GSAT-29 Satellite Launched

The Indian Space and Research Organisation (ISRO) has successfully launched **GSAT-29 (Geostationary Satellite)** communication satellite through Geosynchronous Satellite Launch Vehicle Mark III (GSLV Mk III).

- GSLV Mk III successfully placed the satellite in **Geosynchronous Transfer Orbit (GTO)** after three orbit-raising maneuvers, the satellite will be placed in the **Geostationary Orbit.**

Payloads on GSLV Mk III

- GSAT-29, weighing 3,423kg, is the **heaviest satellite to be put into orbit by ISRO's launch vehicle** and is designed for a mission life of 10 years.
- It is a multiband, multi-beam communication satellite which will serve as a testbed for several new and critical technologies.
- Its Payload also consists of Geo High-Resolution Camera and an Optical Communication Payload.

Significance

- GSAT-29 will help in providing **internet connectivity** in remote areas especially in **Jammu & Kashmir and North-Eastern regions of India.**
- Geo-High Resolution Camera will help in high-resolution imaging and help in **surveillance in the Indian Ocean.**
- Optical Communication payload will help in **data transmission at a very high rate** through the optical communication link.
- The successful launch signifies the **completion of the experimental phase of GSLV Mk III and it is now operational.**
- Future Mission of ISRO, **Chandrayaan-2 and Gaganyaan missions** (human space flight) will also be **launched by GSLV Mk III.**
- The success of GSLV Mk III marks an important milestone in the Indian space programme towards **achieving self-reliance** in launching heavier satellites.

Types of Orbits

In general, there are two types of orbits:

- Polar Synchronous
- Geosynchronous

Polar Orbit

- A polar orbit travels **north-south over the poles** and takes approximately **90 minutes for a full rotation.**
- These orbits have an **inclination near 90 degrees.** This allows the satellite to see virtually every part of the Earth as the Earth rotates underneath it.
- These satellites have many uses such as **monitoring crops, global security, measuring ozone concentrations in the stratosphere or measuring temperatures in the atmosphere.**
- Almost all the satellites that are in a polar orbit are at **lower altitudes.**
- An orbit is called **sun-synchronous** when the angle between the **line joining the center of the**

Earth and the satellite and the Sun is constant throughout the orbit.

- These orbits are also referred to as **“Low Earth Orbit (LEO)”** which enables the onboard camera to take images of the earth under the same sun-illumination conditions during each of the repeated visits, thus making the satellite useful for earth resources monitoring.
- **It passes over any given point on Earth’s surface at the same local solar time.**

Geosynchronous Orbit

- Geosynchronous satellites are launched into orbit in the same direction the Earth is spinning and can have any inclination.
- When the satellite is in orbit at a specific altitude (approximately 36,000km above the Earth's surface)**, it will exactly match the rotation of the Earth.**
- While, **Geostationary orbits** fall in the same category as geosynchronous orbits, but with that one special quality of being **parked over the equator.**
- In the case of geostationary satellites, the Earth’s force of gravity is exactly enough to provide acceleration required for circular motion.
- **Geosynchronous Transfer Orbit(GTO):** To attain geostationary or geosynchronous earth orbits, a spacecraft is first launched into a Geosynchronous Transfer Orbit.
- From the **GTO the spacecraft uses its engines to shift to geostationary or geosynchronous orbit.**