# Prelim Bits 14-06-2019

## Significant Components of Chandrayaan-2

- Chandrayaan-2 is ISRO's upcoming Lander and Rover mission to Moon.
- Chandrayaan-2 consists of an Orbiter, Lander and Rover, all equipped with scientific instruments to study the moon.
- **Orbiter -** The Orbiter will 100 km away from the moon, which will observe lunar surface and relay communication between Earth and the Lander.
- The orbiter is equipped with different kinds of camera to take create high-resolution three-dimensional maps of the surface, would remain in orbit for a year.
- **Vikram Lander -** Lander module Vikram was named after Vikram Sarabhai.
- It is the first time that ISRO is attempting to soft-land a module in extra-terrestrial space.
- The main challenge is in controlling its speed as it approaches the surface.
- Once the Lander and the Rover, enter the Moon's gravity, they would be in a state of free fall.
- To enable a smooth landing, the speed of the Lander just ahead of touchdown should be 1 m/s (3.6 km/h) or less.
- The Lander will mainly study the moon's atmosphere and look out for seismic activity.
- **Pragyaan Rover -** Rover module Pragyaan means wisdom.
- The 6-wheeled, AI Solar powered rover was designed, developed and build indigenously by ISRO.
- The rover will be landed in be landed closer to the Moon's equator to receive more sun light.
- Its primary objective will be to study the composition of the surface near the lunar landing site, and determine its abundance of various elements.
- Both the Lander and Rover are designed to work for only 14 days (1 lunar day).

## Landing Site on the Moon

- Chandrayaan-2 will make a landing at a site where no earlier mission has

gone, near the south pole of the Moon.

- The unexplored territory offers an opportunity for the mission to discover something new.
- Incidentally, the crash-landing of the MIP from Chandrayaan-1 had happened in the same region of the Moon.
- The south pole of the Moon holds possibility of presence of water.
- In addition, this area is also supposed to have ancient rocks and craters that can offer indications of history of the Moon, and also contain clues to the fossil records of early solar system.
- Recently, China landed a lander and rover on the Moon's far side (not facing the Earth).
- This was the first time any landing had taken place on that side.
- The Chinese mission, Chang'e 4, was designed to function for three lunar days but has already entered its fifth lunar night.

## Europa

- Europa, a frozen moon around Jupiter, is believed to be one of the most habitable worlds in the solar system.
- It was first imaged in detail by the NASA's Voyager 1 probe in 1979, revealing a surface almost devoid of large craters.
- Europa is also criss-crossed with long troughs, folds and ridges, potentially made of icebergs floating around in melt-water or slush.
- In 1990's The Galileo mission found evidence that it had a sub-surface liquid salt water ocean.
- Recent studies shows it may well be normal table salt (sodium chloride), just like on Earth.
- This has important implications for the potential existence of life in Europa's hidden depths.
- Scientists believe that hydrothermal circulation within the ocean, possibly driven by hydrothermal vents might naturally enrich the ocean in sodium chloride, via chemical reactions between the ocean and rock.
- On Earth, hydrothermal vents are thought to be a source of life, such as bacteria.
- Like our moon and Earth, Europa is tidally locked to Jupiter, meaning that it always presents the same side to the giant planet.
- Salt, specifically the sodium ions in table salt, is also crucial for a whole range of metabolic processes in plant and animal life.

## Vedas

- Vedas are the most sacred and ancient Hindu texts, there are four Vedas, the Rigveda, Samaveda, Yajurveda and Atharvaveda.
- The Rigveda is by far the oldest and consists of about one thousand hymns, made up of about 10,600 verses.
- The others are typically shorter; the Samaveda has about 1,500 verses, the Atharvaveda has about 6,000 mantras and so on
- The Vedas were composed somewhere around 2000 BC, while writing in India began more than 2,500 years later.
- Vedas transferred from one to the other through the process of memorization, by listening was called the 'shruti', which means "what is heard", and is often used to refer to the Vedas themselves.

## Vedic Chanting

- To preserve the purity of the Vedas, ancient Indians came up with ingenious techniques.
- In addition to memorizing each mantra the standard way, they would learn the same sentence in many different ways backwards, forwards, combining two words at a time and so on.
- There were more than ten recitation techniques, which are as follows Vakya-patha (Sentence recitation), Pada-patha (ord recitation), Krama-patha (Step recitation), Jata-patha (Woven recitation), Ghana-patha,  mala (garland), shikha (peak), dhvaja (flag), rekha (line), danda (stick) and ratha (chariot).
- Reciting the entire Rigveda in the Ghanam style just once could take up to 450 hours.
- UNESCO has designated the tradition of the Vedic chant a "Masterpiece of the Oral and Intangible Heritage of Humanity", due to its cultural significance.

## Per- and Polyfluoroalkyl (PFA)

- Per- and Polyfluoroalkyl (PFAs) are a group of man-made chemicals that includes PFOA, PFOS, GenX, and many other chemicals.
- PFAs are chemical on non-stick cookware among many other things, which has made its way into the human food chain.
- Apart from cookware, they are found in resistant fabrics used for cleaning, paints and food packaging.
- Recently it has been found that the chemicals can be fatal for human beings, travelling through bloodstreams and collecting in the kidney and liver.

- Continuous deposition can lead to dysfunction of organs or cancer after a period.

**Source: Down to Earth, Indian Express**

