



13. Do all the stars in the sky move? Explain.

Answer:

No, Stars do not move they actually appear to move from east to west due to rotation of earth on its axis from west to east.

14. Why is the distance between stars expressed in light years?

What do you understand by the statement that a star is eight light years away from the Earth?

Answer:

The distance of the stars from the Earth and the distance between the stars are very large. It is inconvenient to express these distances in kilometer (km). Thus, these large distances are expressed in light years. One light year is the distance travelled by light in one year. One light year is equal to 9.46×10^{12} km.

A star is located eight light years away from the Earth. This means that the distance between the star and the Earth is equivalent to the distance travelled by light in eight years, i.e., a star is located $8 \times (9.46 \times 10^{12}) = 7.6 \times 10^{13}$ km away from the Earth.

15. The radius of Jupiter is 11 times the radius of the Earth. Calculate the ratio of the volumes of Jupiter and the Earth. How many Earths can Jupiter accommodate?

Answer:

Earth and Jupiter can be considered as two spheres with radii R and R' respectively. Given that the radius of Jupiter is 11 times the radius of the Earth.

Thus, $R' = 11 R$

Volume of a sphere of the radius r is given as $= \frac{4}{3} \pi r^3$

Volume of the earth $= \frac{4}{3} \pi r^3$

And, volume of Jupiter $= \frac{4}{3} \pi (R')^3 = \frac{4}{3} \pi (11R)^3 = 1331 \left(\frac{4}{3} \pi R^3 \right)$

The ratio of the volumes of Jupiter and Earth

$$= \frac{\text{Volume of Jupiter}}{\text{Volume of Earth}} \\ = \frac{1331 \left(\frac{4}{3} \pi R^3 \right)}{\frac{4}{3} \pi r^3} = 1331$$

Hence, this ratio suggests that Jupiter can accommodate 1331 number of Earths within it.

16. Boojho made the following sketch (Fig. 17.29) of the solar system. Is the sketch correct? If not, correct it.

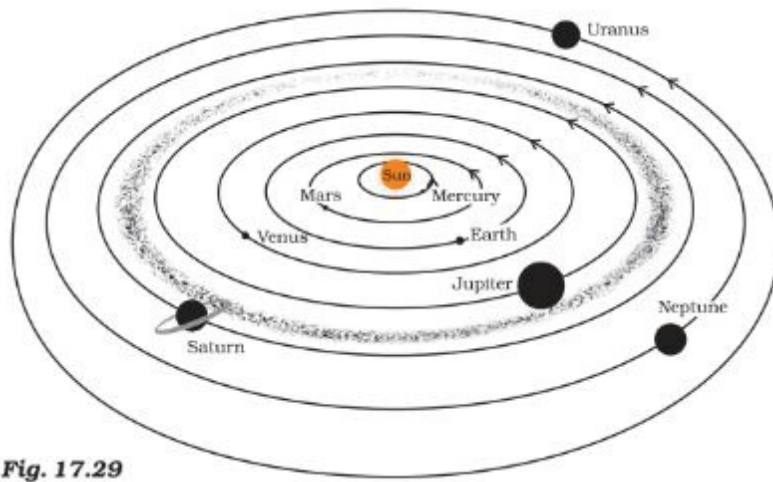
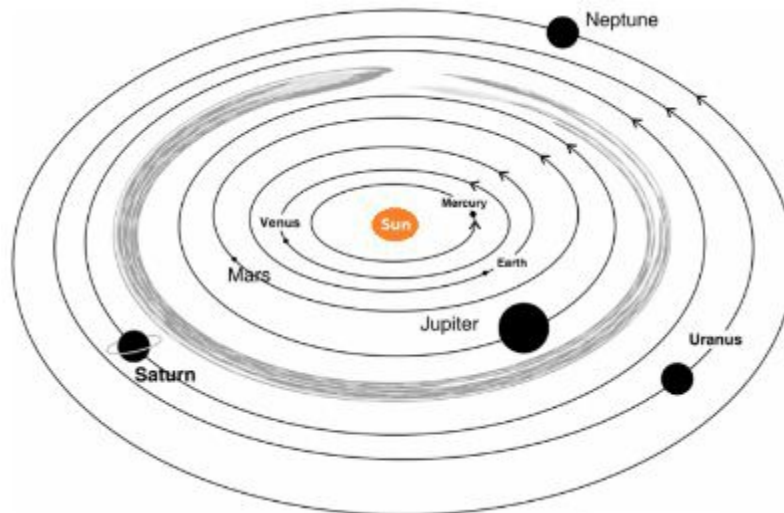


Fig. 17.29

Answer:

No, the sketch is not correct as the planet because he has interchanged the positions of Mars and Venus and also the positions of Uranus and Neptune. Also, he has shown the Asteroid belt in the gap between the orbits of Jupiter and Saturn which is not correct. The asteroid belt is located between the orbits of Mars and Jupiter. The correct fig is given below.



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