

Q.1) Consider the following statements with reference to National Clean Air Program.

1. It is a pollution control initiative launched by Ministry of Environment, Forest and Climate change.
2. It aims to cut the concentration of Particulate matter by at least 40% by 2025.
3. Under NCAP, 500 smart cities have been identified across the country based on the Air Quality data from 2014-2018.

Which of the above statements are *incorrect*?

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

Q.1) Solution (b)

Statement analysis

The Ministry of Environment, Forest and Climate change launched National Clean Air Programme (NCAP) as a long-term, time-bound, national level strategy to tackle the air pollution problem across the country in a comprehensive manner with targets to achieve **20% to 30% reduction in Particulate Matter concentrations by 2024 keeping 2017 as the base year** for the comparison of concentration.

- Under NCAP, 122 non-attainment cities have been identified across the country based on the Air Quality data from 2014-2018.
- The NCAP will be a mid-term, five-year action plan with 2019 as the first year.
- The approach for NCAP includes collaborative, multi-scale and cross-sectoral coordination between the relevant central ministries, state governments and local bodies.
- The city specific action plans have been prepared which, inter-alia, include measures for strengthening the monitoring network, reducing vehicular/industrial emissions, increasing public awareness etc. Implementation of the city specific action plans are regularly monitored by Committees at Central and State level namely Steering Committee, Monitoring Committee and Implementation Committee.
- Other features of NCAP include, increasing number of monitoring stations in the country including rural monitoring stations, technology support, emphasis on awareness and capacity building initiatives, setting up of certification agencies for

monitoring equipment, source apportionment studies, emphasis on enforcement, specific sectoral interventions etc.

Q.2) Recently a term 'Brown carbon Tarballs' was in news, which is associated with –

- a) The particles that absorb graphene but are extremely short-lived.
- b) Small light-absorbing, carbonaceous particles that deposits on snow and ice.
- c) A pollutant released from nuclear power plants.
- d) The cell tissue that resides in Plant

Q.2) Solution (b)

Explanation:

Nearly 28 per cent of particles collected from the air samples from a research station in the Himalaya-Tibetan Plateau were tarballs, a recent study has found.

- **Tarballs are small light-absorbing, carbonaceous particles formed due to burning of biomass or fossil fuels that deposit on snow and ice.**
- The percentage of the tarballs increased on days of higher levels of pollution and could contribute to hastening of glacial melt and global warming,
- Tarballs are formed from brown carbon, emitted during the burning of fossil fuels. Until now, black carbon was found to be transported long distances by wind to the Himalayan atmosphere; there was not sufficient direct evidence for primary BrC in the Himalayan atmosphere.
- Primary brown carbon (BrC) co-emitted with black carbon (BC) from biomass burning is an important light-absorbing carbonaceous aerosol.
- The black carbon from the Indo-Gangetic Plain can reach the Himalaya region and influence glacial melting and climatic change.
- But recent study points that tarballs from long-range transport can be an important factor in the climatic effect and would correspond to a substantial influence on glacial melting in the Himalaya region.

Q.3) Which of the followings are Ex-situ method of Bioremediation?

1. Land farming

2. Biopiles
3. Biosparging
4. Bioreactors

Select the correct code:

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

Q.3) Solution (a)

Explanation:

Bioremediation is a branch of biotechnology that employs the use of living organisms, like microbes and bacteria, in the removal of contaminants, pollutants, and toxins from soil, water, and other environments. Bioremediation is used to clean up oil spills or contaminated groundwater.

Ex situ Bioremediation Technique — involves the removal of the contaminated material to be treated elsewhere.

1. **Land farming:** contaminated soil is excavated and spread over a prepared bed and periodically tilled until pollutants are degraded. The goal is to stimulate indigenous biodegradative microorganisms and facilitate their aerobic degradation of contaminants.
2. **Bio-piles:** it is a hybrid of land farming and composting. Essentially, engineered cells are constructed as aerated composted piles. Typically used for treatment of surface contamination with petroleum hydrocarbons.
3. **Bioreactors:** it involves the processing of contaminated solid material (soil, sediment, sludge) or water through an engineered containment system.
4. **Composting:** Composting is nature's process of recycling decomposed organic materials into a rich soil known as compost.

Bioremediation techniques are more economical than traditional methods and pollutants can be treated on site, thus reducing exposure risks for personnel.

In Situ Bioremediation includes Bioinventing, Biosparaging, Bioslurping and Phytoremediation.

Hence statement 3 is part of In-situ Bioremediation.

Q.4) Which of the following statements with reference to Critical Wildlife Habitat is/are correct?

1. They have been envisaged in Wildlife protection amendment act 2002.
2. These areas are required to be kept as inviolate for the purposes of wildlife conservation.
3. Ministry of Tribal Affairs determines and identifies it.

Select the correct code

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

Q.4) Solution (b)

Explanation:

Statement 1 and 2: **The Critical Wildlife Habitats (CWH) have been envisaged in Forest Rights Act, 2006.** The Act — defines CWH as areas “**required to be kept inviolate for the purposes of wildlife conservation**”. These areas are to be identified within national parks and sanctuaries on a case by case basis and on the basis of scientific and objective criteria, according to the act. Areas once declared CWHs cannot be diverted for any other purpose. Hence **statement 1 is incorrect while statement 2 is correct.**

Statement 3: As per the sec 2 (b) of FRA, 2006 the Ministry of Environment and Forest (MoE&F) has been identified as the agency to determine and notify CWH. The ministry of tribal affairs is the nodal ministry for recognition and vesting of Individuals and community forests rights.

Q.5) Smog is the most common form of Air Pollution that occurs in many cities throughout the world. Consider the following statements with reference to it.

1. Classical smog occurs in cool humid climate and is mixture of smog, fog and sulphur dioxide.
2. Photochemical smog occurs in warm, dry and sunny climate and has concentration of oxidising agents.

Which of the above statements is/are correct?

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

Q.5) Solution (c)

Explanation:

The word smog is derived from smoke and fog. This is the most common example of air pollution that occurs in many cities throughout the world

There are two types of smog:

- **Classical smog occurs in cool humid climate.** It is a mixture of smoke, fog and sulphur dioxide. Chemically it is a reducing mixture and so it is also called as reducing smog. Hence, **statement 1 is correct.**
- **Photochemical smog** occurs in warm, dry and sunny climate. The main components of the photochemical smog result from the action of sunlight on unsaturated hydrocarbons and nitrogen oxides produced by automobiles and factories.
 - Photochemical smog has high concentration of oxidising agents and is, therefore, called as oxidising smog. **Hence, statement 2 is correct.**

Q.6) Which of the following are the consequences of Harmful Algal Blooms over Aquatic Environment?

1. It leads to change in water colour giving foul, obnoxious smell making it unfit for drinking purposes.
2. It increases the penetration of lights by settling the decomposed substances at the bottom.
3. It increases the Biological Oxygen demand of water.

Select the correct code

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

Q.6) Solution (a)

Explanation:

Algal bloom is a rapid increase or accumulation in the population of algae in an aquatic system. Algal blooms may occur in freshwater as well as marine environments. Most algal blooms are not harmful but some produce toxins and do affect fish, birds, marine mammals and humans. The toxins may also make the surrounding air difficult to breathe. These are known as Harmful Algal Blooms (HABs).

Consequences of HAB over aquatic environment:

- Impact over biodiversity: **HABs limit the penetration of light causing die-offs of plants in littoral zones** and their dependent population. To decompose these dead organisms, a large quantity of Oxygen is consumed. **This increases the Biological Oxygen Demand (BOD) of water.** Dissolved oxygen decreases and results into fish-kills. In worst cases, it leads to Hypoxia of water-bodies, further leading to formation of dead-zones where water can no more support life.
- Impact over water quality: The colour of the water changes and it **also gives a foul, obnoxious smell** making the **water unfit for drinking purposes.**
- Furthermore, high rates of photosynthesis associated with eutrophication can deplete dissolved inorganic carbon and raise pH to extreme levels during the day. Elevated pH can in turn 'blind' organisms that rely on perception of dissolved chemical cues for their survival by impairing their chemosensory abilities.

Q.7) In which of the following the concept of extended producer responsibility has not been imbibed?

- a) Plastic waste Management rules 2016
- b) E-waste management and Handling Rules, 2011
- c) Solid waste management Rules, 2016
- d) The Food Safety and Standard Regulations, 2011

Q.7) Solution (d)

Explanation:

Extended Producer Responsibility (EPR) is a concept based on the "polluter pays principle". The idea of EPR is extremely critical to waste management. The system is based on the premise that

producers are required to provide financial incentive to the collection systems, processing facilities and the recycling industry to collect and process plastic waste in order to meet the targets set out by the Government.

- Today, India's recycling sector is mostly informal, and consists of waste pickers and kabadiwallahs.
- The concept of EPR has been imbibed in the **E-Waste (Management and Handling) Rules, 2011, Plastic Waste Management Rules, 2016, Solid Waste Management Rules, 2016** etc.
- The EPR entails three liabilities on producers i.e. Economic (expenses of collection, recycling and final disposal of products), Physical (management of products and its illeffects) and Informative (dissemination of information on the environmental properties of the manufactured products).

According to the Food Safety & Standards (Packaging & Labelling) Regulations, 2011, which covers Licensing and Registration, Packaging and Labelling of Food Businesses, Food Product Standards and Food Additives Regulation. FSSAI Regulations are a comprehensive set of guidelines that all food product manufacturers and brands should follow. Further, FSSAI imposes twelve primary labelling regulations for any food packaging. **It does not relate to EPR concept. Hence, statement 4 is incorrect.**

Q.8) Dobson Unit measures which of the following

- a) Greenhouse gases
- b) Arsenic contamination
- c) Species richness in a community
- d) Thickness of Ozone layer

Q.8) Solution (d)

Explanation:

The Dobson Unit is the most common unit for measuring ozone concentration. One Dobson Unit is the number of molecules of ozone that would be required to create a layer of pure ozone 0.01 millimeters thick at a temperature of 0 degrees Celsius and a pressure of 1 atmosphere (the air pressure at the surface of the Earth).

- Expressed another way, a column of air with an ozone concentration of 1 Dobson Unit would contain about 2.69×10^{16} ozone molecules for every square centimeter of area at the base of the column.
- Over the Earth's surface, the ozone layer's average thickness is about 300 Dobson Units or a layer that is 3 millimeters thick.
- Ozone in the atmosphere isn't all packed into a single layer at a certain altitude above the Earth's surface; it's dispersed. Even the stratospheric ozone known as "the ozone layer" is not a single layer of pure ozone. It is simply a region where ozone is more common than it is at other altitudes.
- Satellite sensors and other ozone-measuring devices measure the total ozone concentration for an entire column of the atmosphere.
- The Dobson Unit is a way to describe how much ozone there would be in the column if it were all squeezed into a single layer.
- The average amount of ozone in the atmosphere is roughly 300 Dobson Units, equivalent to a layer 3 millimeters (0.12 inches) thick—the height of 2 pennies stacked together. What scientists call the Antarctic Ozone "Hole" is an area where the ozone concentration drops to an average of about 100 Dobson Units.

Q.9) Consider the following statements with reference to Zero Liquid Discharge.

1. It is a waste treatment process to recirculate all the water back to the process with zero liquid waste.
2. Zero Liquid Discharge generates hazardous solid wastes creating disposal challenges.

Select the correct answer using the code given below

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

Q.9) Solution (c)

Statement Analysis:

Statement 1: **ZLD is a water treatment process to recirculate all the water back to the process with zero liquid waste.** The focus of ZLD is to reduce wastewater economically and produce

clean water that is suitable for reuse (e.g. irrigation), thereby saving money and being beneficial to the environment. ZLD systems employ advanced wastewater/desalination treatment technologies to purify and recycle virtually all of the wastewater produced.

Statement 2: The conventional way to reach ZLD is with thermal technologies such as evaporators (multi stage flash (MSF), multi effect distillation (MED) and mechanical vapor compression (MCV)) and crystallizers and recover their condensate. Thus, **ZLD plants produce hazardous solid wastes creating disposal challenges.**

Evaporators in ZLD system consume a large amount of energy thus increasing the carbon footprint. Also implementing ZLD increases the production costs 25%-30%.

Q.10) Consider the following statements

1. Water having dissolved oxygen less than 50 mg / L is considered as contaminated.
2. BOD is the amount of dissolved oxygen needed by bacteria in decomposing the organic wastes present in water.
3. Higher value of Biological oxygen demand indicates higher dissolved oxygen.

Which of the above given statements is/are correct?

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

Q.10) Solution (b)

Explanation:

Statement 1: Presence of organic and inorganic wastes in water decreases the dissolved Oxygen (DO) content of the water. **Water having DO content below 8.0 mg L⁻¹ may be considered as contaminated.** Water having DO content below 4.0 mg L⁻¹ is considered to be highly polluted. DO content of water is important for the survival of aquatic organisms. **Hence, statement 1 is incorrect.**

The higher amounts of waste increases the rates of decomposition and O₂ consumption, thereby decreases the DO content of water. The demand for O₂ is directly related to increasing input of organic wastes and is expressed as biological oxygen demand (BOD) of water.

Statement 2: Water pollution by organic wastes is measured in terms of Biochemical Oxygen

Demand (BOD). **BOD is the amount of dissolved oxygen needed by bacteria in decomposing the organic wastes present in water.** It is expressed in milligrams of oxygen per litre of water. **Hence, statement 2 is correct.**

Statement 3: The higher value of BOD indicates low DO content of water. Since BOD is limited to biodegradable materials only. Therefore, it is not a reliable method of measuring pollution load in water. **Hence, statement 3 is incorrect.**

Q.11) Burning of coal generates fly ash, which contain many toxic pollutants, which include

1. Sulphur
2. Zinc
3. Arsenic
4. Plutonium
5. Mercury

Select the correct code

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

Q.11) Solution (d)

Statement Analysis:

Fly ash is a coal combustion product that is composed of the particulates (fine particles of burned fuel) that are driven out of coal-fired boilers together with the flue gases.

Depending upon the source and composition of the coal being burned, the components of fly ash vary considerably, but all fly ash includes substantial amounts of silicon dioxide (SiO_2) (both amorphous and crystalline), aluminium oxide (Al_2O_3) and calcium oxide (CaO), the main mineral compounds in coal-bearing rock strata.

The minor constituents of fly ash depend upon the specific coal bed composition but may include one or more of the following elements or compounds found in trace concentrations (up to hundreds ppm): **arsenic, beryllium, boron, cadmium, chromium, hexavalent chromium, cobalt, lead, manganese, mercury, zinc, copper molybdenum, selenium, strontium, thallium, and vanadium**, along with very small concentrations of dioxins and PAH compounds.

Plutonium is a radioactive chemical element, when exposed to moist air, it forms oxides and hydrides that can expand the sample up to 70% in volume, which in turn flake off as a powder that is pyrophoric. It is radioactive and can accumulate in bones, which makes the handling of plutonium dangerous. Producing plutonium in useful quantities for the first time was a major part of the Manhattan Project during World War II that developed the first atomic bombs. The Fat Man bombs used in the Trinity nuclear test in July 1945, and in the bombing of Nagasaki in August 1945, had plutonium cores.

Q.12) There are several ways to remove particulate matter from atmosphere. Consider the following statements with respect to it.

1. The electrostatic precipitator can remove over 99 per cent particulate matter present in the exhaust from a thermal power plant.
2. A scrubber can remove gases like sulphur dioxide. In a scrubber, the exhaust is passed through a spray of water or lime.

Which of the above given statements is/are incorrect?

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

Q.12) Solution (d)

Explanation:

Incorrect statement is being asked here

Statement Analysis:

Statement 1 : An electrostatic precipitator is a filter-less device that removes fine particles, like dust and smoke, from a flowing gas using the force of an induced electrostatic charge minimally impeding the flow of gases through the unit. They **can remove over 99 per cent particulate matter present in the exhaust from a thermal power plant. Hence, statement 1 is correct.**

Statement 2: **A scrubber can be used to remove gases like Sulfur dioxide and ammonia when is passed through the water or lime droplets.** In a scrubber, the exhaust is passed through a spray of water or lime water. Water dissolves gases. The particles also become heavy and fall down. Lime reacts with sulphur dioxide to produce a precipitate of calcium sulphate or sulphite,

used to remove soluble gases and particles. Hence, statement 2 is correct.

Q.13) Which of the following statements are correct with reference to Central Pollution Control Board?

1. It was established under the Air (Prevention and Control of Pollution) Act, 1981.
2. It co-ordinates the activities of the State Pollution Control Boards by providing technical assistance and guidance and also resolves disputes among them.
3. CPCB has the responsibility to regulate and control noise producing and generating sources.

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

Q.13) Solution (b)

Explanation:

Statement 1: The Central Pollution Control Board (CPCB) of India is a statutory organisation under the Ministry of Environment, Forest and Climate Change. **It was established in 1974 under the Water (Prevention and Control of pollution) Act, 1974.** The CPCB is also entrusted with the powers and functions under the Air (Prevention and Control of Pollution) Act, 1981.

Statement 2: CPCB co-ordinates the activities of the State Pollution Control Boards by providing technical assistance and guidance and also resolves disputes among them. It is the apex organisation in country in the field of pollution control, as a technical wing of MoEFCC.

Statement 3: CPCB has the responsibility to regulate and control noise producing and generating sources with the objective of maintaining the ambient air quality standards. In India, the Air (Prevention and Control of Pollution) Act came into force in 1981, but was amended in 1987 to include noise as an air pollutant.

Q.14) Consider the following statements:

1. Biodiversity hotspots are areas that have relatively low biological diversity but are also experiencing a high rate of habitat loss.
2. Biodiversity cold spots are regions with unusually high concentrations of endemic species that also have suffered severe habitat destruction.

Which of the statements given above is/are correct?

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

Q.14) Solution (d)

Basic Information:

Statement 1: **Biodiversity hotspots are regions with unusually high concentrations of endemic species (species that are found nowhere else on Earth) that also have suffered severe habitat destruction.** Conservation International was a pioneer in defining and promoting the concept of hotspots. In 1989, just one year after scientist Norman Myers wrote the paper that introduced the hotspots concept, The hotspot concept has been extremely effective at directing international funding and philanthropy. **Hence, statement 1 is incorrect.**

Statement 2: **Biodiversity coldspots are areas that have relatively low biological diversity but are also experiencing a high rate of habitat loss.** Although a biodiversity coldspot is low in species richness, it can also be important to conserve, as it may be the only location where a rare species is found. Extreme physical environments (low or high temperatures or pressures, or unusual chemical composition) inhabited by just one or two specially adapted species are coldspots that warrant conservation because they represent unique environments that are biologically and physically interesting. **Hence, statement 2 is incorrect.**

Q.15) Consider the following species and select the critically endangered from the code given below:

1. Indian Pangolin
2. Asiatic Lion
3. Indian Bustard
4. Gharial
5. Bengal Florican

Select the correct code:

- a) 1, 2 and 3 only
- b) 2, 3 and 4 only
- c) 3, 4 and 5 only
- d) All of the above

Q.15) Solution (c)

Explanation:

Statement 1: Of the eight extant species of pangolin, the **Indian Pangolin** and Chinese Pangolin occur in India. Indian Pangolin is a large anteater covered dorsally by 11-13 rows of scales. IUCN status of Indian Pangolin is **endangered**.

Statement 2: **Asiatic Lion** is a Panthera leo leo population in India. Its current range is restricted to the Gir National Park and environs in the Indian state of Gujarat. Its IUCN status is **endangered**. it is slightly smaller than African lions.

Statement 3: **Indian bustard** is a bustard found on the Indian subcontinent. A large bird with a horizontal body and long bare legs, giving it an ostrich like appearance, this bird is among the heaviest of the flying birds. Its IUCN status is **Critically Endangered**.

Statement 4: **Ghrial is a fish eating crocodile**. It has been listed as **critically endangered** on the IUCN Red List since 2007. The geographical range of ghrial distribution has dwindled throughout Pakistan, Bhutan, India, Nepal and Bangladesh.

Statement 5: The **Bengal florican** , also called Bengal bustard, is a bustard species native to the Indian subcontinent, Cambodia, and Vietnam. It is listed as **Critically Endangered** on the IUCN Red List because fewer than 1,000 individuals were estimated to be alive as of 2017.

Q.16) Consider the following statements with reference to E-waste Management in India

1. India is the 8th largest E-waste generator in the world
2. India's first E-waste clinic is going to be set up in Bhopal that would enable segregation, processing and disposal of waste from both household and commercial units.
3. Under E-waste management rules 2018, the financial cost of testing Electronic equipment is to borne by producer.

Which of the above statements is/are correct?

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

Q.16) Solution (b)

Basic information:

Electronic waste (e-waste), refers to all items of electrical and electronic equipment (EEE) and its parts that have been discarded by its owner as waste without the intent of re-use. EEE includes a wide range of products with circuitry or electrical components with a power or battery supply

The increase in production of electrical and electronic equipment (EEE) has been attributed to industrialisation, urbanisation and higher levels of disposable income. E-waste generation trends have also moved uphill, which has been majorly imputed to higher and irresponsible consumption, shorter life spans of products and the mandatory obsolescence planned by the producers of EEE.

India is the only country in Southern Asia with e-waste legislation, with laws to manage e-waste in place since 2011, mandating that only authorised dismantlers and recyclers collect e-waste. There are now 312 authorised recyclers in the country.

Statement Analysis

Statement 1: **According to the Global E-Waste Monitor 2020 India is the third largest electronic waste generator in the world after China and the USA 2020.** India, together with China and the United States, accounts for 38 per cent of this volume generated worldwide. **(So, statement 1 is incorrect.)**

Statement 2: **India's first E-waste clinic is going to be set up in Bhopal** that would enable segregation, processing and disposal of waste from both household and commercial units. **So, Statement 2 is incorrect.**

Statement 3: The E-waste (Management) Rules, 2016 (effective from October 2016) mandated collection targets and transferred responsibilities to the producers – Extended Producer Responsibility (EPR). This put the onus on the brands to ensure that waste was brought back in. These targets were relaxed in 2018.

This amendment also gives the Central Pollution Control Board power to randomly select electronic equipment on the market to test for compliance of rules. **The financial cost associated with this testing shall be the responsibility of the government, whereas previously,**

this responsibility was of the producer. **Hence, statement 3 is incorrect.**

Q.17) For Bio magnification to occur, a pollutant must be –

1. Soluble in fat
2. Short lived
3. Mobile
4. Biologically active

Select the correct answer using the code given below:

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

Q.17) Solution (c)

Statement analysis:

A few toxic substances, often present in industrial waste waters, can undergo biological magnification (Bio magnification) in the aquatic food chain. Biomagnification refers to the tendency of pollutants to concentrate as they move from one trophic level to the next.

- This happens because a toxic substance accumulated by an organism cannot be metabolised or excreted, and is thus passed on to the next higher trophic level. This phenomenon is well known for mercury and DDT.
- Thus in biomagnification there is an increase in concentration of a pollutant from one link in a food chain to another.
- **In order for biomagnification to occur, the pollutant must be: long-lived, mobile, soluble in fats, biologically active.**
- If a pollutant is short-lived, it will be broken down before it can become dangerous. If it is not mobile, it will stay in one place and is unlikely to be taken up by organisms. If the pollutant is soluble in water, it will be excreted by the organism. Pollutants that dissolve in fats, however, may be retained for a long time.

Q.18) Biorock technology is in news with reference to

- a) Coral Reef restoration
- b) Tackling climate change through cloud seeding
- c) Heart regenerative technology
- d) Restoration of Ozone layer

Q.18) Solution (a)

Explanation:

The Zoological Survey of India (ZSI), with help from Gujarat's forest department, is attempting for the first time a process to restore coral reefs using biorock or mineral accretion technology.

- A biorock structure was installed one nautical mile off the Mithapur coast in the Gulf of Kachchh.
- Biorock is the name given to the substance formed by electro accumulation of minerals dissolved in seawater on steel structures that are lowered onto the sea bed and are connected to a power source, in this case solar panels that float on the surface.
- The location for installing the biorock had been chosen keeping in mind the high tidal amplitude in the Gulf of Kachchh.
- The low tide depth where the biorock has been installed is four metres, and at high tide it is about eight metres. The ongoing initiative of coral restoration using biorock technology could help corals, including the highly sensitive branching corals, to counter the threats posed by global warming.
- Biorock technology is the only sustainable method of protecting coral reefs from mass extinction from global warming.

Q.19) Consider the following statements with reference to Plastic waste management rules 2016 (as amended in 2018).

1. It defines minimum thickness of plastic carry bags.
2. It seeks to promote use of plastic for road construction.
3. It aims to phase out Multi-layered plastics by 2024.

Which of the above statements is/are incorrect?

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

d) 1, 2 and 3

Q.19) Solution (c)

Explanation:

Note: incorrect statements are asked.

Plastic Waste Management Rules, 2016 (as amended in 2018)

- **Defines minimum thickness of plastic carry bags** i.e. 50 microns. This would increase the cost and the tendency to provide free carry bags would come down. **Hence, statement 1 is correct.**
- Expand the jurisdiction of applicability from the municipal area to rural areas, because plastic has reached rural areas also
- To bring in the responsibilities of producers and generators, both in plastic waste management system and to introduce collect back system of plastic waste by the producers/brand owners, as per extended producer's responsibility.
- **Promote the use of plastic for road construction** as per Indian Road Congress guidelines **or energy recovery**, or waste to oil etc. for gainful utilization of waste and also address the waste disposal issue. **Hence, statement 2 is correct.**
- Manufacturing and use of non-recyclable **multi-layered plastic to be phased in two years. Hence statement 3 is incorrect.**

Plastic Waste Management Amendment rules, 2018

- The amended Rules lay down that the phasing out of Multilayered Plastic (MLP) is now applicable to MLP, which are "non-recyclable, or non-energy recoverable, or with no alternate use."
- The amended Rules also prescribe a central registration system for the registration of the producer/importer/brand owner.
- In addition, Rule 15 of the Plastic Waste Management (Amendment) Rules 2018 on "explicit pricing of carry bags" has been omitted.

Q.20) The Global Climate risk index is released by

- a) IUCN
- b) IPBES

- c) German watch
- d) UNEP

Q.20) Solution (c)

Explanation:

Global Climate Risk Index analyses the extent to which countries and regions have been affected by weather-related events such as severe rainfall, storms, floods and heatwaves.

- The Index stresses on the level of vulnerability of nations to severe climate events, which they should view as warnings for more frequent or severe events in the future.
- **The Global Climate Risk Index 2020 is published by International Environmental think tank Germanwatch.**
- The most recent data available — for 2018 and from 1999 to 2018 — were taken into account.
- India was the fifth most climate-affected country in 2018, which suffered water shortages, crop failures and worst flooding,
- Japan, the Philippines and Germany were found to be the most climate-affected countries in 2018 followed by Madagascar, India and Sri Lanka.
- Regarding future climate change, the Climate Risk Index may serve as a red flag for already existing vulnerability that may further increase in regions where extreme events will become more frequent or more severe due to climate change.

Q.21) With reference to Global Partnerships on Artificial Intelligence (GPAI), consider the following statements:

1. GPAI aims to bridge the gap between theory and practice on Artificial Intelligence.
2. GPAI is built around a shared commitment to the OECD Recommendation on Artificial Intelligence.
3. India is a founding member of GPAI.

Which of the statements given above is/are correct?

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

d) 1, 2 and 3

Q.21) Solution (d)

Statement 1	Statement 2	Statement 3
Correct	Correct	Correct
The Global Partnership on Artificial Intelligence (GPAI) is a multi-stakeholder initiative which aims to bridge the gap between theory and practice on AI by supporting cutting-edge research and applied activities on AI-related priorities.	Built around a shared commitment to the OECD Recommendation on Artificial Intelligence , GPAI brings together engaged minds and expertise from science, industry, civil society, governments, international organisations and academia to foster international cooperation.	GPAI is the fruition of an idea developed within the G7, under the Canadian and French presidencies. GPAI's 15 founding members are Australia, Canada, France, Germany, India , Italy, Japan, Mexico, New Zealand, the Republic of Korea, Singapore, Slovenia, the United Kingdom, the United States and the European Union. They were joined by Brazil, the Netherlands, Poland and Spain in December 2020.

Q.22) Which of the following institutions has recently launched the 'Seaweed Mission' for commercial farming of seaweeds?

- Technology Information, Forecasting and Assessment Council (TIFAC)
- Central Marine Fisheries Research Institute (CMFRI)
- Indian National Centre for Ocean Information Services (INCOIS)
- Central Institute of Fisheries Technology (CIFT)

Q.22) Solution (a)

- **Technology Information, Forecasting and Assessment Council (TIFAC) has launched a Seaweed Mission for commercial farming of seaweeds** and its processing for value addition towards boosting national economy.
- TIFAC is an autonomous organization under the Department of Science & Technology, Government of India.
- The Mission shall undertake following activities:

- Establishing model demonstration farms over one hectare for cultivation of economically important seaweeds in nearshore and onshore along the Indian coasts.
- Establishment of seaweed nurseries for supplying seed material for large scale farming
- Onshore cultivation for (i) Seedling supply facility (ii) Seaweed cultivation for processing
- Setting up of processing plant for production of plant growth stimulants (sap) and industrially important cell wall polysaccharides such as agar, agarose, carrageenan and alginates from fresh seaweeds.

Q.23) With reference to Leatherback sea turtle, consider the following statements:

1. It is the smallest of the seven species of sea turtles.
2. It is found only in Indian and Pacific Ocean.
3. It is listed in Schedule I of Wildlife Protection Act, 1972.

Which of the statements given above is/are correct?

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

Q.23) Solution (c)

Statement 1	Statement 2	Statement 3
Incorrect	Correct	Correct
The seven existing species of sea turtles are the green sea turtle, loggerhead sea turtle, Kemp's ridley sea turtle, olive ridley sea turtle, hawksbill sea turtle, flatback sea turtle, and leatherback sea turtle. Leatherback sea turtle (<i>Dermochelys coriacea</i>) is the largest of the seven species	It is found in all oceans except the Arctic and the Antarctic. Within the Indian Ocean, they nest only in Indonesia, Sri Lanka, and the Andaman and Nicobar Islands.	They are listed in Schedule I of India's Wildlife Protection Act, 1972. It is listed as 'Vulnerable' on the IUCN Red List of Threatened Species.

of sea turtles.



Q.24) India's first full-fledged international cruise terminal "Sagarika" is located in which of the following State?

- a) Gujarat
- b) Maharashtra
- c) Goa
- d) Kerala

Q.24) Solution (d)

- **Sagarika, the International Cruise Terminal in Kochi** was inaugurated recently by the Prime Minister of India.
- It is India's first full-fledged international cruise terminal.

Q.25) The draft of National Strategy on Blockchain is released by which of the following?

- a) Ministry of Science and Technology
- b) NITI Aayog
- c) Ministry of Electronics and Information Technology
- d) Both (a) and (b)

Q.25) Solution (c)

- The **Ministry of Electronics and Information Technology (MeitY)** has prepared a draft **National Strategy on Blockchain**, a framework for the use of blockchain technology in government services and intends to use it in the areas of property record keeping, digital certificates, power distribution, health records as well as supply chain management.
- All the applications of blockchain technology are likely to be explored by the government under the leadership of the IT ministry.
- The National Strategy on Blockchain is also likely to explore the possibility of use of the technology for vaccine and medical supplies logistics management for future purposes.

Q.26) Recently the Central Bank of Sri Lanka (CBSL) settled a \$400 million currency swap facility from the RBI. In this context, consider the following statements:

1. Currency swap agreement is an arrangement between two countries to involve in trading in their own local currencies.
2. A currency swap agreement reduces the risk of volatility against the third currency.

Which of the statements given above is/are correct?

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

Q.26) Solution (c)

Statement 1	Statement 2
Correct	Correct
Currency swap agreements involve trade in local currencies, where countries pay for imports and exports at pre-determined rates of exchange without the involvement of a third country currency like the US dollar.	Currency swap agreements reduces the risk of volatility against the third currency and does away with the charges involved in multiple currency exchanges.

Q.27) The historic martyr town of Dhekiajuli in Assam is associated with which of the following Indian independence movement?

- a) Non Cooperation Movement
- b) Anti-Simon Commission Movement
- c) Civil Disobedience Movement
- d) Quit India Movement

Q.27) Solution (d)

- Dhekiajuli was home to possibly the youngest martyr of the Indian freedom struggle. **Dhekiajuli is associated with the Quit India Movement of 1942.**
- On September 20, 1942, as part of the Quit India movement, processions of freedom fighters marched to various police stations across several towns in Assam.
- These squads, which were known as 'Mrityu Bahini', or death squads, had wide participation - including women and children - and set out to unfurl the tricolor atop police stations, seen as symbols of colonial power.
- The British administration came down heavily on them. In Dhekiajuli, at least 15 people were shot dead, three of them women, including the 12-year-old Tileswari Barua.
- Recently, the Dhekiajuli police station was accorded heritage status and restored by the Assam government.

Q.28) Arrange the following Islands of Indian Ocean from North to South?

- 1. Comoros
- 2. Mauritius
- 3. Maldives
- 4. Seychelles

Select the correct answer using the code given below:

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

Q.28) Solution (a)

Correct sequence is: Maldives – Seychelles – Comoros – Mauritius.



Q.29) The Scheme of Jan Shikshan Sansthan aims to provide vocational training to which of the following?

1. Non-literates
2. Neo-literates
3. School drop-outs

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

Q.29) Solution (d)

- **Jan Shikshan Sansthan aims to provide vocational training to non-literates, neo-literates as well as school drop-outs in rural regions** by identifying skills that have a relevant market in that region.
- The objective of JSS is to uplift this rural population economically by imparting essential skills training, thereby enabling local trades to grow and creating new opportunities for the natives of the region.
- The Scheme of Jan Shikshan Sansthan (JSS), formerly known as Shramik Vidyapeeth is implemented through a network of NGOs in the country since March 1967. The first Shramik Vidyapeeth was established in Mumbai [Worli].
- The scheme of Jan Shikshan Sansthan was transferred from Ministry of Human Resources Development (MHRD) to Ministry of Skill Development and Entrepreneurship (MSDE) in July 2018.
- At present 248 Jan Shikshan Sansthans in 27 States and 2 UTs are active out of which 17 JSSs are not functional. A decision of setting up of 83 new Jan Shikshan Sansthans is under consideration.
- JSS Scheme is implemented by Directorate of JSS which is a sub-ordinate office of MSDE.

Q.30) The "Go Electric" Campaign has been launched recently by which of the following Ministry?

- a) Ministry of Environment, Forest and Climate Change
- b) Ministry of Road Transport & Highways
- c) Ministry of Power
- d) Ministry of Heavy Industries and Public Enterprises

Q.30) Solution (b)

"Go Electric" Campaign was launched recently by the Union Ministry for Road Transport & Highways to spread awareness on the benefits of e-mobility and EV Charging Infrastructure and electric cooking in India.

Read the following passage and answer the questions that follow each passage. Your answer to these questions should be based on passage only.

Ever since the Centre and the States passed the landmark legislation in 2016 adopting a single countrywide Goods and Services Tax (GST), the federal council that is tasked with overseeing all the regulatory aspects of the indirect tax has had its hands full. From recommending the rates that could apply to various products and services, to deciding on what could be tax exempted, the GST Council has had the onerous task of laying out the policy framework for administering the tax in a manner that benefits all stakeholders – the governments, the consumers and the suppliers along the value chain. Given the complexity of the legacy taxes that GST subsumed and replaced and the teething troubles of operating a new tax system, ensuring optimal outcomes has proved an abiding challenge. A significant concern relates to the loopholes that unscrupulous operators have sought to exploit, whereby revenue that ought to have accrued to the Centre and the States has leaked while allowing these elements to derive illicit profits. And the scale of some has been breath-taking. Earlier this month, the Directorate General of GST Intelligence and the Directorate General of Revenue Intelligence conducted a pan-India joint operation, which saw about 1,200 officers simultaneously conducting searches at 336 different locations. In the process they unearthed a network of exporters and their suppliers who had connived to claim fraudulent refunds of Integrated GST, with more than ₹470 crore of input tax credit availed being based on non-existent entities or suppliers with fictitious addresses. A further ₹450 crore of IGST refund is also under review.

It is against the backdrop of such cases, and the fact that frauds totalling up to a staggering ₹45,682 crore have been detected since the roll-out of the tax in July 2017, that the GST Council has decided “in principle” to recommend linking Aadhaar with registration of taxpayers. In its 37th meeting in Goa on Friday, the council also agreed to appraise the possibility of making the biometrics-based unique identifier mandatory for claiming refunds. Already the GST Network — the information technology backbone on which the whole tax system runs — has made it mandatory for new dealers registering under the composition scheme for small businesses to either authenticate their Aadhaar or submit to physical verification of their business, starting January 2020. The council too needs to follow the network’s lead and move swiftly to recommend mandatory linking for refunds, especially since that has proved to be the main source of most frauds. In a becalmed economy, neither the Centre nor States can afford to forego even a rupee of revenue that is due to the public coffers.

Q.31) According to the passage what remedial actions are suggested to avoid fraudulent activities?

- a) Authentication of Aadhaar for new registrations

- b) Biometrics-based unique identifier mandatory for claiming refunds
- c) Linking Aadhaar with registration of taxpayers
- d) All of the above

Q.31) Solution (d)

Refer to the passage below:

'...to appraise the possibility of making the biometrics-based unique identifier mandatory for claiming refunds. Already the GST Network ...has made it mandatory for new dealers registering under the composition scheme for small businesses to either authenticate their Aadhaar or submit to physical verification of their business, ...'

On reading the passage carefully, we see all the above remedial measures listed as recommendations to reduce fraudulent activities.

Hence, option d is the correct answer.

Q.32) Which of the following is the most logical inference that can be drawn from the passage?

- a) GST has some challenges in terms of administration which cannot be rectified.
- b) GST loopholes are easy to identify and it has led to a decrease in tax theft.
- c) The new tax regime has become a tiring and excruciating exercise to operate.
- d) Aadhaar-Linked GST registration will help curb the malpractices and smooth operation of GST.

Q.32) Solution (d)

Option a is incorrect as no such issue that cannot be solved has been mentioned.

Option b is opposite of what has been mentioned in the passage.

Option c is factually incorrect.

Option d is correct as the author feels this step would reduce fraud.

Hence, option d is the correct answer.

Direction for the following 2(two) questions:

Study the information given below and answer the questions that follow

A family consists of six members A, B, C, D, E, and F. There are two married couples. B is a doctor and father of E. F is the grandfather of C and is a contractor. D is the grandmother of E and is a housewife. There is one doctor, one contractor, one nurse, one housewife, and two students in the family.

Q.33) Which of the following is definitely a group of male members?

- a) BF
- b) BFE
- c) BFA
- d) BE

Q.33) Solution (a)

In the above question, we can understand that B, the Doctor, is the father of E.

D, the Housewife, is the grandmother of E and hence the mother of B.

Since there are only two married couples, one being that of B, the grand-father of C this indicates that F must be married to D.

Thus, C and E will be both children of B and these must be the students.

So, A, who remains, shall be the wife of B and she alone can be the nurse. Thus, F must be the Contractor.

Clearly, the males are B, the father, and F, the grand-father. Therefore from the explanation, we can conclude that the correct option is a

Q.34) Which of the following are two married couples?

- a) DF and BE
- b) DF and AB
- c) DE and CF
- d) DF and AC

Q.34) Solution (b)

In the above question, we can understand that B, the Doctor, is the father of E.

D, the Housewife, is the grandmother of E and hence the mother of B.

Since there are only two married couples, one being that of B, the grand-father of C this indicates that F must be married to D.

Thus, C and E will be both children of B and these must be the students.

So, A, who remains, shall be the wife of B and she alone can be the nurse. Thus, F must be the Contractor.

The two married couples are B, A and F, D.

Hence, option b is correct.

Q.35) B's father is 26 years younger than B's grandfather and 29 years older than B. The sum of the ages of all the three is 135 years. What is the age of B's grandfather?

- a) 17 years
- b) 46 years
- c) 58 years
- d) 72 years

Q.35) Solution (d)

Let B's father's age be x years. Therefore, B's age and B's grandfather's age will be $(x - 29)$ years and $(x + 26)$ years respectively.

According to the given question, the sum of the ages of these 3 people is 135 years.

$$\therefore x + x - 29 + x + 26 = 135$$

$$3x - 3 = 135$$

On transposing 3 to R.H.S, we obtain

$$3x = 135 + 3$$

$$3x = 138$$

On dividing both sides by 3,

$$3x/3 = 138/3$$

We obtain $x = 46$

B's father's age = x years = 46 years

B's age = $(x - 29)$ years = $(46 - 29)$ years = 17 years

B's grandfather's age = $(x + 26)$ years = $(46 + 26)$ years = 72 years

