philippine language, had packing winds of 180 km per hour near its centre.
  - The storm brought record-breaking rainfall to many areas, resulting in floods and landslides in the country.
  - **Hence, option B is correct**

QUESTION 76:

Consider the following statements with reference to 'PRAKASH portal':

1. It aims to improve coordination between the power, coal and railway ministries to ensure coal supplies to power plants.
2. It has been developed by National Thermal Power Corporation (NTPC).
3. The portal is accessible to the general public.

Which of the statements given above is/are correct?

(A) 1 only

(B) 1 and 2 only

(C) 2 and 3 only

(D) 1 2 and 3

Answer: B

Explanation

The government has launched a web portal, PRAKASH (Power Rail Koyla Availability through Supply Harmony).

- It aims to improve coordination between the power, coal and railway ministries to ensure coal supplies to power plants.
- It has been developed by National Thermal Power Corporation (NTPC) and sources data from different stakeholders such as Central Electricity Authority (CEA), Centre for Railway Information System (CRIS) and coal companies.
- The portal is not accessible to the general public.
- The present mechanism to review the coal supply situation consists of an inter-ministerial group. It faces several issues such as scattered information, the correctness of data from different organizations, timely availability of data, etc. leading to difficulties in decision making.
- Benefits of the Portal:
  - Stakeholders can review the overall availability of coal at thermal power plants in different regions.
  - The coal company will be able to track stocks and the coal requirement at power stations for effective production planning.

QUESTION 77:

Consider the following statements: (2018)

1. The definition of "Critical Wildlife Habitat" is incorporated in the Forest Rights Act, 2006.
2. For the first time in India, Baigas have been given Habitat Rights.
3. Union Ministry of Environment, Forest and Climate Change officially decides and declares Habitat Rights for Primitive and Vulnerable Tribal Groups in any part of India.

Which of the statements given above is/are correct?

(A) 1 and 2 only
(B) 2 and 3 only
(C) 3 only
(D) 1, 2 and 3

Answer: A

Explanation

- "**Critical Wildlife Habitat**" has been **defined in the Forest Rights Act, 2006** as such areas of National Parks and Sanctuaries that are required to be kept as inviolate for the purpose of wildlife conservation as may be determined and notified by the Central Government. **Hence, statement 1 is correct.**
- The **Baiga community** (largely in Madhya Pradesh) is one of the 75 **Particularly Vulnerable Tribal Groups (PVTGs)** in India, who are eligible to **get Habitat Rights** under the Forest Rights Act, 2006. Over the years, increasing state control over forests and diversion of forest land for development and conservation has seriously threatened these forest communities. The Government of Madhya Pradesh in 2015 recognised the habitat rights of Baigas and the tribe became the first community in India to get the habitat rights. **Hence, statement 2 is correct.**
- The Habitat Rights of the PVTGs are **recognized by the District Level Committee in the States**. The Ministry of Tribal Affairs clarifies the scope and extent of the definition of habitat rights in the context of PVTG's. **Hence, statement 3 is not correct.**

QUESTION 78:

Sustainable development is described as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. In this perspective, inherently the concept of sustainable development is intertwined with which of the following concepts? (2010)

(A) Social justice and empowerment
(B) Inclusive Growth
(C) Globalization
(D) Carrying capacity

Answer: D

Explanation

- The concept of sustainable development received its first major international recognition in 1972 at the **UN Conference on the Human Environment** held in Stockholm. The term was popularised later in "**Our Common Future**", a report of the World Commission on Environment and Development (**Brundtland Report**), which defined sustainable development as a "development which meets the needs of the present without compromising the ability of future generations to meet their own needs".
- The concept of sustainable development can be interpreted in many different ways, but at its core it is an approach to development that looks to balance different, and often competing needs against an awareness of the environmental, social and economic limitations we face as a society.

- Living within our environmental limits is one of the central principles of sustainable development.
- But the **focus of sustainable development is far broader than just the environment**. It is also about ensuring a strong, healthy and just society. This means meeting the diverse needs of all people in existing and future communities, promoting personal wellbeing, social cohesion and inclusion, and creating equal opportunity. Thus, **it relates explicitly to the extent of carrying capacity of our planet**, which is defined as the maximum population size of the species that the environment can sustain. **Hence, option D is correct.**

QUESTION 79:

In which one of the following States is Pakhui Wildlife Sanctuary located? (2018)

(A) Arunachal Pradesh
(B) Manipur
(C) Meghalaya
(D) Nagaland

Answer: A

Explanation

- **Pakhui Wildlife Sanctuary** lies in the foothills of the Eastern Himalaya in the East Kameng District of **Arunachal Pradesh**. It was declared as a sanctuary in 1977 and a tiger reserve (**also known as Pakke Tiger Reserve**) in 2002.
- At least 40 mammal species occur in the Pakhui Wildlife Sanctuary.
  - Large Cats: Tiger, Leopard and Clouded Leopard
  - Canids: Wild Dog and Asiatic Jackal
  - Herbivore Species: Elephant, Barking Deer, Gaur and Sambhar
  - Commonest Monkeys: Rhesus and Assamese Macaques, and Capped Langur
  - The site is also home to as many as sixteen species of civets, weasels and mongooses. **Hence, option A is correct.**

QUESTION 80:

According to the Wildlife (Protection) Act, 1972, which of the following animals cannot be hunted by any person except under some provisions provided by law? (2017)

1. Gharial
2. Indian wild ass
3. Wild buffalo

Select the correct answer using the code given below:

(A) 1 only
(B) 2 and 3 only
(C) 1 and 3 only
(D) 1, 2 and 3

Answer: D

Explanation

- **Gharial, Indian wild ass and Wild buffalo are all listed under Schedule I of the Wildlife (Protection) Act 1972.** The Wildlife (Protection) Act 1972 prohibits hunting of any animal enlisted in Schedule I of the Act except under some provisions provided by law.
- Further, the section 11 of the Act states that the chief wildlife warden may, if he is satisfied that any wild animal specified in Schedule I has become dangerous to human life or is so disabled or diseased

as to be beyond recovery, by order in writing and stating the reasons therefore, permit any person to hunt such animal or cause such animal to be hunted. The killing or wounding in good faith of any wild animal in defence of oneself or of any other person shall not be an offence. **Hence, option D is correct.**

QUESTION 81:

With reference to Greenhouse Gases, consider the following statements:

1. Carbon dioxide (CO_2) is the biggest overall contributor to the greenhouse effect.
2. Unlike many other greenhouse gases, fluorinated gases have no natural sources.
3. Methane has higher Global Warming Potential (GWP) than Carbon Dioxide.

Which of the statements given above is/are correct?

(A) 1 and 2 only
(B) 2 only
(C) 2 and 3 only
(D) 1, 2 and 3

Answer: C

Explanation

- Water vapour is the biggest overall contributor to the greenhouse effect and humans are not directly responsible for emitting this gas in quantities sufficient to change its concentration in the atmosphere. However, CO_2 and other greenhouse gases is increasing the amount of water vapour in the air by boosting the rate of evaporation.
  - The major greenhouse gases are water vapor, which causes about 36-70% of the greenhouse effect on Earth (not including clouds); carbon dioxide, which causes 9-26%; methane, which causes 4-9%, and ozone, which causes 3-7%. **Hence, statement 1 is not correct.**
- **Fluorinated gases have no natural sources and only come from human-related activities** through a variety of industrial processes such as aluminum and semiconductor manufacturing units. They are also emitted through their use as substitutes for ozone-depleting substances (e.g., as refrigerants). Many fluorinated gases have higher global warming potentials (GWPs) as compared to other Greenhouse gases. **Hence, statement 2 is correct.**
- A molecule of Methane doesn't stay in the atmosphere as long as a molecule of carbon dioxide. Methane is mostly removed from the atmosphere by chemical reaction, persisting for about 12 years. Thus although methane is a potent greenhouse gas, its effect is relatively short-lived.
  - The **Global Warming Potential (GWP)** for a gas is a measure of the total energy that a gas absorbs over a particular period of time (usually 100 years), compared to carbon dioxide.
  - Methane (CH4) has a **GWP more than 20 times higher than CO2** for a 100-year time scale. CH4 emitted today lasts for only 12 years in the atmosphere, on average.
  - Gases with a higher GWP absorb more energy, per pound, than gases with a lower GWP, and thus contribute more to warming Earth.
  - **Hence, statement 3 is correct**

QUESTION 82:

Consider the following statements:

1. The United Nations Convention to Combat Desertification (UNCCD) is a legally binding agreement.
2. India recently hosted COP14 of UNCCD for the first time.
3. Bonn Challenge is a global effort to restore degraded and deforested land.

Which of the statements given above is/are correct?

(A) 1 only

(B) 1 and 2 only

(C) 1 and 2 only

(D) 1, 2 and 3

Answer: D

Explanation

- The **United Nations Convention to Combat Desertification (UNCCD)** was established in 1994. It is the **sole legally binding international agreement** linking environment and development to sustainable land management. **Hence, statement 1 is correct**.
- India for the first time hosted the **14th session of the Conference of Parties (COP14)** of the United Nations Convention to Combat Desertification (UNCCD) in September, 2019. **Hence, statement 2 is correct.**
- At the UNFCCC Conference of the Parties (COP) 2015 in Paris, India also joined the **voluntary Bonn challenge pledge** to bring into restoration 13 million hectares of degraded and deforested land by the year 2020, an additional 8 million hectares by 2030. **Hence, statement 3 is correct.**

QUESTION 83:

Perform Achieve and Trade (PAT) scheme is a flagship programme of which of the following organisations?

(A) Bureau of Energy Efficiency (BEE)

(B) Intergovernmental Panel on Climate Change (IPPC)

(C) National Environmental Engineering Research Institute (NEERI)

(D) Central Pollution Control Board (CPCB)

Answer: A

Explanation

- **Perform Achieve and Trade (PAT) scheme** is a flagship programme of **Bureau of Energy Efficiency** under the **National Mission for Enhanced Energy Efficiency (NMEEE)**.
  - NMEEE is one of the eight national missions under the **National Action Plan on Climate Change (NAPCC)** launched by the Government of India in the year 2008. **Hence, option (a) is correct.**
- It is a market-based mechanism to further accelerate as well as incentivize energy efficiency in the large energy-intensive industries. The scheme provides the option to trade any additional certified energy savings with other designated consumers to comply with the Specific Energy Consumption reduction targets.
- The Energy Savings Certificates (ESCerts) so issued will be tradable on special trading platforms to be created in the two power exchanges--Indian Energy Exchange and Power Exchange India.

QUESTION 84:

With respect to Catalytic Convertors, consider the following statements:

1. As the exhaust passes through the catalytic converter, unburnt hydrocarbons are converted into carbon dioxide and water.
2. Motor vehicles equipped with catalytic converters should use leaded petrol because lead in the petrol activates the catalyst.
3. Platinum-palladium and rhodium are used as the catalysts catalytic converters for reducing emission of poisonous gases.

Which of the statements given above is/are correct?

(A) 1 and 2 only
(B) 2 and 3 only
(C) 1 and 3 only
(D) 1,2 and 3

Answer: C

Explanation

- **Catalytic converter** is an exhaust emission control device that reduces toxic gases and pollutants in exhaust gas from an internal combustion engine into less-toxic pollutants by catalyzing a redox reaction (an oxidation and a reduction reaction).
  - As the exhaust passes through the catalytic converter, **unburnt hydrocarbons are converted into carbon dioxide and water**, and carbon monoxide and nitric oxide are changed to carbon dioxide and nitrogen gas, respectively. **Hence, statement 1 is correct.**
- Motor vehicles equipped with catalytic converters should **use unleaded petrol because lead in the petrol inactivates the catalyst**. **Hence, statement 2 is not correct.**
- Catalytic converters, having expensive metals namely **platinum-palladium and rhodium as the catalysts**, are fitted into automobiles for reducing emission of poisonous gases. **Hence, statement 3 is correct.**

QUESTION 85:

The 'Biorock Technology', recently in the new, is related to:

(A) Determination of age of fossil fuels.
(B) Restoration of coral reefs.
(C) Breaking down environmental pollutants.
(D) Carbon sequestration

Answer: B

Explanation

- Biorock Technology is a method that applies safe, low voltage electrical currents through seawater, causing dissolved minerals to crystallize on structures, growing into a white limestone (CaCo3) similar to that which naturally makes up coral reefs and tropical white-sand beaches. **Hence, option B is the correct answer.**

QUESTION 86:

System of Air Quality and Weather Forecasting And Research (SAFAR) monitors which of the following pollutants:

1. Mercury
2. PM10
3. Benzene
4. Lead
5. PM2.5

Select the correct answer using the code given below::

(A) 1, and 4 only
(B) 2, and 5 only
(C) 1, 2, 3 and 5
(D) 1, 2, 3, 4 and 5

Answer: C

Explanation

- The **System of Air Quality and Weather Forecasting And Research (SAFAR)** is a national initiative introduced by the **Ministry of Earth Sciences (MoES)** to measure the air quality of a metropolitan city, by measuring the overall pollution level and the location-specific air quality of the city.
  - The system is indigenously developed by the Indian Institute of Tropical Meteorology (IITM), Pune and is operationalized by the India Meteorological Department (IMD).
- Pollutants monitored by SAFAR: PM1, **PM2.5**, **PM10**, Ozone, CO, NOx (NO, NO2), SO2, BC, Methane (CH4), Non-methane hydrocarbons (NMHC), VOC's, **Benzene**, **Mercury**. **Hence, option C is correct.**

QUESTION 87:

Which of the following is/are the left bank tributary of Cauvery river?

1. The Harangi
2. The Suvarnavathi
3. The Lakshman tirtha
4. The Shimsha
5. The Kabbani

Select the correct answer using the code given below:

(A) 1 and 4 only
(B) 2 and 3 only
(C) 1 only
(D) 1, 2, 3, 4 and 5

Answer: A

Explanation

- The Cauvery basin extends over states of Tamil Nadu, Karnataka, Kerala and Union Territory of Puducherry draining an area of 81 thousand Sq.km.
- Lakshman tirtha, the Kabbani, the Suvarnavati, Bhavani, the Noyil and the Amaravati join from right.
- **Left Bank tributaries of Cauvery** are the **Harangi**, the Hemavati, **the Shimsha** and the Arkavati. **Hence, option A is correct.**

QUESTION 88:

Consider the following pairs:

	Islands		Located at River
1.	Bashan Char Island	—	Meghna
2.	Majuli Island	—	Brahmaputra
3.	Omkareshwar Island	—	Narmada

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

(A) 1 and 2 only
(B) 2 and 3 only
(C) 1 and 3 only
(D) 1, 2 and 3

Answer: D

Explanation

- Bhashan Char island was formed about two decades ago on the mouth of river Meghna.
  - The uninhabited island is located around 30 kilometres east of Hatiya island in South-East Bangladesh.
  - The Rohingya refugees living in Bangladesh camps have agreed to move to Bhashan Char Island in the Bay of Bengal.
  - The island is also known as **Thengar Char Island. Hence, pair 1 is correctly matched.**
- **Majuli Island** is located at the Brahmaputra river. Majuli is currently listed as the world's largest river island in the Guinness book of world's records and it also became the first island to be a district in India in 2016. **Hence, pair 2 is correctly matched.**
- Omkareshwar Island is located at **Narmada river**. This island is shaped like the sign OM, which is a spiritual symbol of Hindus. **Hence, pair 3 is correctly matched.**

QUESTION 89:

Which one of the following is an artificial lake?

1. Kodaikanal (Tamil Nadu)
2. Oussudu lake (Puducherry)
3. Nainital (Uttarakhand)
4. Renuka (Himachal Pradesh)

Select the correct answer using the code below

(A) 1 and 2 only
(B) 3 and 4 only
(C) 1, 2 and 3 only
(D) 1, 2, 3, 4

Answer: A

Explanation

- **Oussudu Lake** is a man-made lake situated about 10 km from Puducherry.
  - It is recognized as one of the important wetlands of Asia by the International Union for Conservation of Nature and Natural Resources (IUCN).
- **Kodaikanal** has a 154-year-old, artificially-built lake. It is also known as Kodai Lake is a manmade lake located in the Kodaikanal city in Dindigul district in Tamil Nadu.
- Nainital and Renuka are **natural lakes.**

QUESTION 90:

Consider the following pairs:

	Strait	Connected Water bodies
1.	Strait of Magellan	Atlantic and Pacific Oceans
2.	Strait of Hormuz	Arabian sea and Mediterranean Sea
3.	Strait of Gibraltar	Mediterranean Sea and Atlantic Ocean

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

(A) 1 only

(B) 1 and 3 only

(C) 2 and 3 only

(D) 1, 2 and 3

Answer: B

Explanation:

- The **Strait of Magellan** is located near southern Chile along the southern edges of the South American continent and **links the Atlantic and Pacific oceans**. **Hence, pair 1 is matched correctly.**

- The **Strait of Hormuz** separates Iran and Oman, linking the Persian Gulf to the Gulf of Oman and the Arabian Sea. **Hence, pair 2 is not matched correctly.**

- The Strait of Gibraltar connects the Atlantic Ocean to the Mediterranean Sea and separates the two continents-Europe and Africa. **Hence, pair 3 is matched correctly.**

QUESTION 91:

Regarding the shadow banking system, consider the following statements:

1. It operates outside the traditional commercial banking sector.
2. It functions as intermediaries between end-suppliers and end-users of funds.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: C

Explanation

- Shadow banking comprises a set of activities, markets, contracts and institutions that operate partially (or fully) **outside the traditional commercial banking sector.** These are either lightly regulated or not regulated at all. **Hence, statement 1 is correct.**
- A shadow banking system comprises entities that **intermediate between end-suppliers and end-users of funds**. However, they do not have explicit access to central bank liquidity and are highly levered with risky and illiquid assets. **Hence, statement 2 is correct.**
- There are three important segments of the shadow banking system in India – Non-Banking Housing Finance Companies (HFCs), Retail Non-Banking Financial Companies (Retail-NBFCs) and Liquid Debt Mutual Funds (LDMFs).

QUESTION 92:

Which of the following statements is/are correct?

1. Strategic disinvestment involves the transfer of ownership and management control of a public sector entity to some other entity, either private or public.
2. Department of Investment and Public Asset Management (DIPAM) is the nodal department for strategic disinvestment.
3. The Department of Disinvestment was set up as a separate department in 2004.

Select the correct answer using the code given below:

(A) 1 and 2 only
(B) 2 and 3 only
(C) 1 only
(D) 1, 2 and 3

Answer: A

Explanation

- **Strategic disinvestment** is transferring the ownership and control of a public sector entity to some other entity (mostly to a private sector entity).
  - Unlike the simple disinvestment, strategic sale implies some sort of privatization.
    - Disinvestment means the dilution of stake of the Government in a public enterprise.
  - According to the government, strategic disinvestment would imply the **sale of a substantial portion** of the Government shareholding of a central public sector enterprises (CPSE) of upto 50%, or such higher percentage as the competent authority may determine, along with **transfer of management control.**
  - **Hence, statement 1 is correct.**

- The **Department of Disinvestment** has been renamed as **Department of Investment and Public Asset Management (DIPAM)** from 14th April, 2016 which has been made the **nodal department for the strategic stake sale** in the Public Sector Undertakings (PSUs). **Hence, statement 2 is correct.**
- The **Department of Disinvestment was set up as a separate department in December, 1999** and was later renamed as the Ministry of Disinvestment in September, 2001. From 27th May, 2004, the Department of Disinvestment was brought under the Ministry of Finance. **Hence, statement 3 is not correct.**

QUESTION 93:

Regarding 'Arth Ganga' project, consider the following statements:

1. It implies a sustainable development model with a focus on economic activities related to Ganga.
2. The inland waterway is one of the most important pillars of the project.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: C

Explanation

- The first meeting of the **National Ganga Council** was held in Kanpur (Uttar Pradesh) during which the Prime Minister urged for a holistic thinking process where **'Namami Gange' evolved to 'Arth Ganga'**.
- **The Arth Ganga project implies a sustainable development model with a focus on economic activities related to Ganga**. Under this farmers will be encouraged to engage in sustainable agriculture practices, including zero budget farming, planting of fruit trees and building plant nurseries on the banks of Ganga. **Hence, statement 1 is correct.**
- Along with the creation of infrastructure for water sports and development of campsites, cycling and walking tracks etc., would help to tap the 'hybrid' tourism potential of the river basin area-for purposes of religious as well as adventure tourism.
- **The Ministry of Shipping** has highlighted that **Inland Waterways is one of the most important pillars** of the Arth Ganga project as it will result into inclusive growth and play a key role in the generation of enormous employment opportunities in the National Waterways stretch. **Hence, statement 2 is correct.**

QUESTION 94:

Which of the following statements is/ are correct regarding Dutch Disease?

1. It is a paradoxical situation in which the growth in one sector negatively impacts the country's broader economy.
2. It leads to depreciation of the currency of the country.
3. It encourages the import of cheaper alternatives in the country.

Select the correct answer using the code given below:

(A) 1 and 2 only
(B) 1 and 3 only
(C) 1 only
(D) 1, 2 and 3

Answer: B

Explanation

- **Dutch Disease** refers to the phenomenon wherein countries that are rich in natural resources witness uneven growth across sectors. It stands for the **negative consequences** that can arise from a spike in the value of a nation's currency. **Hence, statement 1 is correct.**
- The resource-rich countries export their resources to the rest of the world, it causes the exchange rate of their **currency to appreciate significantly**. **Hence, statement 2 is not correct.**
- The term was coined owing to the after impacts of the discovery of vast natural gas deposits in the North Sea (The Netherlands) in 1959.
- The newfound wealth and massive exports of oil caused the value of the Dutch guilder (the erstwhile currency) to rise sharply, making Dutch exports of all non-oil products less competitive on the world market. It affects other sectors in the country by **discouraging their exports** while **encouraging the import of cheaper alternatives. Hence, statement 3 is correct.**

QUESTION 95:

The term 'Bank run' often seen in news refers to

(A) A condition when homebuyers fail to make a mortgage payment.

(B) A situation when a corporation or government fails to pay a bond which has reached maturity.

(C) A condition of insolvency of banks due to increasing liabilities.

(D) A large number of people start making withdrawals from banks out of panic.

Answer: D

Explanation

- **Bank runs** happen when a large number of people start making withdrawals from banks because they fear the institutions will run out of money.
- A bank run is typically the result of panic rather than true insolvency. A bank run triggered by fear that pushes a bank into actual insolvency represents a classic example of a self-fulfilling prophecy. The bank does risk default, as individuals keep withdrawing funds. So what begins as panic can eventually turn into a true default situation. **Hence, option D is correct.**

QUESTION 96:

With reference to the "Multilateral Instrument" or "MLI", consider the following statements:

1. It is a treaty to implement tax treaty-related measures to prevent Base Erosion and Profit Shifting (BEPS).
2. It will modify tax treaties of the countries to curb revenue loss through treaty abuse.
3. India has ratified Multilateral Instrument in 2019.

Which of the statements given above is/are correct?

(A) 1 only

(B) 2 and 3 only

(C) 1 and 3 only

(D) 1, 2 and 3

Answer: D

Explanation

- **Multilateral Convention** to Implement Tax Treaty Related Measures to Prevent Base Erosion and Profit Shifting ("Multilateral Instrument" or "MLI") was signed to swiftly implement a series of tax treaty measures to update international tax rules and lessen the opportunity for tax avoidance by multinational enterprises. **Hence, statement 1 is correct.**

- The **Multilateral Convention/MLI** is an outcome of the OECD / G20 Project to tackle Base Erosion and Profit Shifting (the "BEPS Project").
  - BEPS is a tax planning strategy that exploits gaps and mismatches in tax rules to artificially shift profits to low or no-tax locations where there is little or no economic activity, resulting in little or no overall corporate tax being paid.
  - India was part of the Ad Hoc Group of more than 100 countries and jurisdictions from G20, OECD, BEPS associates and other interested countries, which worked on an equal footing on the finalization of the text of the Multilateral Convention.
- India has **ratified the Multilateral Convention to Implement Tax Treaty Related Measures to Prevent Base Erosion and Profit Shifting (MLI)**, which was signed by the Finance Minister at Paris on 7th June 2017 on behalf of India, along with representatives of more than 65 countries. **Hence, statement 3 is correct.**
  - On 25th June 2019, India has deposited the Instrument of Ratification to OECD, Paris along with its Final Position in terms of Covered Tax Agreements (CTAs), Reservations, Options and Notifications under the MLI, as a result of which MLI will enter into force for India on 1st October 2019 and its provisions will have an effect on India's DTAAs from FY 2020-21 onwards.
- The MLI will **modify India's tax treaties** to **curb revenue loss through treaty abuse and base erosion and profit shifting strategie**s by ensuring that profits are taxed where substantive economic activities generating the profits are carried out. The MLI will be applied alongside existing tax treaties, modifying their application in order to implement the BEPS measures. **Hence, statement 2 is correct.**

QUESTION 97:

With reference to Public Goods, consider the following statements:

1. These are non-excludable, non-rejectable and have non-rival consumption.
2. Trust in government is an example of the public good.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: C

Explanation

- A public good is a product that an individual can consume without reducing its availability to others and of which no one is deprived. For Example, law enforcement, national defence, air etc.
- **Characteristics of Public Goods:**
  - **Non-excludability**: The citizens can enjoy their benefits at no explicit financial cost.
  - **Non-rival consumption**: The marginal cost of supplying this public good to an extra citizen is zero.
  - **Non-rejectable:** There is a collective supply for public goods to all citizens which means that they cannot be rejected. **Hence, statement 1 is correct.**
- The Economic Survey 2019-2020 introduces the idea of trust as a public good. It noted that unlike other public goods, trust grows with repeated use and therefore takes time to build. **Hence, statement 2 is correct.**
- The Survey also suggests that policies must empower transparency and effective enforcement using data and technology to enhance this public good.

QUESTION 98:

With reference to the 'Index of Economic Freedom', consider the following statements:

1. It is annually brought out by the Fraser Institute.
2. The index measures the status of Rule of Law, Government Size, Regulatory Efficiency and Open Markets in the country.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: B

Explanation

- The Index of Economic Freedom is brought out by the **Heritage Foundation**, whereas it is the **Global Economic Freedom Index** which is brought out by the **Fraser Institute**. **Hence, statement 1 is not correct.**
- India was categorized as 'mostly unfree' with a score of 55.2 in 2019 ranking the Indian economy 129th among 186 countries in the index.
- The index measures economic freedom based on 12 quantitative and qualitative factors, grouped into four broad categories, or pillars, of economic freedom:
    1. **Rule of Law** (property rights, government integrity, judicial effectiveness)
    2. **Government Size** (government spending, tax burden, fiscal health)
    3. **Regulatory Efficiency** (business freedom, labour freedom, monetary freedom)
    4. **Open Markets** (trade freedom, investment freedom, financial freedom). **Hence statement 2 is correct.**

QUESTION 99:

With reference to the MCA-21 initiative of the government, consider the following statements:

1. MCA-21 is an e-Governance project of the Ministry of Commerce and Industry.
2. It is an e-Governance initiative that enables easy and secure access to the Government's services to the corporate sector.

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: B

Explanation

- MCA-21 is an e-Governance initiative of the **Ministry of Corporate Affairs (MCA)**. **Hence, statement 1 is not correct.**
- It **enables easy** and **secure access of the Ministry of Corporate Affairs (MCA's) services to the corporate entities, professionals and citizens of India.**
    - It is one of the 27 Mission Mode Projects of the National e-Governance Plan. **Hence, statement 2 is correct.**

- **Objective:** The MCA21 application is designed to **fully automate all processes related to the proactive enforcement and compliance of the legal requirements** under the Companies Act, 1956, Companies Act 2013, and Limited Liability Partnership Act, 2008. This will help the business community to meet their statutory obligations.
  - It also provides public access to corporate information.
- The **second phase** of the project is being implemented by Infosys for the period of January 2013 – July 2021.
- The Ministry has planned to introduce an **artificial intelligence system in the MCA 21 portal** as it seeks to make compliance process easier as well as ensure routine enforcement activities are done round-the-clock on autopilot basis.

QUESTION 100:

With reference to 'Authorised Economic Operators', consider the following statements:

1. It aims to enhance international supply chain security and facilitate the movement of goods.
2. It is a programme under the aegis of the World Trade Organisation (WTO).

Which of the statements given above is/are correct?

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

Answer: A

Explanation

- **Authorised Economic Operators (AEO)** seeks to secure and facilitate global trade. It aims to enhance international supply chain security and facilitate the movement of goods. **Hence, statement 1 is correct.**
- AEO is a programme under the aegis of the **World Customs Organization (WCO)** SAFE Framework of Standards. **Hence, statement 2 is not correct.**
  - Under this, an entity engaged in international trade is approved by WCO as compliant with supply chain security standards and granted AEO status. An entity with an AEO status is considered a 'secure' trader and a reliable trading partner.
  - Benefits of AEO status include expedited clearance times, fewer examinations, improved security and communication between supply chain partners, and more.
- AEO is a **voluntary programme**.
- The **World Customs Organization (WCO)**, established in 1952 as the **Customs Co-operation Council (CCC)** is an independent intergovernmental body whose mission is to enhance the effectiveness and efficiency of Customs administrations.
  - The WCO represents 183 Customs administrations across the globe that collectively process approximately 98% of world trade.
  - As the global centre of Customs expertise, the WCO is the only international organization with competence in Customs matters and can rightly call itself the voice of the international Customs community.