Daily MCQs: 17-04-2024

1. Consider the following statements.

1. The tropospheric ozone layer protects humans from ultraviolet radiation from the sun.
2. Montreal Protocol regulates the production and consumption of ozone depleting substances.
3. Kigali Agreement of Montreal Protocol aims at phasing out the production and consumption of Hydrofluorocarbons.

How many of the statements given above is/are correct?

A. Only one
B. Only two
C. All three
D. None

2. Consider the following statements about the Aditya-L1 mission.

1. It was launched using the LVM3-M4 rocket.
2. The satellite will enter the Sun's atmosphere and make its closest approach to the Sun in 2025.

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

3. 'MATSYA 6000', sometimes seen in the news, is related to

A. National Supercomputing Mission
B. Deep Ocean Mission
C. Human Space-flight Programme
D. Cryptocurrencies

4. With reference to the Soil Health Card (SHC) scheme, consider the following statements.

1. It is promoted by the Ministry of Chemicals and Fertilizers.
2. SHC does not provide information about Physical parameters of soil.

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

5. The government has unveiled the e-shram portal with the main objective to

A. Integrate ration card portability between states
B. Register unorganised workers in India
C. Postal ballot voter registration
D. Promote digital learning among marginalised sections of the society

Solutions:

1. Answer: **B**

Explanation:

- Ozone is a gas made of three oxygen atoms, and just like any other gas it circulates in the atmosphere.
- Ozone is present throughout the atmosphere although there are concentration peaks at two levels, the **stratosphere** (a layer of the atmosphere between 10 and 40 km above us) and **troposphere** (the atmospheric layer from the surface up to about 10 km).

- **Statement 1 is incorrect:** Stratospheric ozone forms a protective layer that shields us from the sun's harmful ultraviolet rays. However, this beneficial ozone has been partially destroyed by chemicals used for refrigeration purposes, such as **chlorofluorocarbons (CFCs)** and **hydrofluorocarbons (HFCs)**, causing what is sometimes called a "hole in the ozone."
- Areas with ozone concentrations less than 220 Dobson Units are called "holes" in the layer.

- Ozone at ground level (**troposphere**) is a harmful air pollutant, because of its effects on people and the environment, and it is the main ingredient in "smog." Tropospheric ozone is a harmful pollutant that causes damage to **lung tissue and plants.**
- Tropospheric ozone is not emitted directly from anthropogenic sources. It is a "secondary" pollutant formed by chemical reactions between **oxides of nitrogen (NOx) and volatile organic compounds (VOC)**. This happens when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources chemically react **in the presence of sunlight.**

Montreal Protocol

- **Statement 2 is correct:** The **Montreal Protocol on Substances that Deplete the Ozone Layer** is an international environmental treaty that **regulates the production and consumption of nearly 100 man-made chemicals referred to as ozone depleting substances (ODS)** including **chlorofluorocarbons (CFCs), halons and hydrochlorofluorocarbons (HCFCs).**
- **The stratospheric ozone layer protects humans and the environment from harmful levels of ultraviolet radiation from the sun**. The widespread use of ODS had caused a hole in the Ozone layer of the atmosphere, which allowed some harmful radiation to reach the earth. These radiations were considered potential health hazards.

- Adopted in **1987**, the Montreal Protocol is the **only UN treaty that has been ratified by every country.**
- Under this treaty, all parties have specific responsibilities related to the phase out of the different groups of ODS, control of ODS trade, annual reporting of data, national licensing systems to control ODS imports and exports, and other matters.
- Developing and developed countries have **equal but differentiated responsibilities** along with **binding, time-targeted and measurable commitments.**
- The Montreal Protocol has been a **far more effective and successful agreement** than the climate change instruments. It has already **resulted in the phase-out of 98.6% of ozone-depleting substances.** The remaining 1.4% are the HCFCs that are in the process of being transitioned.

About Hydrofluorocarbons

- Hydrofluorocarbons (HFCs) are a **group of industrial chemicals** primarily used for **cooling and refrigeration.**
- HFCs are **powerful greenhouse gases** and a substantial number are **short-lived climate pollutants** with a lifetime of between 15 and 29 years in the atmosphere.
- HFCs are widespread in **air conditioners, refrigerators, aerosols, foams and other products.**
- HFCs were introduced as **non-ozone depleting alternatives** to support the timely **phase out of CFCs and HCFCs under Montreal Protocol.**
- While these chemicals **do not deplete the stratospheric ozone layer**, HFCs were found to be extremely potent in causing global warming. Some of them have **high Global Warming Potentials (GWPs) ranging from 12 to 14,000.**
- So, the HFCs solved one problem, but were contributing in a major way to another. But these could not be eliminated under the original provisions of Montreal Protocol which was meant to phase-out ozone-destroying chemicals only. The **Kigali Amendment** enabled the Montreal Protocol to **mandate the elimination of HFCs as well.**

Kigali Agreement

- **Statement 3 is correct:** The Parties to the Montreal Protocol reached agreement at their 28th Meeting of the Parties on 15 October 2016 in Kigali, Rwanda. The Agreement particularly aims at **phasing out the production and consumption of Hydrofluorocarbons** which were first introduced as a substitute to ODSs namely CFCs and Hydrochlorofluorocarbons HCFCs.
- Before the middle of this century, **current HFC use has to be curtailed by at least 85 per cent**. Countries have **different timelines** to do this. **India** has to achieve this target by **2047** while the developed countries have to do it by 2036. China and some other countries have a target of 2045.
- While the reductions for the rich countries have to begin immediately, India, and some other countries, have to begin cutting their HFC use only from 2031.
- The agreement came into force on **1st January 2019** and has been ratified by more than **130 countries** (including **India**) so far.
- The phasing down of HFCs is expected to prevent the **emission to the tune of 105 million tonnes of greenhouse gases**, which would potentially help avoid a rise in global temperature up to **0.5 degrees** Celsius by the year 2100.
- Kigali Agreement **legally binds the signatory countries** with non-compliance measures.

2. Answer: **D**

Explanation:

- **Statement 1 is incorrect:** ISRO successfully launched the country's **first space mission to study the sun, Aditya-L1.**
- The **Polar Satellite Launch Vehicle (PSLV),** in its 59th flight with the Aditya-L1 onboard, took off from the Satish Dhawan Space Centre in Sriharikota.
- **Statement 2 is incorrect:** The Aditya L1 spacecraft will stay in Earth's orbit for sixteen days. After four months of journey, the satellite will be placed on the **L1 point** in the halo orbit around the Sun.
- Aditya-L1 has a mission life of **five years.**

What are the science objectives of Aditya-L1?

- The Aditya-L1 will **observe the Sun from a close distance,** and try to **obtain information about its atmosphere and magnetic field.** It is equipped with **seven payloads.**
- The main objective of the mission is to get a **deeper understanding of the star closest to us, and how its radiation, heat, flow of particles, and magnetic fields affects us.**
- The payloads on the mission will study **chromosphere and corona.** They will also study **coronal mass ejection (CME).** The magnetic field of the corona and the drivers of the space weather will also be studied.
- Importantly, it might provide clues to scientists about a **long-standing mystery:** why the corona of the Sun is a million degree C hot, when the temperature on the surface of the Sun is just about 5,700 degree C.
- It will also help scientists understand the reasons behind acceleration of particles on the Sun, which leads to **solar winds.**

3. Answer: **B**

Explanation:

- Deep Ocean Mission is an initiative spearheaded by the **Ministry of Earth Sciences (MoES)** in collaboration with ISRO, DRDO, Department of Atomic Energy (DAE), Council of Scientific and Industrial Research (CSIR), Department of Biotechnology (DBT) and the Indian Navy.
- The Indian government wants to understand the oceans better, both as a resource and for the conservation of marine biodiversity.
- One of the main aspects of the mission will be **design, development and demonstration of human submersibles** (in the image below).

- Another aspect is **exploring the possibility of deep sea mining and developing necessary technologies.**
- Under the mission, studies are planned at depths close to 6,000 metres under six major components —
  1. Mineral exploration on the sea-bed;
  2. Study and mapping of biodiversity;
  3. Study of climate change;
  4. Exploration of marine biology and developing allied courses,
  5. Training; development and demonstration of ocean exploration
  6. Off-shore technologies for future.

Significance of the mission

- The mission forms a part of the **Blue Economy** envisioned to be developed by 2030, which will place India among select countries — US, France, Japan, Russia and China — to have special missions dedicated for ocean studies.
- It is a **strategic and geo-political move** in order to further strengthen India's position in the Indian Ocean region.
- Globally, **only 11 percent of marine species have been identified.** The deep ocean species are even less explored. Hence it will be helpful in identifying the species and knowing more about **climate change.**

Economic Potential

- It will enable India to develop capabilities to **exploit resources in the Central Indian Ocean Basin (CIOB).**

- CIOB reserves contain deposits of metals like iron, manganese, nickel and cobalt. It is envisaged that **10% of recovery of that large reserve can meet the energy requirement of India for the next 100 years.**
- India has also been allotted 75,000 square kilometres in the CIOB by the **UN International Sea Bed Authority (ISA)** for exploration of **poly-metallic nodules**.

'MATSYA 6000'

- Under the Deep Ocean Mission, a manned scientific submersible known as the **'MATSYA 6000'** is being designed and developed by **National Institute of Ocean Technology (NIOT),** an autonomous Institute under the Ministry of Earth Sciences. The project is named as **Samudrayaan**.
- The Samudrayaan mission is aimed at **sending three personnel to 6000-metre depth** in the 'MATSYA 6000' for the exploration of deep sea resources like minerals.
- The **UN International Sea Bed Authority (ISA)** is an institution set up under the **UN Convention on Law of the Sea** to which **India is a Party.**

4. Answer: **D**

Explanation:

- **Statement 1 is incorrect:** The Soil Health Card (SHC) scheme is promoted by the **Ministry of Agriculture and Farmers' Welfare** to provide information to farmers on **nutrient status of their soil** along with recommendations on appropriate dosage of nutrients to be applied for improving soil health and its fertility.
- Launched in 2015, it is being **implemented through the Department of Agriculture of all the State and Union Territory Governments.**

Constituents of a Soil Health Card

- SHC is a printed report that a farmer will be handed over for each of his holdings.
- **Statement 2 is incorrect:** It will contain the status of his soil with respect to **12 parameters**, namely N, P, K (Macronutrients); S (Secondary- nutrient); Zn, Fe, Cu, Mn, Bo (Micronutrients); and pH, EC, OC (Physical parameters).

5. Answer: **B**

Explanation:

- The Ministry of Labour and Employment has unveiled the e-shram portal which aims to **register 38 crore unorganised workers**, such as construction labourers, migrant workforce, street vendors and domestic workers, among others. It was launched in 2021.
- The workers will be issued an **e-Shram card containing a 12 digit unique number**, which will help in including them in social security schemes.
- The portal would lead to the creation of a **national database of unorganised workers.**
- Apart from being **Aadhaar-linked**, it **will collect details of the name, occupation, address, educational qualification, skill types and family of the registered workers.**

- The portal was developed by the Ministry of Labour & Employment, in technical collaboration with the **National Informatics Centre** (an attached office under the Ministry of Electronics and Information Technology).
- The portal is open to workers engaged in the **unorganised sector** and **aged between 16 and 59.**