

KIRAN TUTORIALS

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Std 10 (English)**Science And Technology - I****Date 29-09-20****Time 1HRS****Chapter 10.00****Marks 20****Q.1 Multiple Choice Questions****3**

- 1 The functioning of the satellite launch vehicle is based on
- Newton's first law of motion
 - Newton's Second law of motion
 - Newtons Third law of motion
 - None of the above

Ans Option c.

- 2 Which one of the following is a Low Earth Orbit (LEO) satellite.
- Navigational Satellite
 - Geostationary Satellite
 - International Space Station
 - All of the above

Ans Option c.

- 3 The structure of launch vehicle is decided by
- weight of satellite
 - type of satellite orbit
 - Both a and b
 - None of the above

Ans Option c.**Q.2 Find the odd one out****2**

- 1 INSAT, PLSV, GSAT, IRNSS

Ans PSLV as it is a launch vehicle.

- 2 EDUSAT, Moon, INSAT, GSAT.

Ans Moon as it the natural satellite and rest are artificial.**Q.3 State True or False****2**

- 1 Some planets have more than one satellite.

Ans Some planets have more than one satellite.- **True**

- 2 High Earth Orbit Satellites pass over the polar region.

Ans High Earth Orbit Satellites pass over the polar region.- **False.****Q.4 Name the following****1**

- 1 Name two satellite launchers built by ISRO.

Ans PSLV – polar satellite launch vehicle
GSLV – Geosynchronous satellite launch vehicle**Q.5 Give scientific reasons(Any One)****2**

- 1 Space debris is a major problem.

Ans All Non functional satellite, parts of launcher detached during launching, debris generated due to

collision of a satellite with another other space object etc. all from space debris.

- i. These debris pose a threat to the current functional satellites, space shuttle and space station.
- ii. If it remains unchecked, it is very risky for all future launches of satellites and space shuttles and there is a growing possibility of space accidents.
- iii. Research and dedicated efforts are on to find the means and ways of managing the space debris.

2 Geostationary satellites not useful for studies of Polar regions.

- Ans**
- i. Geostationary satellites are High Earth orbit satellite and are placed at 35780 km above the earth's surface.
 - ii. A geostationary satellite revolves in the equatorial plane of the earth and thus it can never fly above the polar regions.
 - iii. Hence geostationary satellite are not useful for studies of polar regions.
 - iv. For this purpose, elliptical medium earth orbits passing over the polar region are used.
 - v. These orbits are called polar orbits.

Q.6 Write Short Notes(Any One)

2

1 Write short note on moon mission.

- Ans** Moon mission have been successfully under taken by Russia, USA, Europe, China, Japan and India
- i. Russia executed 15 moon mission between 1959 and 1976.
 - ii. Last four mission of Russia brought the stone samples for the study and analysis.
 - iii. These mission were unmanned.
 - iv. USA executed moon missions between 1962 and 1972.
 - v. Some of these mission were unmanned.
 - vi. On 20th July 1969. American astronaut **Neil Armstrong** became the first human to step on moon.
 - vii. Indian Space Research Organization successfully launched Chandrayaan 1.
 - viii. India became the first country to discover presence of **water on moon** through the mission.

2 Write short note on mars mission.

- Ans** Many nations have sent spacecraft towards mars but only few of these mission have been successful.
- i. ISRO sent **Mangalyaan** towards mars.
 - ii. Mangalyaan was launched in November 2013 and was placed in orbits of mars successfully in September 2014.
 - iii. It has obtained useful information about the surface and atmosphere of mars.

Q.7 Answer the following(Any One)

3

1 How much time will the satellite take to complete one revolution around the earth? If satellite at a height of 35780 from earth's surface.

Ans Given :

$$R : 6400 \text{ km} = 6.4 \times 10^6 \text{ m}$$

$$h : 35780 \text{ km} = 3.5780 \times 10^7 \text{ m}$$

$$u_c : 3.08 \text{ km / s} = 3.08 \times 10^3 \text{ m/s}$$

$$T = ?$$

The time required for the satellite to complete one revolution around the earth.

$$T = \frac{2\pi(R+h)}{u_c}$$

$$= \frac{2 \times 3.142 \times (6.4 \times 10^6 + 35.78 \times 10^6) \text{ m}}{3.08 \times 10^3 \text{ m/s}}$$

$$= \frac{6.284 \times 42.18 \times 10^3}{3.08} \text{ s}$$

= Approx 86060 s

= **23 hours 54 minutes 20 seconds.**

2 What is meant by space debris ? Why there is used to manage the debris ?

Ans Space debris – In addition to the artificial satellite, some other objects such as non-functional satellites, parts of the launcher detached during launching and debris generated due to collision of satellite with other satellite or any other object in the space, revolve around the earth. All this forms space debris.

- i. It is harmful to the artificial satellites.
- ii. It can collide with these satellites or space crafts and damage them.
- iii. Due to increasing debris, it will become difficult to launch new space craft.

Q.8 Answer the following in detail (Any One)

5

1 What is meant by an artificial satellite? How are the satellites classified based on their functions?

Ans A manmade object orbiting the earth or any other planet is called an artificial satellite. Satellites work on solar energy and hence photovoltaic panels are attached on both sides of the satellite, which look like wings. Satellites are installed with various transmitters and other equipment to receive and transmit signals between the earth and the satellites.

Classification of satellites depending on their functions :

Weather satellites : Weather satellites collect the information regarding weather conditions of the region. It records temperature, air pressure, wind direction, humidity, cloud cover, etc. this information is sent to the space research station on the earth, and then with this information weather forecast is made.

Communication satellites : In order to establish communication between different places on the earth through mobile phones or computer assisted internet, communication satellites are used.

ii. Many artificial satellites placed at various location in the earth's orbit are well interconnected and help us to have communication with any place, from anywhere, at any time and in any form including voicemail, email, photographs, audio mail, etc.

Broadcasting satellites : Broadcasting satellites are used to transmit various radio and television programmes and even live programmes from any place on the earth to any other place. As a result, one can have access to information about current incidents, events, programmes, sports and other events right from his drawing room with these satellites.

Navigational satellites : Navigational satellites assist the surface, water and air transportation and coordinate their busy schedule. These satellites also assist the user with current live maps as well as real time traffic conditions.

Military satellites : Every sovereign nation needs to keep the real time information about the borders. Satellites help to monitor all movements of neighbouring countries or enemy countries. Military satellites also help to guide the missiles effectively.

Earth observation satellites : These satellites observe and provide the real time information about the earth. These satellites also help us to collect the information about the resources, their management, continuous observation about a natural phenomenon and the changes within it.

Other satellites : Apart from these various satellites, certain satellites for specific works or purposes are also sent in the space. E.g. India has sent EDUSAT for educational purpose; CARTOSAT for surveys and map making. Similarly, satellites with telescopes, like Hubble telescope or a satellite like International Space Station help to explore the universe. In fact, ISS (International Space Station) provides a temporary residence where astronauts can stay for a certain short or long period and can undertake the research and study space activities.

2 Why it is beneficial to use satellite launch vehicles made of more than one stage?

- Ans**
- i. Earlier Satellite Launch Vehicles used to be a single stage vehicles.
 - ii. Such satellite launch vehicles used to be very heavy as well as expensive in terms of its fuel consumption.
 - iii. As a result, satellite launch vehicles with multiple stages were developed.
 - iv. In a multiples SLVs, as the journey of the launch vehicle progresses and the vehicle achieves a specific velocity and a certain height, the fuel of the first stage is exhausted and the empty fuel tank gets detached from the main body of the launch vehicle.
 - v. It falls back into a sea or on unpopulated land.
 - vi. As the fuel in the first stage is exhausted, the engine in the second stage is ignited.
 - vii. The weight of the launch vehicle is now less that what it was earlier and now it can move with higher velocity.
 - viii. It saves fuel consumption.
 - ix. It is beneficial to use a multistage satellite launch vehicle.