

**17**

## **STARS AND THE SOLAR SYSTEM**

### **TEXTBOOK QUESTIONS AND THEIR ANSWERS**

**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

**Ans. (c)**

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

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

**Ans. (a)**

**Q.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 moon's surface.
- (d) the thickness of the moon's atmosphere is not constant.

**Ans.** (a)

**Q.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 \_\_\_\_\_.
- (e) Shooting stars are actually not \_\_\_\_\_.
- (f) Asteroids are found between the orbits of \_\_\_\_\_ and \_\_\_\_\_.

**Ans.** (a) Neptune, (b) Mars, (c) Constellation, (d) Satellite, (e) Stars,  
(f) Mars and Jupiter

**Q.5. Mark the following statements 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. ( )

**Ans.** (a) False, (b) True, (c) False, (d) True, (e) False, (f) False.

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

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

| <b>Ans.</b> | <b>A</b>                    | <b>B</b>                  |
|-------------|-----------------------------|---------------------------|
|             | (i) Inner planets           | (g) Mars ; (e) Earth      |
|             | (ii) Outer planets          | (a) Saturn                |
|             | (iii) Constellation         | (c) Great Bear, (f) Orion |
|             | (iv) Satellite of the Earth | (d) Moon                  |

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

**Ans.** Venus is visible as an evening star in the western sky.

**Q.8. Name the largest planet of the solar system?**

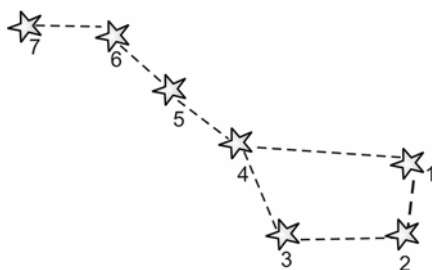
**Ans.** Jupiter is the largest planet of the solar system.

**Q.9. What is a constellation? Name any two constellation.**

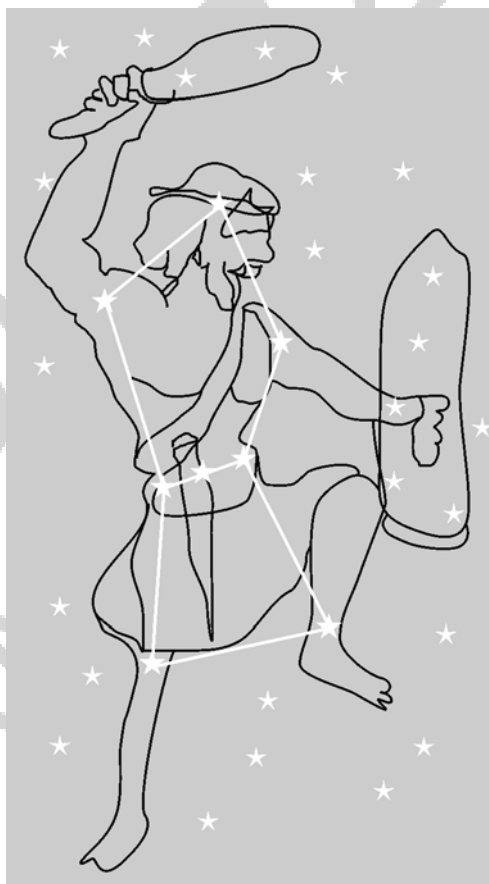
**Ans.** A group of stars which forms a recognizable pattern or shape is called a constellation.

Example : Orion, Cassiopeia.

**Q.10. Draw sketches to show relative positions of prominent stars in**



(a) **Ursa Major**



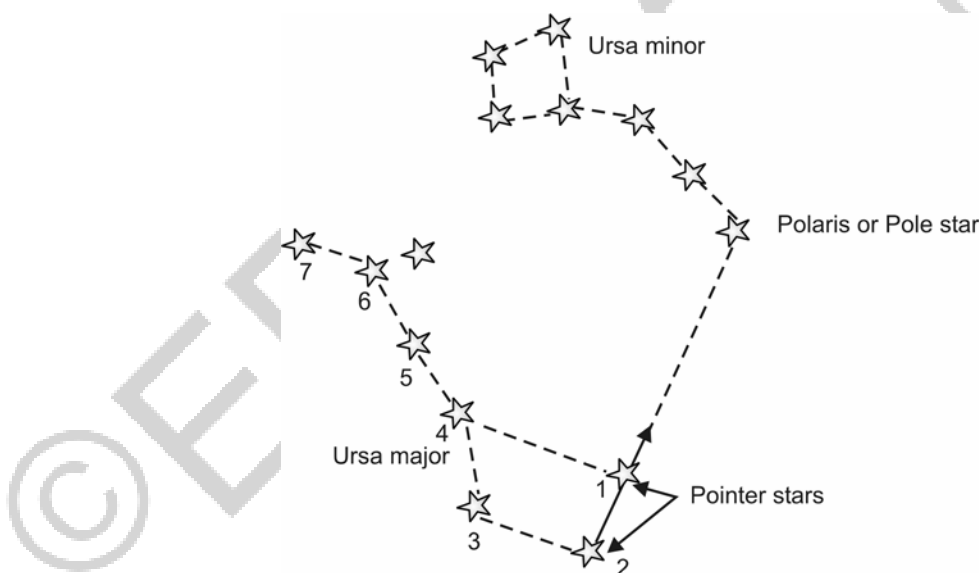
(b) **Orion**

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

**Ans.** Meteors and asteroids are two objects other than planets which are members of the solar system.

**Q.12. Explain how you can locate Ursa Major with the help of pole star.**

**Ans.** The pole star is situated in the north direction, which is directly above the geographic north-pole of the earth's axis. Its position with respect to earth does not change, and hence, it appears stationary. An imaginary straight line starting from pole star and point in the direction of last two stars of Ursa Major, tells the position of Ursa Major.



**Q.13. Do all the stars in the sky move?**

**Ans.** 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.

**Q.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?**

**Ans.** Most of stars are so far away from the earth, that even the light which travels at a speed of  $3 \times 10^5$  km/s takes millions of years to reach the earth. Thus, the distances of the stars are measured in light years.

The distance travelled by light in eight years will be the distance between the Earth and such a star which is eight light years away from the Earth.

$$\therefore \text{light year} = 9.46 \times 10^{12} \text{ km}$$

$$\text{Light year} = 8 \times 9.46 \times 10^{12} \text{ km} = 75.68 \times 10^{12} \text{ km.}$$

$$\therefore \text{the distance between the earth and the star is} \\ 75.68 \times 10^{12} \text{ km.}$$

**Q.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?**

**Ans.** Let radius of Earth be R km then radius of Jupiter is 11R km

$$\text{Volume of Earth} = \frac{4}{3} \pi R^3 \quad (\text{i})$$

$$\{ \therefore \text{Volume of sphere} = \frac{4}{3} \pi r^3 \}$$

$$\text{Volume of Jupiter} = \frac{4\pi}{3} (11R)^3$$

$$= 1331 \left( \frac{4}{3} p R^3 \right) \quad (\text{ii})$$

From (1) and (2), we get

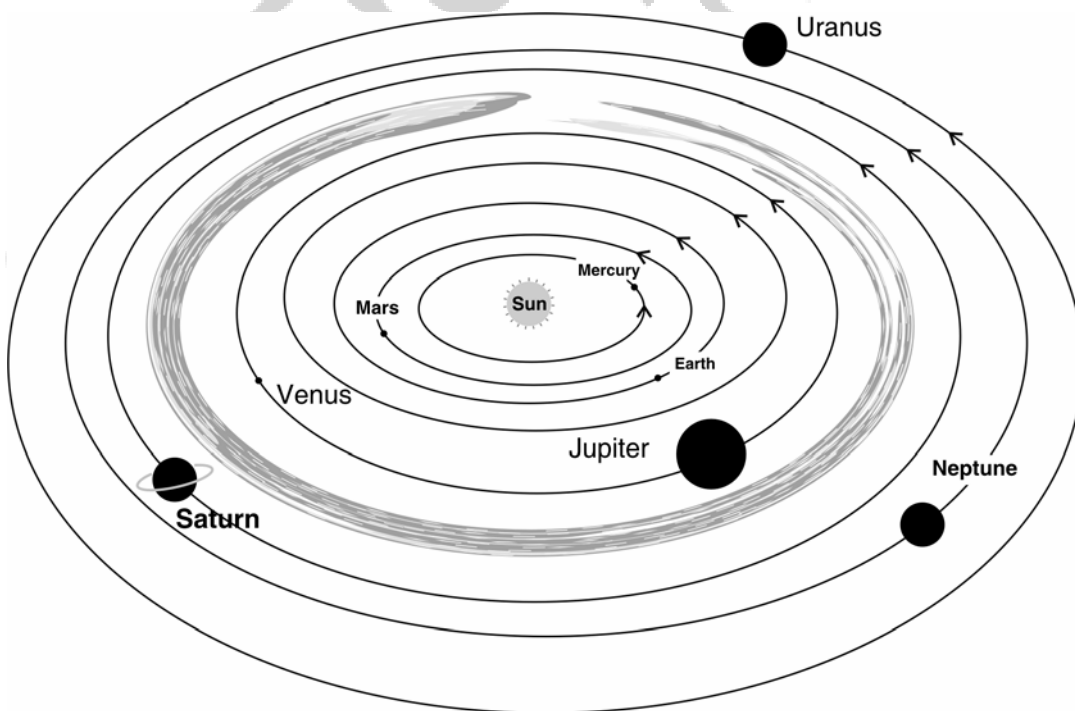
Volume of Earth : Volume of Jupiter

$$= \frac{4}{3} \pi R^3 : 1331 \times \left( \frac{4}{3} p R^3 \right)$$

$$= 1 : 1331$$

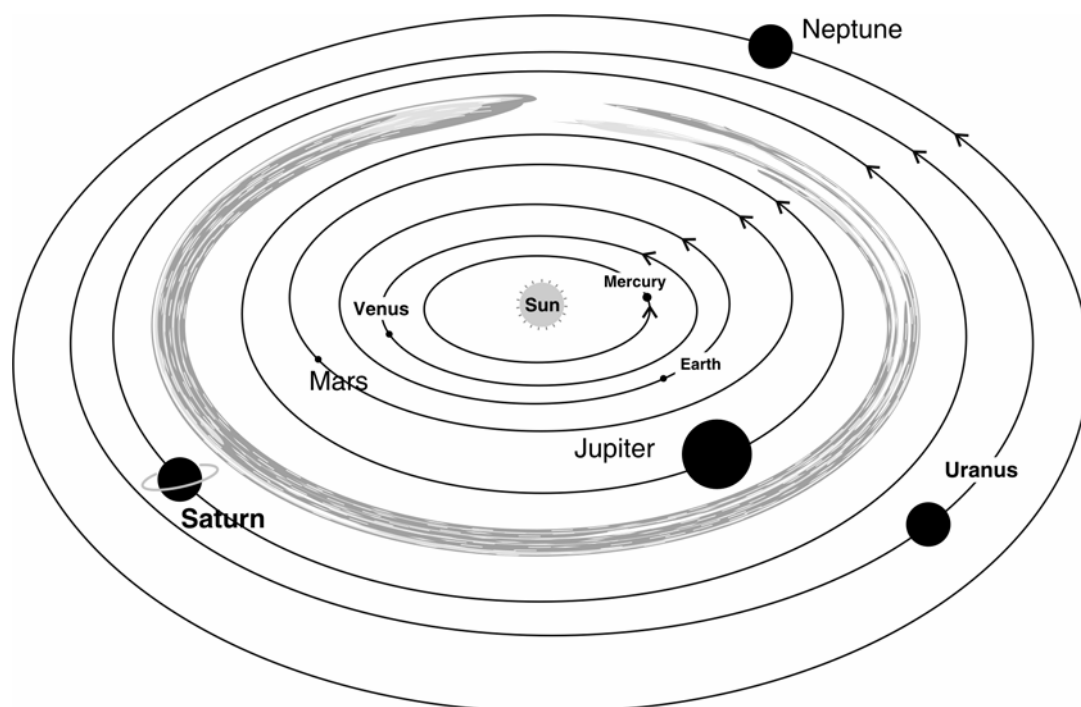
Hence, Jupiter can accommodate 1331 Earths in it.

**Q.16. Boojho made the following sketch of the solar system. Is the sketch correct? If not, correct it.**



**Ans.**





**Q.17. Why the village sky was so different from the night sky in the big cities?**

**Ans.** Night sky is more clearer in villages than in big cities because of the presence of bright light, smoke and dust in the big cities.

**Q.18. Do all the celestial bodies twinkle?**

**Ans.** No, all the celestial bodies do not twinkle.

**Q.19. Are there any star like bodies which do not twinkle?**

**Ans.** The planets do not twinkle.

**Q.20. Are all celestial objects similar?**

**Ans.** No, all celestial objects are not similar.

**Q.21. Is there a change in the shape of the moon everyday?**

**Ans.** Yes, there is a change in the shape of the moon everyday.

**Q.22. Are there days when the shape of the moon appears to be perfectly round?**

**Ans.** Yes, on full moon day the shape of the moon appears to be perfectly round.

**Q.23. Are there days when the moon cannot be seen at all even if the sky is clear?**

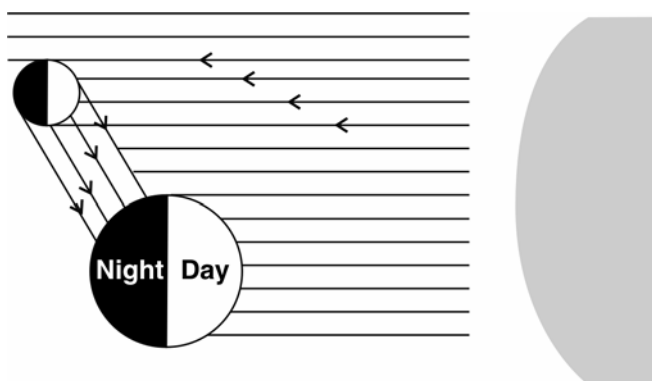
**Ans.** Yes, there are days when moon is invisible even if the sky is clear.

**Q.24. Why does the moon change its shape everyday?**

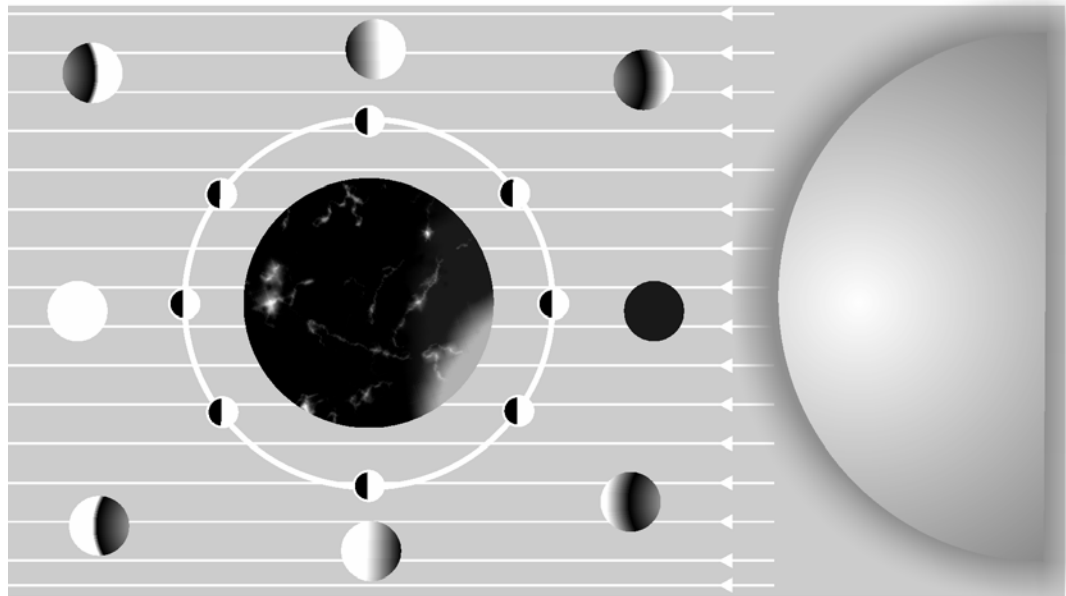
**Ans.** Moon reflects the light of the sun falling on it.

So, we can see only that part of moon, from which light of the sun is reflected towards us.

The size of the illuminated part of the moon visible from the earth increases each day after the new moon day till it reaches full moon day.



After the full moon day, sunlit part of the moon visible from the earth decreases in size everyday.



Positions of the moon in its orbit and its corresponding phases

**Q.25. Can you now guess the relative positions of the Sun, moon and the Earth on the day of the full moon and on the day of the new moon?**

**Ans.** On a full moon day, Earth is between Sun and the Moon.

On a new moon day, Moon is between the Sun and the Earth.

**Q.26. I have heard that we never see the back side of the moon from the Earth. Is it true?**

**Ans.** Yes, we can never see the backside of the moon from the Earth as period of rotation of moon is equal to its period of revolution.

**Q.27. The moon has no atmosphere. It has no water. Can any life exist on the moon?**

**Ans.** No life exists on the moon as there is no atmosphere and water on the moon.

**Q.28. Can we hear any sound on moon?**

**Ans.** No sound is heard on the moon as there is no air on the moon. Sound needs a material medium to propagate and sound cannot propagate through vacuum.

**Q.29. Are all the stars equally bright?**

**Ans.** No, all stars are not equally bright.

**Q.30. Are they of same colour?**

**Ans.** No, they are not of same colour.

**Q.31. Why does the sun appears so large as compared to the other stars?**

**Ans.** The sun appears very large as compared to the other stars as the sun is our nearest stars and the other stars are very far away from us.

**Q.32. Which appears bigger, a football placed near you, or a football placed at a distance of 100 m?**

**Ans.** A football which is placed near us will appear more bigger than a football placed at a distance of 100 m.

**Q.33.** The star Alpha Centauri is at a distance of about 40,000,000,000,000 km from the Earth. Can you read this distance in kilometers conveniently?

**Ans.**  $40,000,000,000,000 = 4 \times 10^{13}$  km.

So, the distance of Alpha Centauri from Earth is  $4 \times 10^{13}$  km.

**Q.34.** Boojho asks I want to know why we do not see the stars during the day. Why are they visible only at night?

**Ans.** We cannot see the stars during the day because of the bright sunlight. Bright sun light is so strong that it suppresses the light coming from the stars, and hence, they are not visible to us although they are present in the sky.

**Q.35.** Why do the stars move from east to west?

**Ans.** The stars appear to move from east to west because our Earth rotates on its axis from west to east.

**Q.36.** Paheli says that her grandfather told that there is one star in the sky which does not move at all. How is it possible?

**Ans.** Yes, actually pole star is situated just over the axis of rotation of our Earth, and hence, it seems stationary with respect to Earth.

**Q.37. Can you distinguish between planets and stars?**

**Ans.** Yes, stars emit light of their own, whereas planets do not have light of their own. Stars twinkle, whereas planets do not.

**Q.38. Why the planets do not collide while revolving around the Sun.**

**Ans.** The planets do not collide while revolving around the sun as the planets have a definite path in which they revolve around the sun.

**Q.39. The Earth revolves around the Sun. Does it make Earth a satellite of the Sun?**

**Ans.** Earth can be stated as a satellite of the Sun though it is generally called a planet of sun.

**Q.40. Does the sun rise in east and set in west on Venus?**

**Ans.** Yes, the sun rises in the east and sets in the west on Venus as rotation of Venus on its axis is from east to west.

**Q.41. If I am 13 years old, how many times have I gone round the sun?**

**Ans.** If you are 13 years old, you have gone 13 times around the sun as earth completes one revolution around the Sun in approximately one year.

**Q.42. Halley's comet appears nearly every 76 years. If it was last seen in 1986, when will it be again visible?**

**Ans.** Again it will be seen in

$$= 1986 + 76 = 2062.$$