

Solars And Solar system

1. Which of the following is NOT a member of the solar system?

- (a) An asteroid
- (b) A satellite
- (c) A constellation
- (d) A comet

Answer:

- (c) Constellation

2. Which of the following is NOT a planet of the sun?

- (a) Sirius
- (b) Mercury
- (c) Saturn
- (d) Earth

Answer:

- (a) Sirius

3. Phases of the moon occur because

- (a) we can see only that part of the moon which reflects light towards us.
- (b) our distance from the moon keeps changing.
- (c) the shadow of the Earth covers only a part of the moon's surface.
- (d) the thickness of the moon's atmosphere is not constant.

Answer:

(a) Phases of the moon occur because we can see only that part of the moon which reflects light towards us.

4. Fill in the blanks:

(a) The planet which is farthest from the sun is_____.

(b) The planet which appears reddish in colour is _____.

(c) A group of stars that appear to form a pattern in the sky is known as a _____.

(d) A celestial body that revolves around a planet is known as a _____.

(e) Shooting stars are actually not _____

(f) Asteroids are found between the orbits of _____ and _____

Answer:

(a) The planet which is farthest from the sun is Neptune .

(b) The planet which appears reddish in colour is Mars.

(c) A group of stars that appear to form a pattern in the sky is known as a constellation .

(d) A celestial body that revolves around a planet is known as a satellite.

(e) Shooting stars are actually not stars .

(f) Asteroids are found between the orbits of Mars and Jupiter.

(Asteroids occupy a large gap between the orbits of Mars and Jupiter)

5. Mark the following statement as true (T) or false (F).

(a) Pole star is a member of the solar system. ()

(b) Mercury is the smallest planet of the solar system. ()

- (c) Uranus is the farthest planet in the solar system. ()
- (d) INSAT is an artificial satellite. ()
- (e) There are nine planets in the solar system. ()
- (f) Constellation Orion can be seen only with a telescope. ()

Answer:

- (a) Pole star is a member of the solar system. (F)
- (b) Mercury is the smallest planet of the solar system. (T)
- (c) Uranus is the farthest planet in the solar system. (F)
- (d) INSAT is an artificial satellite. (T)
- (e) There are nine planets in the solar system. (F)
- (f) Constellation Orion can be seen only with a telescope. (F)

6. Match items in column A with one or more items in column B.

Column A	Column B
(i) Inner planets	(a) Saturn
(ii) Outer planets	(b) Pole star
(iii) Constellation	(c) Great Bear
(iv) Satellite of the Earth	(d) Moon
	(e) Earth
	(f) Orion
	(g) Mars

Answer:

Column A	Column B
(i) Inner planets	Mars, Earth
(ii) Outer planets	Saturn
(iii) Constellation	Great Bear, Orion, Pole star
(iv) Satellite of the Earth	Moon

7. In which part of the sky can you find Venus if it is visible as an evening star?

Answer:

Venus appears in the western sky after sunset and is called the evening star.

8. Name the largest planet of the solar system.

Answer:

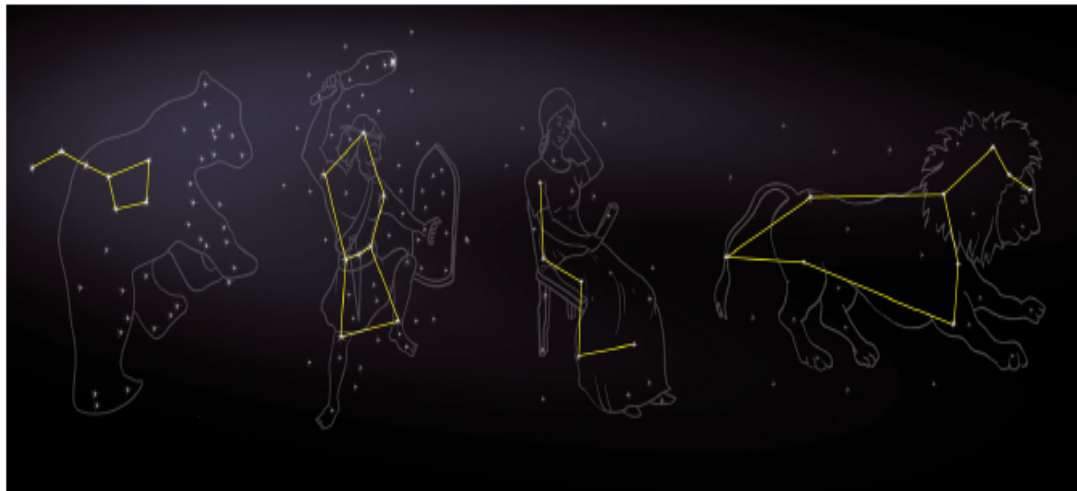
The largest planet of the solar system is Jupiter.

9. What is a constellation? Name any two constellations.

Answer:

A constellation is a group of stars that form a recognizable pattern in the sky.

The well known constellations are Great Bear, Orion, Cassiopeia and Leo Major.



(a) Great Bear

(b) Orion

(c) Cassiopeia

(d) Leo Major

10. Draw sketches to show the relative position of prominent stars in (a) Ursa Major and (b) Orion.

(a) Ursa Major or Big Dipper or Great Bear or Saptarshi: is a very famous constellation which is seen in the summers during early night time in the Northern Hemisphere. It has seven bright stars and looks like a big inverted spoon or a question mark in the sky. This constellation helps us locating Pole Star.



Ursa Major

(b) Orion is another well-known constellation that can be seen during winter in the late evenings. It is one of the most magnificent constellations in the sky. It also has seven or eight bright stars Orion is also called the Hunter.



Orion

11. Name two objects other than planets which are members of the solar system.

Answer:

Asteroids: A collection of a large number of small objects, gases and dust are revolving around the sun. They occupy a large gap between the orbits of Mars and Jupiter. However, these are not planets. These celestial objects are known as asteroids.

Meteors: Meteors are small celestial objects that are seen as bright streaks of light in the sky. They burn out on entering the Earth's atmosphere because of the heat produced by friction. This results in bright streaks in the sky. They are not planets.

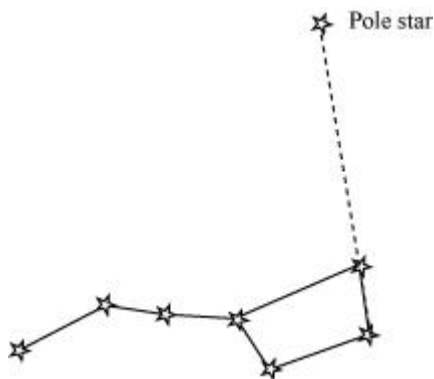
12. Explain how you can locate the Pole Star with the help of Ursa Major.

Answer:

In order to locate the Pole star in the sky, first of all Ursa Major or Big Dipper constellation must be located. The bowl of the Big Dipper consists of four bright stars (as shown in the given figure).



Consider two stars at the end of this bowl. Now, draw an imaginary straight line towards the Northern direction connecting these two stars as shown here.



This imaginary line meets a star called the Pole Star. The length of the imaginary line from the bowl is about five times the distance between the two stars of the bowl.

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

Answer:

No. The Earth rotates from West to East on its axis. Hence, all stars in the sky (except the Pole star) appear to move from East to West. With reference to the Earth, the Pole star does not appear to move in the sky because it is located above the axis of rotation of the Earth in the north direction. It appears to remain stationary at a point in the sky.

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 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

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

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.

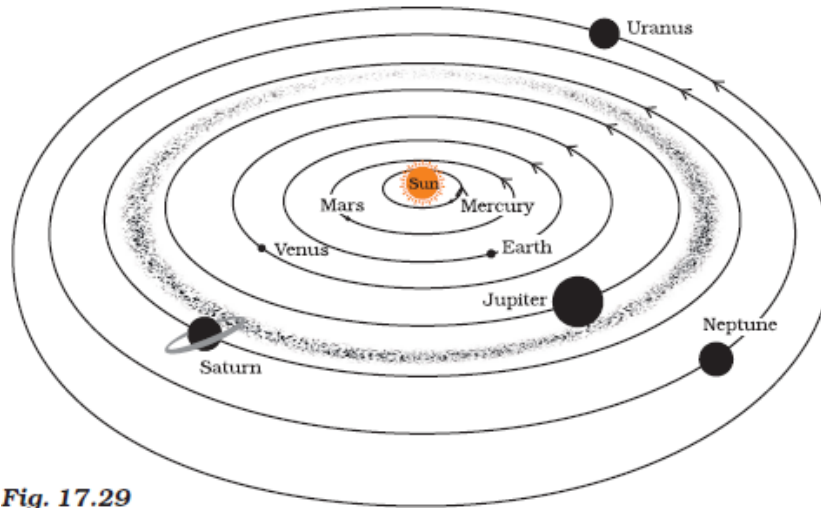


Fig. 17.29

Planets of the solar system in sequence of their distances from the sun are:

Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune

Therefore, Boojho's sketch of the solar system is not correct 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. This is not correct. The asteroid belt is located between the orbits of Mars and Jupiter. The correct sketch of the solar system is shown in the given figure.

