1 Introduction to Space Mission

A **space mission** is a scientific program carried out using spacecraft such as satellites, rockets, probes, and space stations to explore space and collect information about Earth, the Moon, planets, stars, and the universe.

India has made significant progress in space research through **ISRO (Indian Space Research Organisation)**.

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2 Artificial Satellites

Definition:

An **artificial satellite** is a man-made object placed into orbit around the Earth or another celestial body.

Types of Artificial Satellites:

1. **Geostationary satellites**
2. **Polar satellites**

Geostationary Satellites

- Orbit in the **equatorial plane**
- Time period = **24 hours**
- Appear **stationary** relative to Earth
- Height ≈ **36,000 km** above Earth

Uses:

- Television broadcasting
- Weather forecasting
- Communication (TV, radio, mobile signals)

□ Polar Satellites

- Orbit from **north pole to south pole**
- Cover the entire Earth as Earth rotates
- Fly at a lower altitude

Uses:

- Earth mapping
- Environmental monitoring
- Weather observation
- Disaster management

3□ Launch Vehicles (Rockets)

Definition:

A **launch vehicle** is a rocket used to carry satellites or spacecraft into space.

Why multi-stage rockets are used?

- Each stage burns fuel and separates
- Reduces weight
- Increases efficiency
- Helps achieve high velocity

Types of Launch Vehicles used by ISRO:

- **PSLV (Polar Satellite Launch Vehicle)**
- **GSLV (Geosynchronous Satellite Launch Vehicle)**
- **LVM-3 (Gaganyaan mission)**

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4. Escape Velocity

Definition:

Escape velocity is the minimum velocity required by an object to escape the gravitational pull of Earth without any further propulsion.

Formula:

$$v = \sqrt{\frac{2GM}{R}}$$

Value for Earth:

$$v \approx 11.2 \text{ km/s}$$

Importance:

- Used to launch spacecraft
- Required for interplanetary missions

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5. Space Probes

Definition:

A **space probe** is an unmanned spacecraft sent to explore outer space beyond Earth's orbit.

Examples:

- Moon missions
- Mars missions
- Venus missions

Functions:

- Collect scientific data
- Take photographs
- Study atmosphere, surface, and magnetic fields

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6 Indian Space Missions (Very Important ⭐)

Chandrayaan Mission

- India's **Moon mission**
- Studied lunar surface, minerals, and water molecules
- Showed India's capability in space exploration

Mangalyaan (Mars Orbiter Mission)

- India's **first interplanetary mission**
- Studied Mars' atmosphere and surface
- Made India the **first country to reach Mars in first attempt**

Gaganyaan Mission

- India's **human spaceflight mission**
- Aim: Send Indian astronauts (Vyomnauts) to space
- LVM-3 rocket used

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7 Remote Sensing Satellites

Definition:

Satellites used to observe Earth without direct contact are called **remote sensing satellites**.

Applications:

- Agriculture planning
- Weather forecasting
- Forest mapping
- Mineral exploration
- Disaster management (floods, cyclones, earthquakes)

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8 Space Station

Definition:

A **space station** is a large spacecraft that remains in orbit and allows astronauts to live and conduct experiments for long periods.

Uses:

- Scientific research
- Study effects of microgravity
- Astronaut training

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9 Importance of Space Technology (Long Answer Ready)

Space technology plays an important role in:

- Communication (TV, internet, mobile)
- Weather prediction
- Navigation (GPS)
- National security
- Disaster management
- Scientific research

□ Important 2-Mark Questions (Exam Ready)

1. Define artificial satellite.
2. What is escape velocity?
3. Write two uses of geostationary satellites.
4. What is a space probe?

□ Important 3-Mark Questions

1. Explain geostationary satellites with two uses.
2. Write features of polar satellites.
3. Explain escape velocity with formula.

□ Important 4-Mark / Long Answer Questions ☆

1. Explain different types of artificial satellites.
2. Describe India’s space missions.
3. Explain the importance of space technology in daily life.
4. Write a note on launch vehicles and their stages.