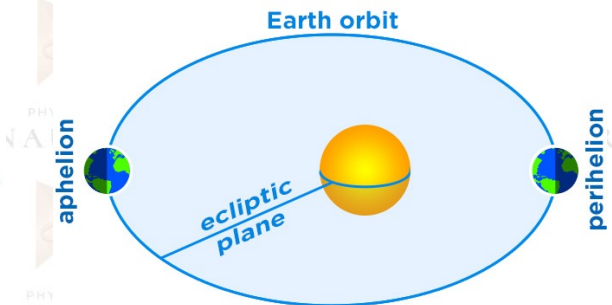
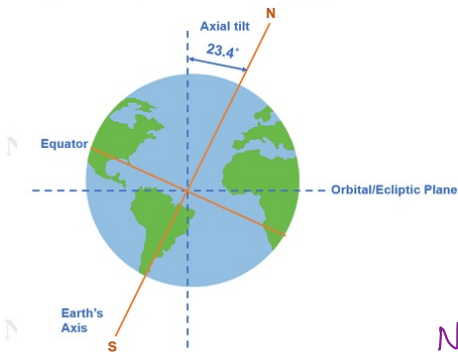


Space Physics

Earth and Solar System

Earth is a rocky planet which

- i) orbits the sun once every 365 days (1 year)
- ii) follows an elliptical orbit (approximately circular).
- iii) completes one full rotation on its axis once every 24 hours (1 day)
- iv) is tilted on its axis at an angle of approximately 23.5°



Note: It takes 500s for light from the sun to reach the earth.

Average orbital speed

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

$$v = \frac{2\pi R}{T}$$

R: average radius of the orbit.

T: orbital period (time to complete one orbit)

unit: m s^{-1}

The Moon

The Moon is a satellite that orbits around the earth.

It travels in a roughly circular orbit and takes approximately 1 month to orbit.

The Moon shines with reflected light from the sun, it does not produce its own light.

Q. The Hubble space telescope moves in a circular orbit around the Earth. Its distance from surface of earth is 560 km and radius of earth is 6400 km. HST completes one orbit in 96 minutes.

Calculate orbital speed in ms^{-1} .

M/J 23/P21/Q38

A space station orbits the Earth at a distance of 7000 km from the Earth's centre. It makes 15 orbits in every 24-hour period.

What is the speed of the space station in its orbit?

A 2900 km/h

B 4400 km/h

C 8800 km/h

D 27 000 km/h

MAR 23/P22/Q37

Which data is needed to calculate the average orbital speed of a satellite around a planet?

	the distance of the satellite from the centre of the planet	the radius of the planet	the period of rotation of the planet	the time for the satellite to orbit the planet once
A	✓	✓	✓	x
B	✓	x	x	✓
C	x	✓	✓	x
D	✓	✓	x	✓

key

✓ = needed

x = not needed

