European Space Agency's Juice Mission

Why in News?

Recently, the European Space Agency is set to launch the Jupiter Icy Moons Explorer (Juice) mission **to explore** Jupiter **and its icy moons, namely Ganymede, Callisto, and** Europa**.**

What is Juice Mission?

- **About:**
  - **Launched from French Guiana** on an Ariane 5 launcher. The mission is set to reach Jupiter in 2031.
  - The spacecraft was constructed by Airbus Defence and Space, a division of the Airbus group.
- **Objectives:**
  - The main objective of the mission:
    - To create **detailed maps of the moons' surfaces** and look beneath them to probe the potential habitable environments by analyzing the water bodies underneath.
    - To create a **comprehensive picture of Jupiter** by trying to understand its origin, history, and evolution.
  - The focus will be on **Ganymede** (the **largest moon in the Solar System,** which generates its magnetic field).
    - The three moons, Ganymede, Callisto, and Europa, are believed to hold immense amounts of water, potentially making them habitable.
  - Juice isn't equipped to detect life but can find out whether there could be places around Jupiter, inside the icy moons, where the necessary conditions, such as water, biological essential elements, energy, and stability, to sustain life are present.

What is Jupiter?

- Fifth in line from the Sun, Jupiter is, by far, the **largest planet in the solar system** – more than twice as massive as all the other planets combined.
  - Jupiter, Saturn, Uranus and Neptune are called **Jovian or Gas Giant Planets.** These have thick atmosphere, **mostly of helium and hydrogen.**
- Jupiter's iconic **Great Red Spot** is a giant storm bigger than Earth that has raged for hundreds of years.
- Jupiter **rotates once about every 10 hours** (a Jovian day), but takes about **12 Earth years** to complete **one orbit of the Sun** (a Jovian year).
- Jupiter has **more than 75 moons.**
  - The planet Jupiter's **four largest moons are called the Galilean satellites** after Italian astronomer Galileo Galilei, who first observed them in 1610.
  - These large moons, named **Io, Europa, Ganymede, and Callisto,** are each distinctive world.
- In 1979, the **Voyager mission** discovered Jupiter's faint **ring system.**
- **Nine spacecraft** have visited Jupiter. Seven flew by and two have orbited the gas giant.
  - The **Galileo probe (NASA)** which orbited the planet between 1995 and 2003.
  - **Juno (NASA)** has been circling the planet since 2016.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Q. Which of the following pairs is/are correctly matched? (2014)

Spacecraft Purpose

1. Cassini-Huygens : Orbiting the Venus and transmitting data to the Earth
2. Messenger : Mapping and investigating the Mercury
3. Voyager 1 and 2 : Exploring the outer solar system

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

Ans: (b)

Exp:

- Cassini-Huygens was sent to study Saturn and its moons. It was a joint collaboration between NASAand European Space Agency. It was launched in 1997 and entered Saturn's orbit in 2004. The mission ended in 2017. **Hence, pair 1 is not correctly matched.**
- Messenger, a spacecraft by NASA was sent to map and investigate Mercury. It was launched in 2004 and entered Mercury's orbit in 2011. The mission ended in 2015. **Hence, pair 2 is correctly matched.**
- Voyager 1 and 2 were launched by NASA in 1977 to explore the outer solar system. Both the spacecraft are still operational. **Hence, pair 3 is correctly matched.**
- **Therefore, option (b) is the correct answer**

Source: IE