

Q: Recently Cabinet approves strategic partnership agreement between MNRE and IRENA. Consider the following statement:

1. It aims to drive green energy transitions based on renewable energy in India.
2. It will help India's energy transition efforts in combating climate change.
3. It will help India in achieving fossil fuel electricity by 2025.

Choose the correct option from the codes given below:

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

Ans: a

Explanation:

- Recently, the Union Cabinet was apprised of a Strategic Partnership Agreement signed between the Ministry of New and Renewable Energy (MNRE) and the International Renewable Energy Agency (IRENA).
- The aim of the Agreement is to drive ambition, leadership and knowledge on green energy transitions based on renewable energy in India.
- The Agreement will help India's energy transition efforts and will also help the world in combating climate change.
- The areas of cooperation as envisaged in the Strategic Partnership Agreement will support India in achieving its ambitious target of 500 GW of installed non-fossil fuel electricity capacity by 2030.

Q: India recently successfully tests high-speed expendable aerial target ABHYAS. Consider the following statement:

1. It is designed & developed by Hindustan Aeronautical Limited.
2. A small gas turbine engine powers it.
3. The target aircraft is equipped with Micro-Electromechanical Systems-based Inertial Navigation System

Choose the correct option from the codes given below:

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

Ans: b

Explanation:

- Recently, India successfully flight-tested the indigenously developed high-speed expendable aerial target (HEAT), ABHYAS, from the Integrated Test Range (ITR) in Chandipur off the Odisha coast.
- ABHYAS is **designed & developed by** Aeronautical Development Establishment of Defence Research and Development Organisation (DRDO).
- The air vehicle was launched using **twin under-slung boosters** which provide the initial acceleration to the vehicle.
- It is **powered by a small gas turbine engine** to sustain a long endurance flight at high subsonic speed.
- The target aircraft is equipped with **Micro-Electromechanical Systems-based Inertial Navigation System** for navigation along with the Flight Control Computer for guidance and control along with Indigenous Radio Altimeter for very low altitude flight and Data Link for encrypted communication between the Ground Control Station and Target Aircraft.

Q: Scientists recently come up with a new way to replicate the process of photosynthesis without sunlight. Consider the following statement:

1. Photosynthesis is a process that converts sunlight into energy.
2. Electro catalytic process convert carbon dioxide, electricity, and water into acetate.

Choose the correct option from the codes given below:

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

Ans: c

Explanation:

- Photosynthesis is a process that converts sunlight into energy and plant life thrives due to this phenomenon, as they use solar energy to break it down to create oxygen and energy in the form of sugar using water, and carbon dioxide.
- Scientists have bypassed the need for biological photosynthesis altogether and create food independent of sunlight by using artificial photosynthesis.
- The study stresses two steps **electrocatalytic process to convert carbon dioxide, electricity, and water into acetate**, the form of the main component of vinegar.
- The acetate thus created is consumed by food-producing organisms in the dark to grow.

Q: India develops its first homegrown mRNA Covid-19 vaccine. Consider the following statement:

1. mRNA vaccine was the first to enter human trials globally.
2. The technology uses genetically engineered mRNA to instruct cells to make the S-protein found on the surface of the Covid-19 virus.
3. After vaccination, the muscle cells begin making S-protein pieces and displaying them on cell surfaces.

Choose the correct option from the codes given below:

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

Ans: d

Explanation:

- India's first home-grown mRNA Covid-19 vaccine, **GEMCOVAC-19** developed at Pune's Gennova Biopharmaceuticals has got a 'restricted emergency use' nod for the 18-and-above age group.
- As the Covid-19 pandemic spread, an mRNA vaccine candidate was the first to enter human trials globally. The first two vaccines that were made available for use in the US were based on mRNA technology.
- Unlike vaccines that put a weakened or inactivated virus in body to activate an immune response, these two Covid-19 vaccines (Pfizer-BioNTech and Moderna) used messenger RNA or mRNA to deliver a message to immune system.
- The **technology uses genetically engineered mRNA** to instruct cells to make the S-protein found on the surface of the Covid-19 virus.
- After vaccination, the **muscle cells begin making S-protein pieces** and displaying them on cell surfaces. This causes the body to create antibodies.
- But these vaccines have to be stored at sub-zero temperatures as **mRNA is fragile and breaks down easily**.

Q: Consider the following statement:

1. Finland and Sweden share Baltic Sea with Russia.
2. Sweden share land border with Russia.

Choose the correct option from the codes given below:

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

Ans: a

Explanation:

- **Russia shares a 1,340 kilometre long border with Finland.** Sweden, though it does not share a land border, shares the Baltic Sea with Russia.
- The land/sea borders with Russia place both countries under direct threat from the Kremlin.