

16-07-2022

I2U2 Summit

Why in Newspapers?

Recently I2U2 (India, Israel, United States of America and United Arab Emirates) leaders summit was held in virtual form.

Quick Issue?

- I2U2 is a group formed by India, Israel, the United Arab Emirates and the United States of America. It is also known as 'West Asian Quad'.
- Its stated objective is to discuss "strengthening economic partnership in trade and investment in and outside common areas of mutual interest".
- Six areas of mutual cooperation have been identified by the countries and aimed at promoting joint investment in water, energy, transport, space, health and food security.

Historical Background?

- I2U2 was formed in October, 2021 after the Abrahamic Agreement to address issues related to maritime security, infrastructure and transport.
- The Abraham Accord is the first peace agreement between Israel and the Arab countries in the last 26 years.
- The United Arab Emirates (UAE) announced an investment of USD 2 billion in India to develop food parks across the country.
- India will provide suitable land for this project and facilitate integration of farmers into food parks.
- The group announced to support a "hybrid renewable energy project" in Gujarat, which includes 300 megawatts (MW) of wind and solar capacity.
- This project will prove to be another important step in India for 500 GW of non-fossil fuel capacity by 2030.
- The US and Israel will be invited to provide their expertise in the private sectors and provide innovative solutions that contribute to the overall sustainability of projects under the group.

Other Key Facts?

- Only partnership can address today's conflicts and overlapping challenges, the most important of which are food and energy security, climate change and health care.
- India also has very old ties with the Middle-East and not only with Gulf countries but also with Israel over the years.
- So just as the United States can play an important and central role in helping to strengthen Israel's integration in the region, so does India.
- India "plays an important role" in the Indo-Pacific, stating that it is "one of the largest, most important, most strategically productive countries in the Indo-Pacific and therefore has a central role in our strategy through the Quad" role should be played.



Dark Matter

Why in Newspapers?

In the United States, one of the most sensitive dark matter detector experiments, 'LUX-ZEPLIN' (LZ), is being used to search for evidence of 'dark matter' in the universe.

Quick Issue?

- All interactions in the universe are the result of four fundamental forces acting on 'particles' - the strong nuclear force, the weak nuclear force, the electromagnetic force and gravity.
- Dark matter is chargeless particles – that is, these particles do not interact through electromagnetic interactions.

Historical Background?

- "Dark means dark": because these particles do not emit light.
- "Matter": Because they have mass like normal matter and therefore interact through gravity.
- Dark matter is quite 'elusive', because- gravitational force is very weak. A particle that interacts so weakly that it becomes very difficult to detect.
- Observation of the rotation of galaxies: During the rotation of stars around the galaxy centre, there are anomalous changes in their actual path and their ideal path. The reason for this is believed to be the presence of 'dark matter' along the rotation path of the stars.
- Observation of 'Bullet Cluster' of Galaxies: Bullet cluster is formed by the merger of two galaxy clusters. When these galaxies do not merge according to observable calculations, it indicates the presence of another massive matter particle, 'dark matter'.
- Structure of Dark Matter Particles: No definite answer is known about this yet, but scientists believe that:-
 - If the neutrino were more massive in size, it could be an excellent candidate as the basic particles of dark matter, but being very light in weight, it does not fit this concept.
 - Other postulates include the super symmetric partner of the 'Z boson' as the fundamental particles of 'dark matter'. This particle mediates the weak electrical interaction.

Other Key Facts?

What is 'dark energy'?

- 'Dark energy' is a hypothetical form of energy, which represents a negative, repulsive pressure acting opposite to gravity.
- It is accelerating, rather than slowing, the rate of expansion of our universe over time, which is the exact opposite of what, might be expected from the universe that arose from the Big Bang.

XENON1T Experiment

- It is the world's most sensitive 'dark matter' experiment, and is being conducted deep underground at INFN Laboratori Nazionali del Gran Sasso in Italy.
- In this experiment, dual phase (liquid/gas) Xenon technology has been used.

Likely Question Asked In Preliminary Exam

Que. With reference to modern scientific research, consider the following statements about Ice Cube, a particle detector located at the South Pole, which was in news recently:

1. It is the world's largest neutrino detector with a diameter of one cubic kilometre in ice.
2. This is a powerful telescope made for the discovery of dark matter.
3. It is buried deep in the snow.

Which of the above statements is/are correct?

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

Answer: (d) 1, 2 and 3

