Lesson 17. Stars and the Solar System

Grade VIII

Basic concepts – A Flow Chart

Stars & Solar System

Sun

- Presence of a combustible substance (a substance which can burn).
- Presence of a supporter of combustion (like air or Oxygen).
- Attainment of ignition temperature.

Planets

- A planet has a definite path in which it revolves around the sun called orbit.
- Time taken by a planet to complete one revolution increases as the distance from the sun increases.

Mercury

- A substance burns as soon as it is ignited, producing large amount of heat and light.
- Example : Burning of cooking gas in a gas stove, burning of paper and kerosene oil, explosion of fire crackers.

Venus

- Does not contain oxygen and is made up mostly of carbon dioxide gas.
- It has no satellite of its own.
- It rotates form east to west.

Earth

- There is abundance of water.
- Seasons, weather conditions and climate on earth best suited for the present life forms
- It ha only one satellite.

Moon

Moon's Surface

- It has gravity which is one- sixth of that of the earth.
- It is made up of rocks but it has no atmosphere and no oceans.
- Without air and water there is no life on the moon. .

Phases of Moon

- Different shapes of moon seen during a month are called the phases of the moon.
- When the moon is directly between the sun and the earth: new moon.
- When equal parts of the moon are visible and hidden; full moon.
- In the first half of the month, the moon grows from a crescent to a half, to a gibbous and finally, to a full moon (waxing).
- During the second half of the month it decreases in size (waning)

Mars

- It is called the red planet.
- It has an atmosphere and it also has seasons like earth.
- It has two small natural satellites.

Jupiter

- It is the biggest planet
- It rotates once in less than 10 hours
- It has faint rings around it.
- It has a large number of natural satellites.

Saturn

- It has rings around it.
- It has small lumps of rock and ice moving around the planet at high speed.

Uranus

- It is a bluish green disk and has rings.
- Rotates form east to west.

Neptune

- It is mostly made up of gases but at the centre it has iron. nickel and silicates.
- Neptune has a ring system and eight moons around it.

Other Members

Asteroids

- These are rocky planetary bits orbiting around Sun.
- Asteroid belt lies between mars and Jupiter.

Comets

- These are heavenly bodies that revolve around the sun.
- It appears generally as a bright head with a long tail.

Meteors and Meteorites

- Meteor is a brief streak of lighrt in the night sky caused by a meteoroid.
- Small meteors melt and burn up creating streaks of light.
- Few meteoroids which survive as they pass through the Earth's atmosphere and reach the Earth surface are called meteorites.

Artificial Satellites

- Man-made objects sent into space to orbit the earth. Example: IRS EDUSAT, INSAT,

Constellations

- A group of stars forming some kind of recongnisable figures or patterns are known as constellations.
- Constellation appear to move from east to west as Earth rotates form west to east.
- Orion- the hunter
- Ursa Major – the Great Bear or Saptarishi
- Cassiopeia

Know the Terms

- **Moon** : It is a natural satellite of the Earth and it revolves around the Earth in a definite regular path, called its orbit.
- **Period of Revolution** : The time taken by a planet to complete one revolution around the sun is called its period of revolution.

Objective Type Questions

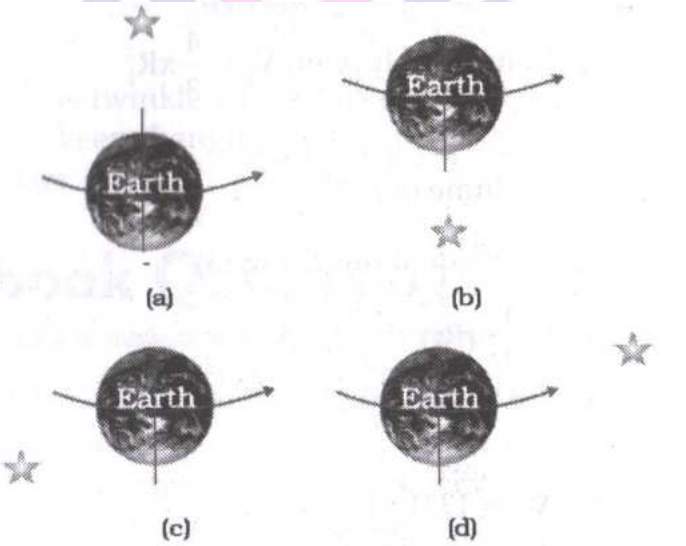
(1 Marks)

I. Multiple Choice Questions

1. Morning star is the name given to : (NCERT Exemplar)

(a) Pole star (b) Star Sirius (c) Planet Jupiter (d) Planet Venus

2. Which of the following figures depicts the position of pole star correctly ?(NCERT Exemplar)



3. Sun appears to move from east to west around the earth. This means that earth rotates from : **(NCERT Exemplar)**

(a) East to west (b) West to east (c) north to south (d) west to north

4. An astronaut standing on the surface of the moon throws a ball upwards. The ball would :

(a) directly fall down from the point it is released.

(b) hang in space.

(c) go up and then come back to the surface of the moon.

(d) keep going up never to come back.

5. Suppose a new planet is discovered between Uranus and Neptune. Its time period would be :

(a) less than that of Neptune. (b) more than that of Neptune.

(c) equal to that of Neptune or Uranus. (d) less than that of Uranus.

6. The change in seasons on the earth occurs because: **(NCERT Exemplar)**

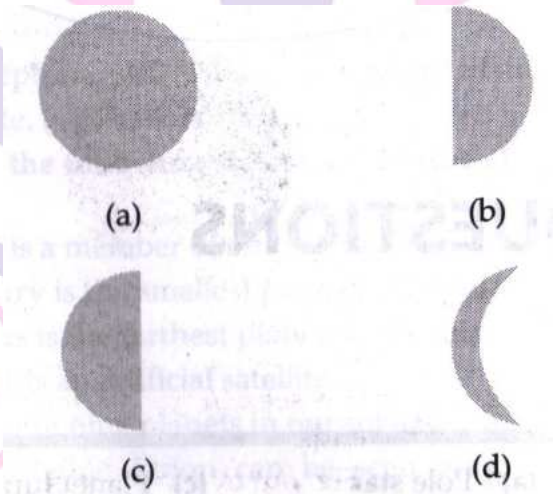
(a) the distance between the earth and the sun is not constant.

(b) the axis of rotation of the earth is parallel to the plane of its orbit.

(c) the axis of rotation of the earth is perpendicular to the plane of its orbit.

(d) the axis of rotation of the earth is tilted with respect to the plane of its orbit.

7. The first day of a month is the new moon day. On fifteenth of the same month, which of the following figures would represent the phase of the moon ? **(NCERT Exemplar)**



8. The outer planet is :

(a) Mercury (b) Venus (c) Earth (d) Jupiter

9. Mars appears red due to the presence of large amount of :

(a) Iron oxide (b) Copper oxide (c) calcium oxide (d) Aluminium oxide

10. Ursa Major is not known as :

(a) Big Dipper (b) Great Bear (c) Saptarishi (d) Orion

1. (d)	2. (a)	3. (b)	4. (c)	5. (a)	6. (d)	7. (a)	8. (d)	9. (a)	10. (d)

II. Multiple Choice Questions

1. The brightest planet is

a. Mercury b. Venus

c. Earth d. Saturn

2. Nearest planet of the sun is

a. Neptune
b. Mars
c. Mercury
d. Earth

3. One of the planets where life exists

a. Earth
b. Moon
c. Jupiter
d. None

4. A planet which appears yellowish

a. Venus
b. Mars
c. Uranus
d. Saturn

5. Farthest planet of the solar system is

a. Neptune
b. Jupiter
c. Mercury
d. Earth

6. The first outside orbit of the earth planet is

a. Jupiter
b. Mars
c. Saturn
d. Uranus

7. The largest planet is

a. Mercury
b. Mars
c. Jupiter
d. Saturn

8. The gap between the orbit of Mars and Jupiter is called

a. Asteroid
b. Comets
c. Meteor
d. Meteorite

9. Stars appear to move from

a. West to East
b. East to West
c. North to South
d. South to West

10. The tilting of the earth is responsible for

a. Change of days
b. Change of the sun's rays
c. Change of season
d. None

1. b	2. c	3. a	4. d	5. a
6. b	7. c	8. a	9. b	10. c

I. Fill in the blanks

1. _____ are celestial bodies that emit light of their own.
2. It is convenient to express distance of stars in _____
3. Stars appear to move from _____to _____
4. _____ are groups of stars that appear to form recognizable shapes.
5. A Solar system consists of eight planets and a host of _____, _____ and _____.
6. A body revolving around another body is called a _____
7. _____ is the brightest planet in the night sky.
8. _____ is the largest planet of the Solar system.
9. Artificial satellites are used for _____and_____
10. _____was the first Indian Satellite.

1. Stars	2. light year	3. east, west	4. Constellations
5. asteroids, comets, meteors	6. satellite	7. Venus	8. Jupiter
9.Weather forecasting, navigation		10. Aryabhatta	

II. Fill in the blanks

1. The celestial body that reaches the earth is called _____.
2. Halley's comets appear after nearly every _____ years.
3. Small objects that revolve around the sun in the gap between the orbit of Mars and Jupiter are _____.
4. On the fifteenth day the moon is not visible. This day is known as _____.
5. The various shapes of the bright part of the moon as seen during a month are called _____.
6. Stars have their own _____.
7. Orion is seen during _____ season.
8. The biggest planet of the solar system is _____.
9. First artificial satellite launched by India is called _____.
10. A group of stars is called _____.
11. The smallest planet is _____.

12. _____ is the brightest object in the night sky.

13. The various shapes of the bright part of the moon are called _____.

14. _____ and _____ landed on the moon for the first time.

15. Large distance is expressed in _____.

16. The path of planets in known as _____.

1. Meteroites	2. 76	3. Asteroids	4. New moon day
5. Phases of the moon	6. Light	7. Winter	8. Jupiter
9. Aryabhatta	10. Constellation	11. Mercury	12. Moon
13. Phases of the moon	14. Neil Armstrong, Edwin Aldrin	15. Light year	16. Orbit

I. Match the following

1. Match the items given in Column A with those in Column B suitably.

Column A		Column B	
(i)	Sun	(a)	Jupiter
(ii)	Earth	(b)	Neptune
(iii)	Largest planet	(c)	Revolve around the sun
(iv)	Extremely cold	(d)	Star
(v)	Planets	(e)	3rd planet

(i) . (d)	(ii) . (e)	(iii) . (a)	(iv) . (b)	(v) . (c)

2. Match the items given in Column A with those in Column B suitably.

Column A		Column B	
(i)	Earth	(a)	Satellite of the earth
(ii)	Moon	(b)	Constellation
(iii)	Shooting star	(c)	Life exists
(iv)	Cassiopeia	(d)	Saptarshi
(v)	Ursa major	(e)	Meteor

(i) . (c)	(ii) . (a)	(iii) . (e)	(iv) . (b)	(v) . (d)

II. Match the following

Column I	Column II
1. Mercury	(i) Reddish
2. Earth	(ii) Green
3. Mars	(iii) Yellow Orange
4. Saturn	(iv) Yellow
5. Uranus	(v) Blue-green

(1) (iii)	(2) (v)	(3) (i)	(4) (iv)	(5) (ii)

I. True or False

1. The planet nearest to us is Jupiter.
2. All the stars are at the same distance from us.
3. The planets do not emit light of their own.
4. The planets keep changing their position with respect to stars.
5. The planet Venus appears in the eastern sky before sunrise.
6. The plane in which the earth revolves around the sun is called equatorial plane of earth.
7. Asteroids can only be seen through large telescope.
8. The Orion is also called the hunter.
9. A constellation has only 5-10 stars.
10. Comets are messengers of disasters.

1. False	2. False	3. True	4. True	5. True	6. False	7. True	8. True	9. False	10.False

II. True or False

1. The Uranus planet is extremely cold.
2. There are nine planets in our solar system.
3. There are many stars which are hotter than the sun.

4. Jupiter is the smallest planet.

5. The stars emit their own light.

6. After the full moon day the visible part of moon decreases.

7. Orion can be seen during summer in the late evening.

8. There are nine planets in the solar system.

9. Mercury is earth's nearest planet.

10. The mass of Jupiter is about 318 Times that of our earth.

1. True	2. False	3. True	4. False	5. True
6. True	7. False	8. False	9. False	10. True

Quiz Time

1. What are the objects such as stars and the planets seen in the sky called?
2. What are the various shapes of the bright part of the moon as seen during a month are known as?
3. What is the time period between one full moon to the next full moon?
4. Which day is known as the 'new moon day'?
5. I have heard that we never see the back side of the moon from the earth. Is it true?
6. Who and when landed on the moon for the first time?
7. What is a light year?
8. What is the speed of light?
9. Why does the sun appear to rise in the east and set in the west?
10. Why do we not see the stars during the day?
11. What is the distance of the nearest Star Alpha Centauri?
12. From where is the Pole star not visible?
13. What is the full form of IAU?

Answers:

1. Celestial objects.
2. Phases of the moon.
3. Slightly longer than 29 days.

4. The fifteenth day of the full moon day when the moon is not visible.

5. Yes, because the moon completes one rotation on its axis while it completes one. revolution around the earth. So, only one face of the moon remains towards the earth.

6. Neil Armstrong, on July 29, 1969 (Indian time).

7. It is the distance travelled by the light in one year.

8. About 3,00,000 km per second.

9. Because the earth rotates from west to east on its axis.

10. Because of the too much brightness of sunlight.

11. The distance of Alpha Centauri is about 4.3 light years.

12. The Pole star is not visible from the southern hemisphere.

13. International Astronomical Union.

NCERT CORNER

Intext Questions

1. Boojho wants to know, why the moon changes its shape.

As moon does not produce its own light, we see the moon because the sunlight falling on it gets reflected towards us. We, therefore see only that part of the moon, from which the light of the sun is reflected towards us.

2. Boojho : Can we hear any sound on the moon ?

No, we know that sound cannot travel in vacuum and there is no atmosphere on moon, so we cannot hear any sound on the moon.

3. I want to know why we do not see the stars during the day. Why are they visible only at night?

In fact, the stars are present in the sky during the day-time also. However, they are not visible because of the bright sunlight.

4. I wonder whether Pluto is still a part of our solar system ?

You might have heard from your parents that there are nine planets in our solar system. This was true till 2006. Pluto was the farthest planet from the sun. The International Astronomical Union (IAU) at a meeting held on 24 August 2006 adopted a new definition of

planet. Pluto does not fit in this definition. It is no more a planet of the solar system. So, the solar system now consists of only eight planets.

5. I wonder, "Why do the planets not collide while revolving around the sun?"

Because, the planets revolve in their separate paths which are called orbits.

6. Paheli : The Earth revolves around the Sun. Does it make Earth a satellite of the Sun?

Generally, we use the term satellite for the bodies revolving around a planet. Moon is a natural satellite of the earth. So, Earth can be said to be a satellite of Sun.

7. Boojho's quiz : If I am 13 years old, how many times have I gone round the sun ?

As earth completes one revolution around the sun in one year, so boojho has gone 13 times round the sun.

8. Why do stars appear to move from East to West ?

As the earth rotates from West to East direction, so the stars appear to move from East to West direction as seen from the earth.

9. Can you distinguish between planets and stars ?

Yes, stars twinkle whereas planets do not. Also the planets keep changing their position with respect to the stars.

10. When will Halley's comet be visible again ?

Halley's comet appears periodically after every 76 years. It was last seen in 1986. So it will be visible again in the mid of 2061.

Textbook Questions

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

(i) An asteroid (ii) A satellite

(iii) A constellation (iv) A comet

(iii) A constellation is not a member of the solar system.

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

(i) Sirius (ii) Mercury (iii) Saturn (iv) Earth

(i) Sirius is not a planet of the Sun. It is the brightest star in the sky located close to orion.

3. Phases of the moon occur because :

(i) We can see only that part of the moon which reflects light toward us.

(ii) Our distance from the moon keeps changing.

(iii) The thickness of the moon's atmosphere is not constant.

(iv) The artificial satellites of the moon can cover only a part of its surface.

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

4. Fill in the blanks :

(i) The planet which is farthest from the sun is _____.

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

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

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

(v) Shooting stars are actually _____.

(vi) Asteroids are found between the orbits of _____ and _____.

(i) Neptune	(ii) Mars	(iii) Constellation
(iv) Satellite	(v) Meteors	(vi) Mars, Jupiter

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

(i) Sirius is a member of our solar system.

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

(iii) Uranus is the farthest planet in our solar system.

(iv) INSAT is an artificial satellite.

(v) There are nine planets in our solar system.

(vi) Constellation Orion can be seen only with the telescope.

(i) False	(ii) True	(iii) False	(iv) True	(v) False	(vi) False

6. Match items in column I with one or more items of column II.

Column I	Column II
(i) Inner Planets	(a) Saturn
(ii) Outer Planets	(b) Pole Star
(iii) Constellation	(c) Great Bear
(iv) Satellite of the Earth	(d) The moon

	(e) The earth
	(f) Orion
	(g) Mars

i. g, e	ii. a	iii. c	iv. f

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

Sometimes Venus appears in the eastern sky before sunrise. Sometimes it appears in the western sky just after sunset. Therefore, it is often called a morning or an evening star.

8. Name the largest planet of the Solar system.

Jupiter is the largest planet of the Solar system. It is so large that about 1300 earths can be placed inside this giant planet.

9. What is constellation? Name any two constellations.

The stars forming a group that has a recognizable shape are called constellation. Few constellations are :

(i) Ursa Major

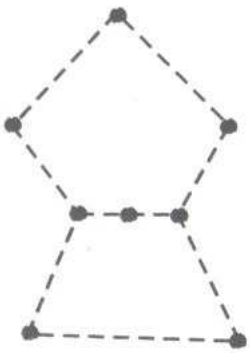
(ii) Orion

(iii) Cassiopeia

10. Draw sketches to show the relative positions of prominent stars in (i) Ursa Major and (ii) Orion.

(i) Ursa Major : There are seven prominent stars in this constellation. They appear like a big ladle or a question mark. There are three stars in the handle of the ladle and four in its bowl.

(i)



(ii)

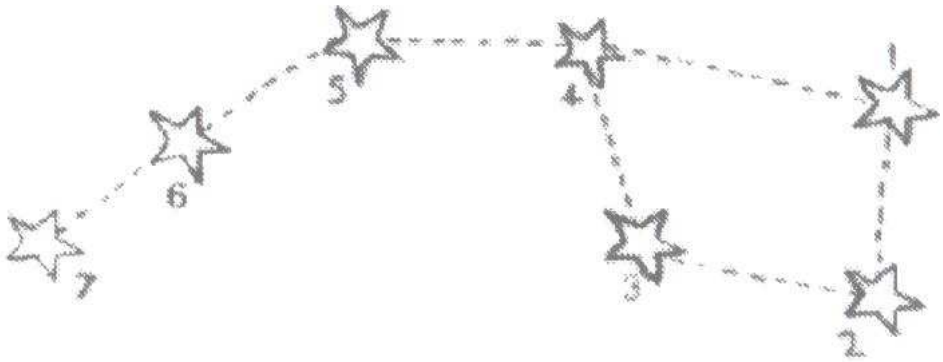
(ii) Orion : Orion is another well-known constellation that can be seen during winter in the late evenings. It is one of the most magnificent constellations in the sky. It also has seven or eight bright stars [figure (b)] Orion is also called the hunter. The three middle stars represent the belt of the hunter. The four bright stars appear to be arranged in the form of a quadrilateral.

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

The comets, asteroids and meteors are also the members of solar system along with the planets.

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

This activity should be performed on a clear moonless night during summer at about 9:00 p.m. Look towards the northern part of the sky and identify Ursa Major. You may get help from elders in your family. Look at the two stars at the end of Ursa Major. Imagine a straight line passing through these stars as shown in figure. Extend this direction. (About five times the distance between the two stars). This line will lead to a star which is not too bright. This is the Pole Star.



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

No, there is actually a star, the pole star, which is situated in the direction of the earth's axis. It does not appear to move. Other stars appear to move due to the relative motion of earth.

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

The distance between the stars and the earth is expressed in light years because the distance between them is several million kilometers, which is not easily readable. Thus, to

measure large distances, a bigger unit is used known as light year. It is the distance travelled by light in one year.

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

Let us assume Jupiter and Earth to be perfect spheres

We have volume of sphere = $\frac{4}{3}\pi R^2$

where R is radius of sphere

So, volume of Jupiter, $V_1 = \frac{4}{3}\pi {R_j}^2$

and volume of Earth, $V_E = \frac{4}{3}\pi R_E^3$

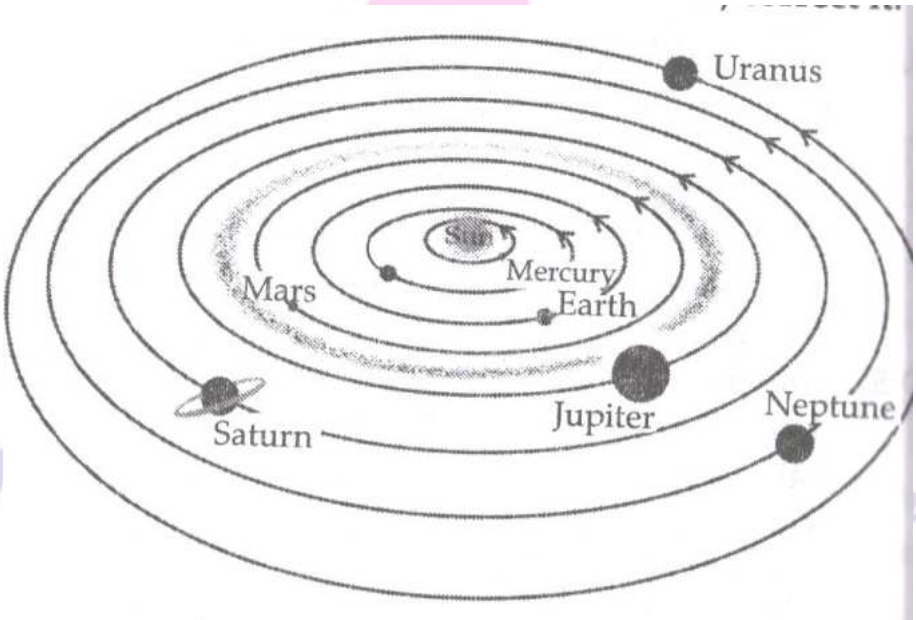
So, from equations (2), & (3)

$$\frac{V_J}{V_E} = \frac{\frac{4}{3}\pi (R_J)^3}{\frac{4}{3}\pi (R_E)^3} = \left(\frac{R_J}{R_E}\right)^3 = 11^3$$

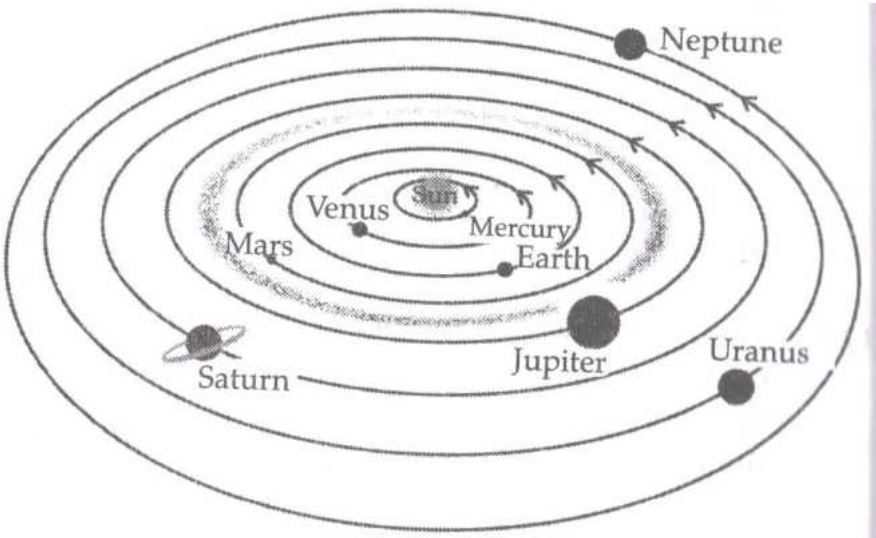
$$V_J : V_E = 1331 : 1$$

As the volume of jupiter is nearly 1300 times that of earth, so Jupiter may accommodate nearly 1300 earths inside it.

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



The sketch made by Boojho is not correct, the correct sketch is as follows :



I. Very Short Answer Type Questions.

1. What is sun?

The sun is a star.

2. Name the planet nearest to the 'sun'.

Mercury.

3. Name the planet nearest to the earth.

Mars.

4. Name the planets opposite side of the earth.

Mars and Venus.

5. Name the star which is nearest to the earth.

Alpha Centaury.

6. Write the name of any two constellations.

Great Bear and Orion.

7. Which planet has rings around it?

Saturn.

8. Name the planet farthest from the sun.

Neptune.

9. Write the name of astronaut who first landed on the moon.

Neil Armstrong.

10. When did Neil Armstrong land on the surface of the moon?

On July 21, 19869.

11. What is the speed of light?

300000 km per second.

12. Write other name of constellation Great Beat.

Saptarishi.

13. How many bright stars are there in Orion?

Seven or Eight.

14. What is the other name of Orion?

Hunter.

15. Which is the nearest star to the earth?

Sun.

16. Which star is called morning or evening star?

Venus.

17. Which colour is seen on earth from space?

Blue green.

18. Which planet is called Red planet?

Mars.

19. Which is the smallest planet?

Mercury.

20. Which planet is yellowish in colour?

Saturn.

21. Which planets are called inner planets?

Mercury, Venus, Earth and Mars.

22. Which planets are called outer planets?

Jupiter, Saturn, Uranus and Neptune.

23. Write the name of artificial satellite.

INSAT, IRS, Kalpana-I.

24. What is responsible for the change in season on earth?

Tilting of earth.

25. Name the planets which have no moon.

Mercury and Venus.

26. Name the planet where life exists.

Earth.

27. What is the path on which planets revolve around the sun called?

Orbit.

28. How many planets are there in the solar system?

Eight.

29. Name the planet where there is no carbon dioxide.

Mercury.

30. What are the objects situated in the sky called?

They are called celestial objects.

31. Do all the objects in the sky twinkle?

No, all the objects do not twinkle in the sky.

32. Name an object in the sky which is not twinkle.

Moon.

33. What are stars?

The objects in the sky which their won light are called stars.

34. Name the nearest star.

Sun is the nearest star.

35. What are natural satellite?

The bodies which revolve around the planets are called natural satellite.

II. Very Short Answer Type Questions.

1. Paheli and Boojho observe a bright object in the night sky which is not twinkling. Paheli says, it is a star and Boojho says it is a planet. Who is correct?

Boojho is correct as planet does not twinkle.

2. Do stars emit light only during night ?

Stars emit light all the time but due to excess brightness of sun during day we are unable to see the light of stars during day.

3. Paheli saw the moon through a glass window at 8.00 p.m. She marked the position of the moon on the glass pane. She got up at 4 a.m. in the morning . Will the moon be visible at the same position ? (NCERT Exemplar)

The position of moon does not remains the same as it changes due to the revolution of the moon around the earth. So, Paheli will not be able to see the position of the moon at the same place.

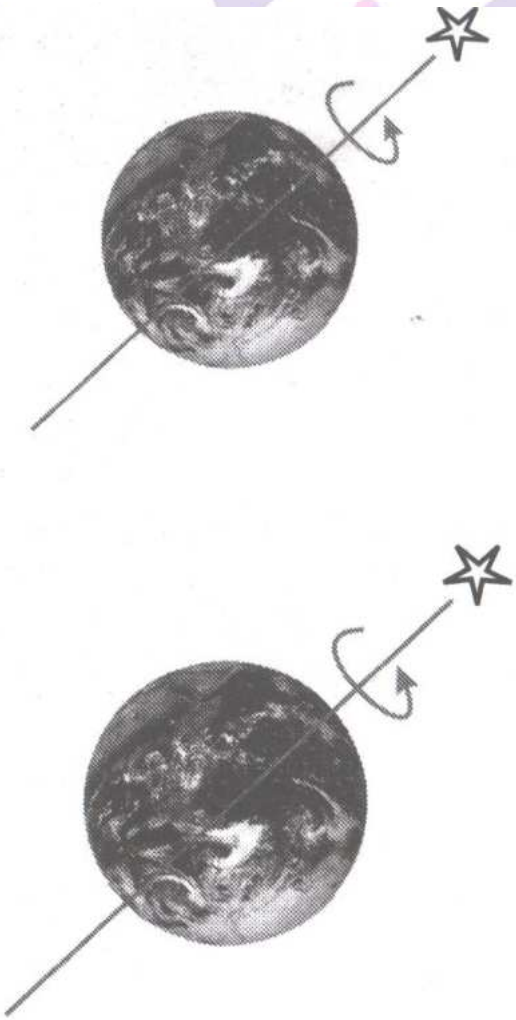
4. Why does the moon change its shape daily ?

Moon changes its shape daily because it revolves around the Earth and the light from the Sun continuously changes due to the presence of Earth between moon and the Sun.

5. A star is 10 light year away from the Earth. Suppose it brightens up suddenly today. After how much time shall we see this change ?

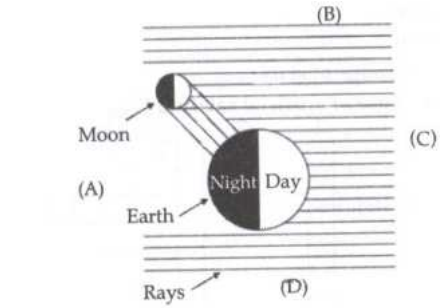
As 1 light year is the distance covered in one year, so, the star which is 10 light year away from earth and glows today, will be seen after 10 years.

6. In the picture of rotating earth given below in fig., mark the position of pole star.

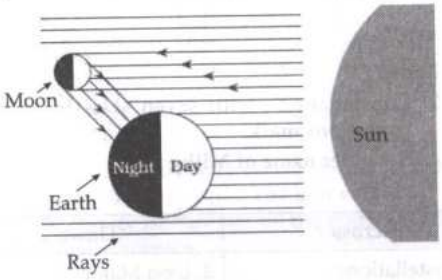


Since Pole star is seen to be stationary, so it will be at one of the ends.

7. In the given Fig. out of the positions A, B, C and D which will indicate the position of the sun ? Draw the sun at the appropriate position. (NCERT Exemplar)



Ans.



Sun will be at position C.

8. What is the distance between the Earth and the Sun ?

150,000,000 (15 crore) kms. Or 1 A.U.

9. What are celestial objects ?

The stars, the planets, the moon and many objects in the sky are called celestial objects.

10. What is full moon day ?

The day on which the whole disc of the moon is visible is known as full moon day.

11. What is new moon day ?

On the fifteenth day the moon is not visible. This day is known as the new moon day.

12. What are phases of the moon ?

The various shapes of the bright part of the moon as seen during a month are called phases of the moon.

13. Who landed on the moon first and when ?

American astronaut, Neil Armstrong, landed on the moon for the first time in July 1969.

14. What is the distance of Earth from the Sun ?

150 million km.

15. Why are stars not visible during the day time ?

The stars are present in the sky during the day time also. They are not visible because of bright sunlight.

16. What do you mean by constellation? Name any two.

The stars forming a group that has recognizable shape are called a constellation. Ursa major and Orion.

17. What do you mean by solar system ? What does it consist of ?

The sun and the celestial bodies which revolve around it form the solar system. It consist of large number of bodies such as planets, comets, asteroids and meteors.

18. What is IAU ?

IAU : International Astronomical Union.

19. Define satellite. Name the natural satellite of the Earth.

Any celestial body revolving around another celestial body is called its satellite. Moon is natural satellite of earth.

20. Why is Venus called morning star or evening star?

Venus appears in the Eastern sky before sunrise. Sometimes it appears in Western sky just after sunlight. Therefore it is often called a morning or an evening star.

21. Why does earth have seasons ?

The axis of rotation of the Earth is not perpendicular to the path of its orbit, but it is slightly tilted. The tilt is responsible for the change of seasons on the earth.

22. Write short note on Jupiter.

Jupiter is the largest planet of the solar system. The mass of Jupiter is about 318 times that of our Earth. It rotates very rapidly on its axis. It has large number of satellites.

23. Name the inner and outer planets of solar system.

Inner planets : Mercury, Venus, the Earth, Mars Outer Planets : Jupiter, Saturn, Uranus, Neptune.

24. What are meteor showers ?

When the earth crosses the tail of a comet, swarms of meteors are seen. These are known as meteor showers.

25. What is the superstition about the comets ?

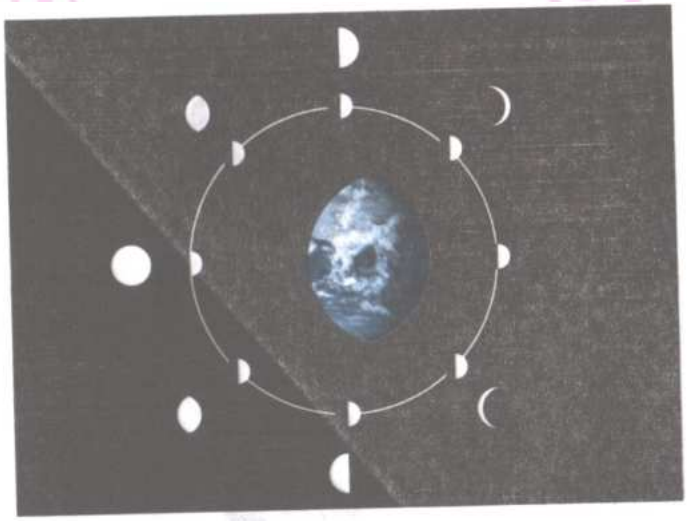
Some people think that comets are messengers of disasters, such as wars, epidemics and floods. But these are all myths and superstitions.

III. Very Short Answer Type Questions.

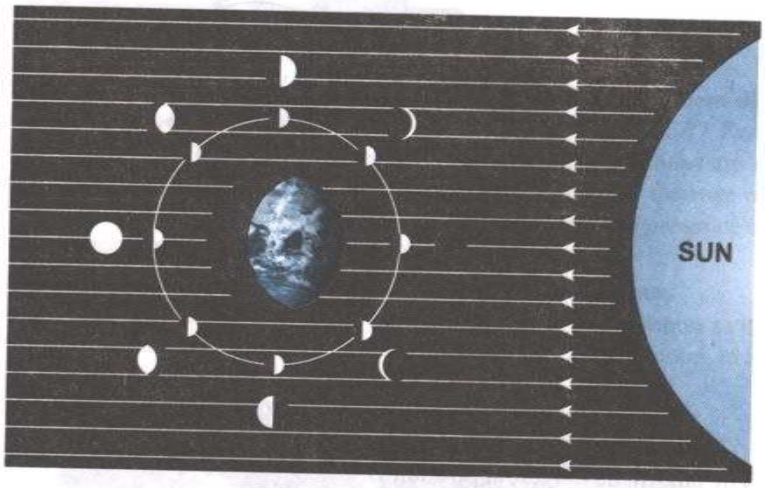
1. John saw full moon on a particular day. After how many days will he be able to see the full moon again?

Approximately 29 days.

2. In figure given below mark the arrow marks the arrows (←), (→),(↓),(↑)to show the direction of sunlight.



Ans. (←)



I. Short Answer Type Questions.

1. Meteors are not visible during the daytime. Explain the reason.

The Brightness of a meteor is extremely small compared to that of the sun, therefore, it is not seen during day time.

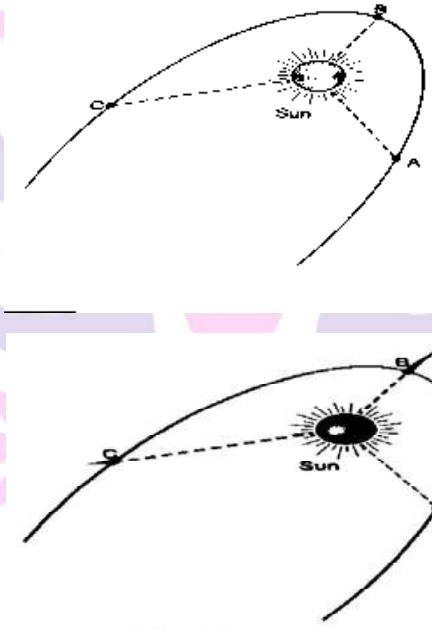
2. Why does the moon change its shape daily?

It changes its shape because we see only that part of the moon form which the light of the sun is reflected towards us.

3. Paheli saw the moon through a glass window at 8:00 p.m. she marked the positions of the –moon on the glass pane. She got up at 4 a.m in the morning. Will the moon be visible at the same positions?

No, because the position of the moon keeps changing during the night.

4. The given figure shows comets without their tail. Show the tails of the comets at positions A, B and C. In which position will the tail be longest?

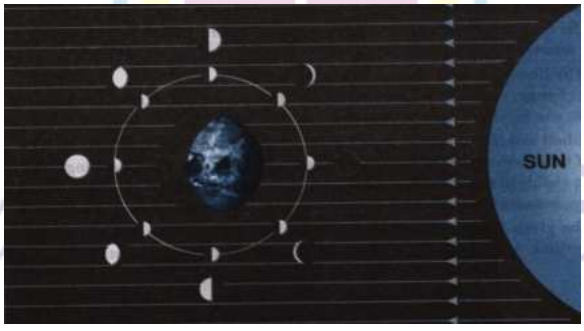


The tail will be longest at position B

5. Explain why we always see the same side of moon.

This is because the period of rotation of the moon on its axis is equal to the period of its revolution round the earth.

6.



Look at above figure carefully and answer the following questions:

a. In which part of the sky would you see the full moon in the evening?

b. in which part of the sky would you see the crescent moon in the evening?

a. In the eastern part of the sky.

b. in the western part the sky.

II. Short Answer Type Questions.

1. Why do we see only the part of the moon?

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

2. Why does the size of the moon decrease every day after the full moon day?

After the full moon day the sunlit part of the moon visible from teh earth decreases in size every day.

3. Why do we classify the sun as a star?

The sun is a star because it has its own source of energy and continuously emits heat and light.

4. What are planets?

The celestial bodies which revolve around the sun are called planets. There are eight planets in the solar system.

5. Why do stars twinkle but planets not?

The stars are very far away from the earth. The point position of the stars vibrate to disturbance by air currents and hence they appear to twinkle. The planets are much nearer than of stars and they do not have disturbance by air current, so they do not twinkle.

6. Define orbit.

A planet has a definite path in which it revolves around the sun. This path is called orbit.

7. What are Asteroids?

There is a large gap between the orbit of Mars and Jupiter. This gap is occupied by a large number of small objects that revolve around the sun. These are called asteroids.

8. What is meteor?

At night, when the sky is clear and moon is not there, sometimes bright streaks of light may be seen in the sky. This is called meteor.

9. What are meteorites?

Some meteors are so large that they do not completely evaporate before reaching the earth. These are called meteorites.

10. What is artificial satellite?

A man made satellite which is orbiting the earth is called artificial satellite.

11. What are comets?

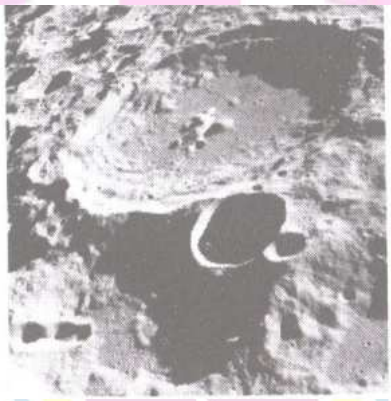
Comets are the members of our solar system. They revolve around the sun in highly elliptical orbit as a bright head with a long tail.

12. Why does the moon change its shape day to day?

There is no light of its own in the moon. We see the moon because the sun light falling on it gets reflected towards us. So we se only that part of the moon which reflects sunlight. Moon revolves around the earth and earth revolves around the sun. Therefore the sun facing part changes day to day. This is because moon changes its shape day to day.

13. Describe the structure of the moon's surface.

The moon is a fascinating object for poets and story tellers. But when astronauts landed on the moon they found that moon's surface is dusty and barren. There are many craters of different sizes. It also has a large number of steep and high mountains.



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III. Short Answer Type Questions- I

1. Suppose the moon emits light of its own. Would it still have phases ? Justify your answer. (NCERT Exemplar)

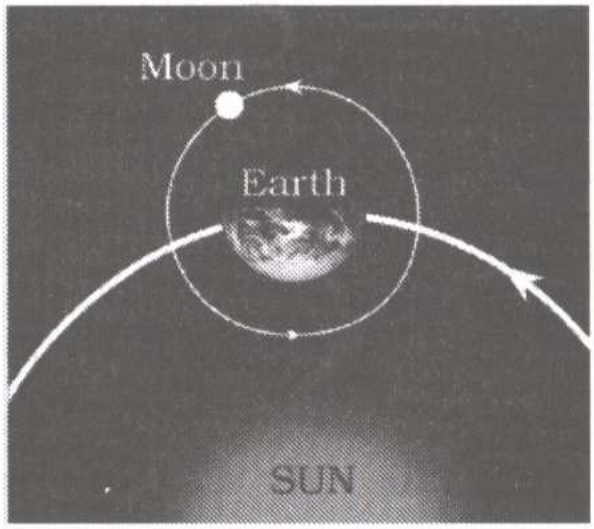
No, it will not have the phases. Because the phases are due to the different intensities of light falling on moon from the sun due to its revolution and position of the Earth. Now, since

the moon will have its own light, it need not be dependent on sun's light to glow, so it will glow continuously and completely.

2. John saw full moon on a particular day. After how many days, he will be able to see the full moon again ? (NCERT Exemplar)

He will be able to see full moon after 30 days because first, the moon size will decrease to zero, i.e., new moon day, then increase from the 16th day and finally on 30th day, it will be full.

3. Draw a diagram to show that earth accompanied by the moon is revolving around the sun.



4. What is star ? Why does it appear so small ?

Stars are celestial bodies that emit light of their own. They are million times farther away the Sun. Therefore, the stars appear to us like points.

5. Why does pole star not appear to be moving ?

Since the pole star is situated in the direction of the Earth's axis, so it does not appear to move.

6. What is the Sun ?

The Sun is a star. It is the nearest star from us. It is continuously emitting huge amounts of heat and light. It is the source of almost all energy on the Earth. It is also a source of heat and light for all the planets.

7. What is the difference between stars and planets ?

Difference between stars and planets :

S. No.	Stars	Planets
(i)	Star twinkles in the sky.	They do not twinkle.
(ii)	They are fixed at a point.	They revolve around the Sun.
(iii)	They have their own light.	They have no light.
(iv)	They are very big in size.	They are smaller in comparison to stars.

8. What is an orbit ?

A planet has definite path in which it revolves around the Sun. This path is called as orbit.

9. What is an Asteroid ?

There is a large gap between the orbits of Mars and Jupiter. This gap is occupied by a large number of small objects that revolve around the Sun. These are called asteroids. It can be seen only through large telescopes.

10. What is a meteor ?

Sometimes we see bright streaks of light in the sky. These are commonly known as shooting stars, although they are meteors. It is usually a small object that occasionally enters into the Earth atmosphere. At the time when they are at high speed, due to friction they glow and evaporate quickly. Hence, bright streak lasts for a very short time.

11. What is meteorite ?

Some meteors are large and so they can reach the Earth before they evaporate completely. The body that reaches the Earth is called a meteorite.

12. We never see the back side of the moon from the Earth. Why ?

Yes, as the moon revolves around the Earth facing one part towards the Earth, therefore we can never see back side of the moon from the Earth.

III. Short Answer Type Questions- II

1. Explain why we always see the same side of the moon. (NCERT Exemplar)

We always see the same side of the moon because the moon does not rotate (i.e., spin at its own axis) like the Earth does, so we see only the side that faces towards us and this side faces towards us all the time.

2. Meteors are not visible during the daytime. Explain the reason. (NCERT Exemplar)

Meteors are very small objects which glow due to friction when they enter the Earth's atmosphere. They are not visible during the daytime because of being very small in size and due to the Sun's brightness.

3. How are phases of moon formed ?

The day on which the whole disc of the moon is visible is known as full moon day. Thereafter, every night the size of the bright part of the moon becomes thinner and thinner. On the fifteenth day the moon is not visible, which is known as new moon day. The next day, only a small portion of the moon appears in the sky, known as crescent and then again the moon grows larger every day. On 15^{th} day again we get full view of the moon. These various shapes are called phases. We see different phases of moon as a result of difference in sunlight reflected by moon. Difference in sunlight incident on moon's surface arises due to revolution of moon around the earth.

4. Write in brief about any two constellations.

Ursa Major : We can see it during summer time in the early part of the night. It is also known as Big Dipper, the Great Bear or the Saptarishi. There are seven prominent stars in this. It appears like a big dipper or a question mark. Three stars are in the handle of the ladle and four in its bowl.

Orion : It is seen during winters in late evening. It has seven or eight bright stars. It is also called hunter. Three middle stars represent the belt of the hunter. The four bright stars appear to be arranged in the form of a quadrilateral.

5. Write the difference between revolution and rotation.

Difference between revolution and rotation :

S.No.	Revolution	Rotation
(i)	The time taken by a planet to complete one revolution is called its period of revolution.	A planet also rotates on its own axis like a top. The time taken by a planet to complete one rotation is called its period of rotation.
(ii)	The period of revolution increases as the distance of the planet increases from the sun.	It is always fixed.

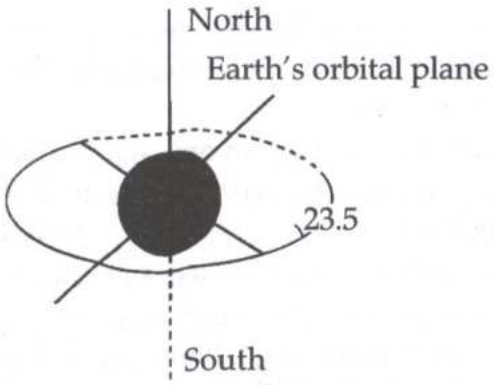
6. What are artificial satellites ? What are their uses ?

There are many man made satellites revolving round the Earth. These are called artificial satellites. They are launched from the Earth. They revolve around the Earth much closer than Earth's natural satellite.

Artificial satellites have many practical applications. They are used for forecasting weather, transmitting television and radio signals etc. They are used for tele-communication and remote sensing.

7. Explain how the Earth rotates on a tilted axis.

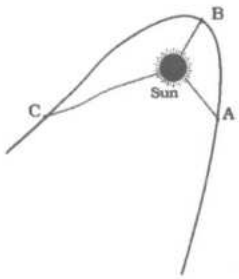
The plane of the equator is called the equatorial plane. The plane in which the Earth revolves round the sun is called the orbital plane of the Earth. These two planes are inclined to each other at an angle of 23.5°. This means that the axis of the Earth is inclined to its orbital plane at an angle of 66.5°.



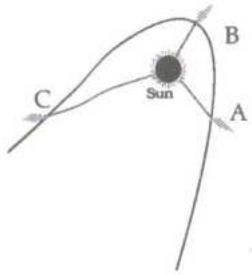
8. What is waxing and vanning of moon ?

Different phases of moon are visible from the Earth. This change in shapes occurs due to variation in sunlight reflected by moon from its surface. At certain times, it appears to be bright whereas at others it appears to be dark When brightness of moon is increasing, it is called waxing, when brightness of moon is decreasing, it is called vanning.

9. Fig. below shows comets without their tail. Show the tails of the comets at position A, B, and C. In which position will the tail be longest ? (NCERT Exemplar)



Ans.



The tail will be longest at position B.

10. Write a short note on (i) Comets (ii) Meteors and (iii) Meteorites.

(i) Comets : Comets are also members of our solar system. Comets are celestial bodies that revolve around the sun in highly elliptical orbits. However, their period of revolution round the sun is usually very large. A comet appears generally as bright head with a long tail. The length of the tail of the comet grows in size as it approaches the sun. The tail of a comet is always directed away from the sun.

(ii) Meteors : At night, when the sky is clear and the moon is not there, you may sometimes see bright streaks of light in the sky. These are commonly known as shooting stars, although they are not stars. They are called meteors. A meteor is usually a small heavenly object moving around the sun. Occasionally, a meteor enters the earth's atmosphere. At that time it has a very high speed. The friction due to atmosphere heats up meteor. It glows and evaporates in a very short time. That is why the bright streak appears for a very short time.

(iii) Meteorites : Some meteors are so large that a part of them reaches the surface of

earth before they evaporate completely. These are called meteorites. Meteorites help scientists in investigating the nature of the material from which solar system was formed.

I. Long Answer Type Questions.

1. Explain with a diagram how you can locate pole star with the help of the constellation Great Bear (Ursa Major). (NCERT Exemplar)

Refer to 'Text Book Question' Page 166, Q. 12

2. Suppose the distance between earth and sun becomes half of its present distance. What is likely to happen to life ? (NCERT Exemplar)

We know that (time period)^2 α (radius of orbit)^3

$$T_1^2 = kr_1^3 \quad \ldots\ldots (i)$$

$$T_2^2 = kr_2^3 = k\left[\frac{r_1}{2}\right]^3 \quad \ldots\ldots (ii)$$

$$\frac{T_1^2}{T_2^2} = \frac{r_1^3}{r_1^3} \times 8$$

$$T_2^2 = \frac{T_1^2}{8}$$

$$T_2 = \frac{T_1}{2\sqrt{2}}$$

It means that time period reduces by $(1/(2\sqrt{2}))$ factor. So the days in a year will be approx. 129 instead of 365 days.

3. Write a short note about planets of the solar system.

There are eight planets in our solar system :

(i) Mercury (Budh) : It is nearest to the Sun. It is the smallest planet of our solar system. It is very difficult to visualize because it is near to the Sun. It has no satellite.

(ii) Venus (Shukra) : It is nearest to the Earth. It is the brightest planet. It is also called as morning and evening star due to its appearance. It also has no moon or satellite. It rotates from East to West.

(iii) Earth (Prithvi) : The earth is the only planet where life exists. It has special environmental conditions, right distance from the Sun, so has right temperature, presence of water and blanket of ozone that makes life possible here.

(iv) Mars (Mangal) : It is the first planet outside the orbit of the Earth. It appears reddish, so is called red planet. It has two small natural satellites.

(v) Jupiter (Brihaspati) : It is the largest planet. It rotates very rapidly on its axis. It has large number of satellites. It also has faint rings and large moons.

(vi) Saturn (Shani) : Saturn is yellowish in colour. It has beautiful rings. It has large number of satellites. It is least dense, density is less than water.

(vii) Uranus and Neptune : They are outermost planets of our solar system. Uranus rotates East to West, and has high rotation speed.

II. Long Answer Type Questions.

1. Differentiate between stars and planets.

S.No	Stars	Planets
1	Stars twinkle in the sky	Planets do not twinkle in the sky
2	They are fixed at a point	They revolve around the sun
3	They have their own light	They have no light
4	They are very big in size	Planets are small as compared to star

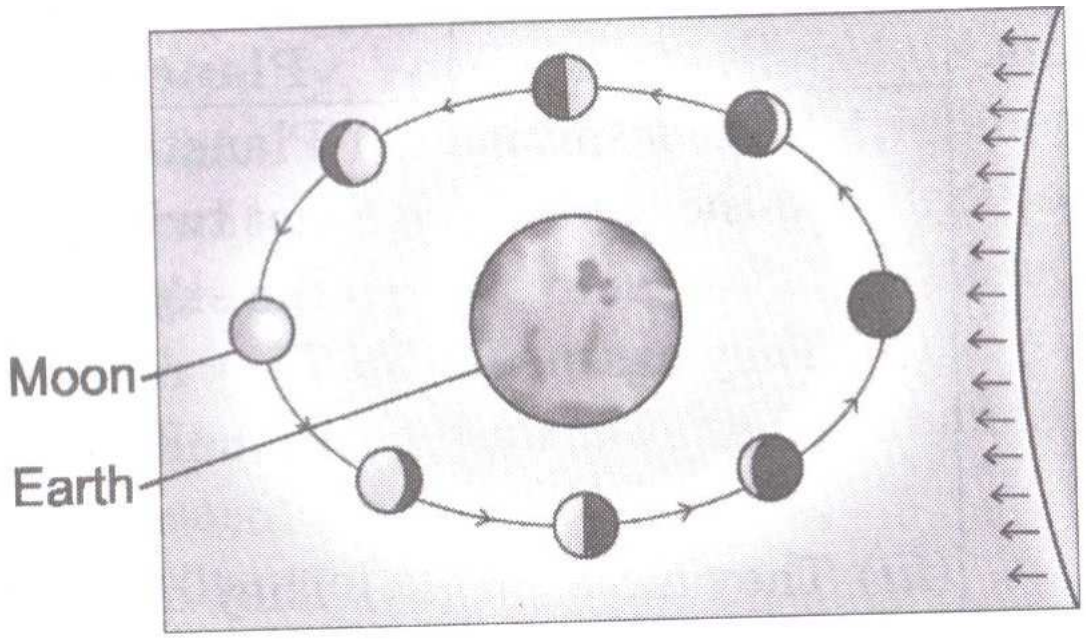
2. Why can we not hear any sound on the moon?

Moon is a natural satellite of the earth. It revolves around the earth. But there is no medium on the moon. There is no air on the surface of the moon. Sound travels with the help of any medium. Without the medium it cannot ravel from one place to other. So we do not hear and sound on the surface of the moon.

3. What do you know about the phases of the moon? Why do phases of the moon occur?

The various shapes of the bright part of the moon as seen during a month are called phases of the moon. The moon does not produce its own light. Whereas the sun and other stars do. We see the moon because the sunlight falling on it is reflected towards us. We therefore see only that part of the moon from which the light of the sun is reflected towards us. The

moon revolves around the earth so its position changes every day. The moon appears different at different positions. So the phases of the moon occur.



4. What is the sun? Name the next nearest star. What is the distance of the sun from the earth? Write the unit of the large distances.

Sun is the nearest star. It also emits light just like the other stars. The next nearest star is Alpha Centauri. The sun is nearly 150 million km away from the earth. Such large distances are expressed in another unit called light year. The distance travelled by light in one year is called light year. The speed of light is about 300000 km per second. Thus the distance of the sun may be said to be about 8 light minutes.

5. What are constellations? Explain some common constellations.

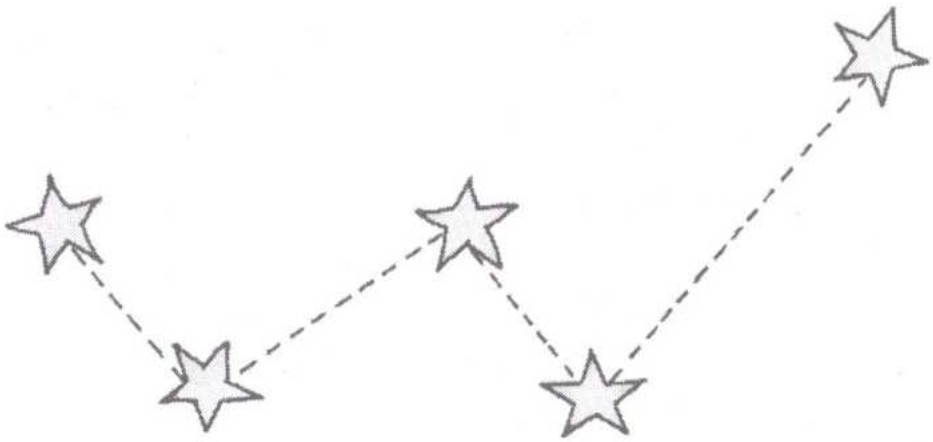
The groups of stars that has a recognisable shape is called constellation.

Some common constellation are;

(i) **Ursa Major :** It appears during summer time in the early part of the night. It is also known as Big Dipper or Great Bear or the Saptarshi. There are seven prominent stars in this constellation. It appears like a big ladle or a question mark.

(ii) **Orion :** This constellation can be seen during winter in the late evenings. It has seven or eight bright stars. Orion is also called the hunter.

(iii) **Cassiopeia :** It is the most common or prominent constellation in the northern sky. It is visible during winter in the early part of the night. It looks like a distorted letter W or M.



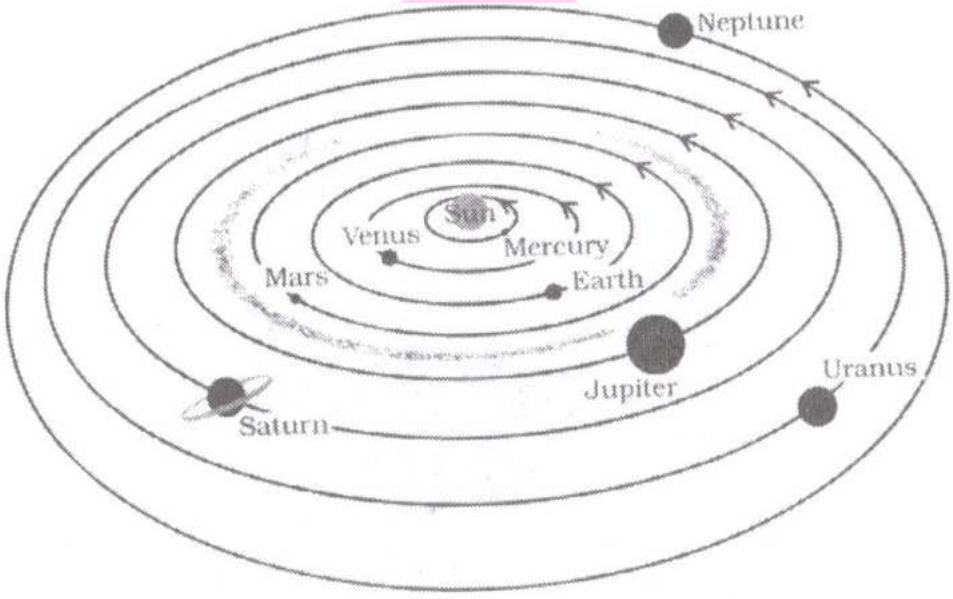
6. What is Pole star? How do you locate the position of Pole star?

Pole star is the star in the sky which appears stationary and does not move like other stars. It is situated above the north pole of the earth.

Look at the two stars at the end of Ursa Major. Imagine a straight line passing through these stars. Extend this line towards north direction. This line will lead to a star called Pole star.

7. Explain the solar system.

The sun and the celestial bodies which revolve around it form the solar system. It consists of a large number of bodies such as planets, comets, asteroids and meteors. The gravitational attraction between the sun and these objects keeps them revolving around it. Out earth is also a planet which revolves around the sun. It is also a member of the solar system. There are seven other planets that revolve around the sun. The eight planet are ; Mercury , Venus , Earth , Mars, Jupiter, Saturn, Uranus and Neptune.



8. Explain the following terms;

(a) Asteroids **(b) Comets**

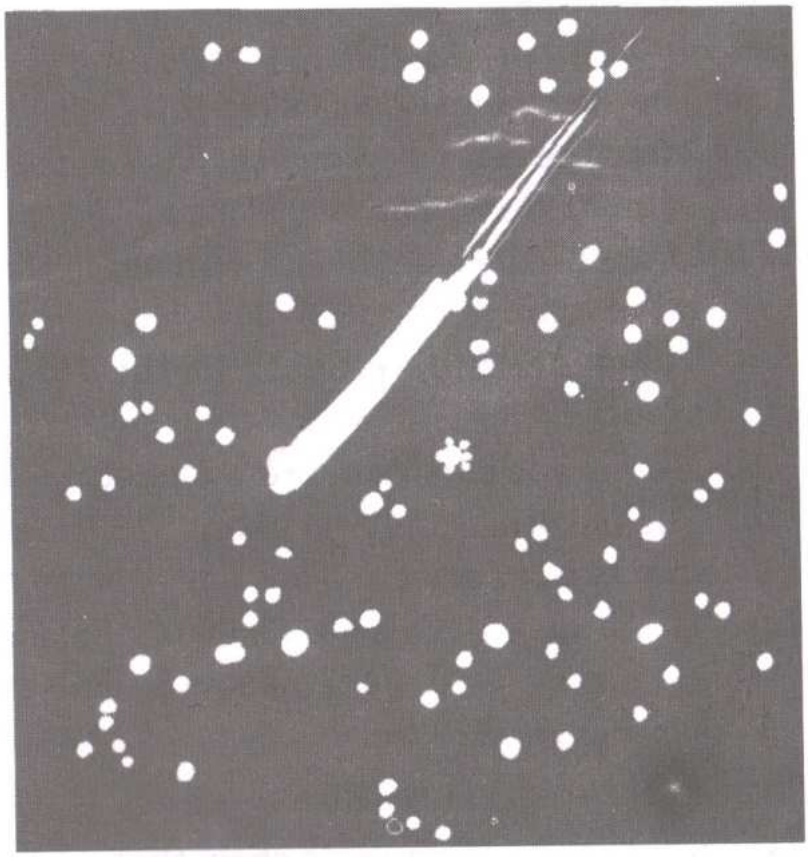
(c) Meteors **(d) Meteorites**

(a) **Asteroids :** There is a gap between the orbits of Mars and Jupiter. This gap is occupied by a large number of small objects that revolve around the sun. These small objects are called asteroids.

(b) **Comets :** Comets are also small bodies which revolve around the sun in highly elliptical orbits. They become visible from the earth only when they come closer to the sun. They are characterised by a small head followed by a long tail.

(c) **Meteors :** The very small stone like objects are called meteors. They are commonly known as shooting stars, although they are not stars. The meteor occasionally enters the earth's atmosphere. Due to friction it heats up. It glows and evaporates quickly.

(d) **Meteorites :** The portion of meteor which does not burn during its fall through the earth's atmosphere and hits the ground is called a meteorite.



9. What are planets? Explain them.

The bodies which revolve around the sun in a certain orbit are called planets. There are following eight planets.

(i) **Mercury :** The planet Mercury is nearest to the sun. It is smallest planet of the solar system. It has no satellite of its own.

(ii) **Venus :** Venus is earth's nearest planetary neighbour. It is brightest planet in the night sky. Venus has no moon or satellite of its own.

(iii) **Earth :** It is the third plant. The earth is the only planet in the solar system on which life exists. Earth appears blue green due to the reflection of light from water and landmass. It has only one moon.

(iv) **Mars :** The fourth planet is called Mars. It is called the red planet. Mars has two small satellites.

(v) **Jupiter :** It is the largest planet of the solar system. It is so large that about 1300 earths can be placed inside this giant planet. It has a large number of satellites.

(vi) **Saturn :** Beyond Jupiter is Saturn, which appears yellowish in colour. It contains beautiful rings which are not visible with naked eyes.

(vii) **Uranus :** It is the seventh planet. It is the second outermost planet.

(viii) **Neptune :** The outermost planet is called Neptune.

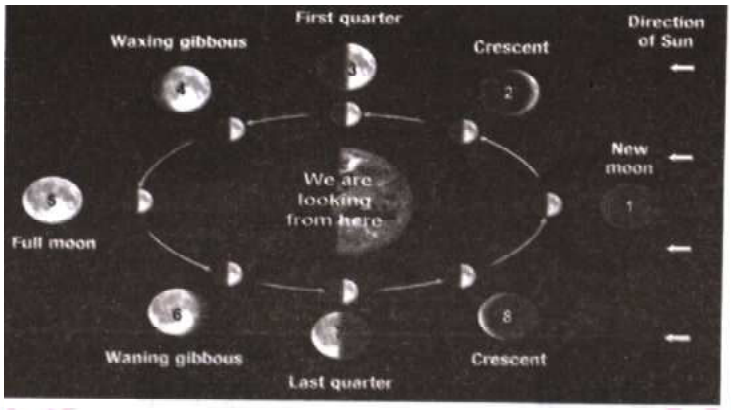
III. Long Answer Type Questions.

1. Suppose the distance between earth and sun becomes half of its present distance. What is likely to happen to life?

Life may no longer exist because some special environmental conditions are needed for the existence and continuation of life on the earth. The right distance of earth from the sun is necessary so that it has right temperature range, the presence of water and suitable atmosphere and a blanket of ozone.

2. How do phases of moon occur? Support your answer with a diagram.

The phases occur because the sun lights up different parts of the moon as it circles around the earth. The phase visible to us depends on the position of moon, in relation to the sun and Earth.



When the moon is directly between the sun and the earth. We cannot see it at all because no sunlight falls on the side facing us. This is the new moon phase. It takes the moon about three and half days to move from one position to the next. In position I, we cannot see the bright side of the moon. This is a new moon which is very difficult to see we wee a half moon in position 3, since we can see equal parts of the dark and bright sides of the moon. In position 5, , We see the whole bright side of it, this is a full moon.

3. How does Earth provide ideal conditions for all forms of life including human beings?

a. There is abundance of water in all its three states liquid, solid and gaseous, because of the presence of water in oceans, the earth is also known as the Blue planet.

b. The earth is at an optimum distance from the sun. it is, therefore, neither too hot nor too cold.

c. there are seasons, weather conditions and climate on earth best suited for the present life- forms. The axis of the earth is tilted and this tilt and the revolution of the earth is responsible for season.

d. it has normal gravity which allows easy movement of living forms.

e. It has a layer of atmosphere which protects the earth from harmful celestial bodies an ultraviolet rays of the sun.

I. High Order Thinking Skills (HOTS) Questions

1. The tail of a comet always points away from the Sun. Explain why.

As the tail of a comet is due to light radiation from the Sun, thus it always points away from it.

2. As the Sun is also a stay then why does it appear so large as compared to the other stars ?

The stars are millions of times farther away than the Sun. So, the stars appear to us like points and the Sun is like a large sphere.

3. When the meteors enter the atmosphere of Earth, then what does exactly happen ?

The moment the meteors enter the Earth's atmosphere, then due to the friction of air, they get heated up and become visible. Then, they are seen as a bright streak of light flashing for a moment across the sky, so they usually get burnt out completely before reaching the surface of the Earth.

4. Explain the reason in brief for non existence of life on the mercury planet.

As we know the only planet which is nearest to the Sun is Mercury, due to which temperature on it is very high. So, the existence of life on it is impossible. Besides this, this planet has no sign of water on its surface and the gases like carbon dioxide, hydrogen, oxygen and nitrogen do not exist in its atmosphere.

Value Based Questions.

1. Last week, Ramesh (a science teacher) was teaching about the planets to his students of class 5th. After a small lecture on planets, he started cross questioning with his students on the same topic. He found that almost, all the students answered all the questions.

He asked following questions.

i. Give the names of all the planets of solar systems with respect to their distance from the Sun.

ii. Name the planet on which the life is known to exist.

iii. Mention the values shown by students of Ramesh here.

i. Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune.

ii. Earth is the planet on which the life is known to exist.

iii. Students of Ramesh seem to be very sharp minded and intelligent. They learn all the facts immediately which Ramesh teaches them.

2. You must have heard that there are number of artificial satellites that are orbiting the Earth. Tell in brief what are their actual uses. Name some satellites launched by India.

Artificial satellites have many practical applications. They are used for forecasting weather, transmitting television and radio signals. They are used for Telecommunication and remote sensing. India has built and launched several artificial satellites. Aryabhatta was the first Indian satellite. Some other Indian satellites are INSAT, IRS, Kalpana-I, EDUSAT etc.

ISRO, (Indian Space Research Organization), Indian Space Research agency is prominently involved in launching new space satellites, time-to-time.

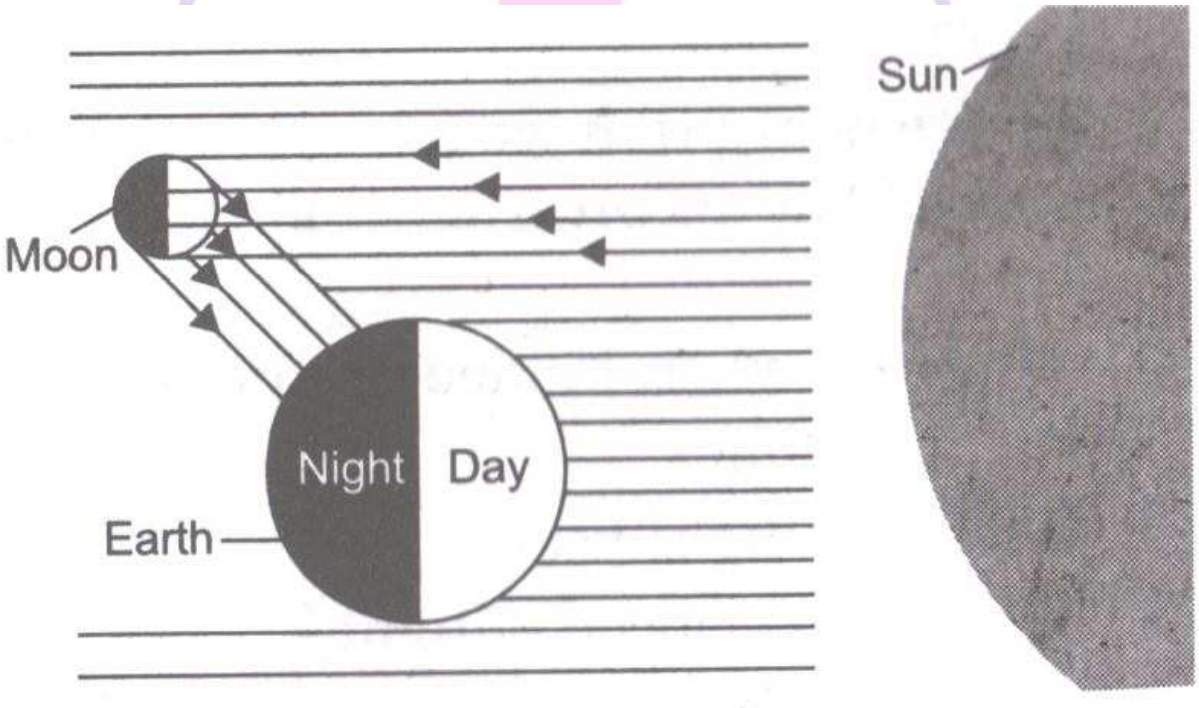
Skill Based Questions.

1. (a) Draw a diagram to show that moon is visible due to reflected sunlight.

(b) How many moons do the earth have?

(c) Name a planet which has no moon.

(a)



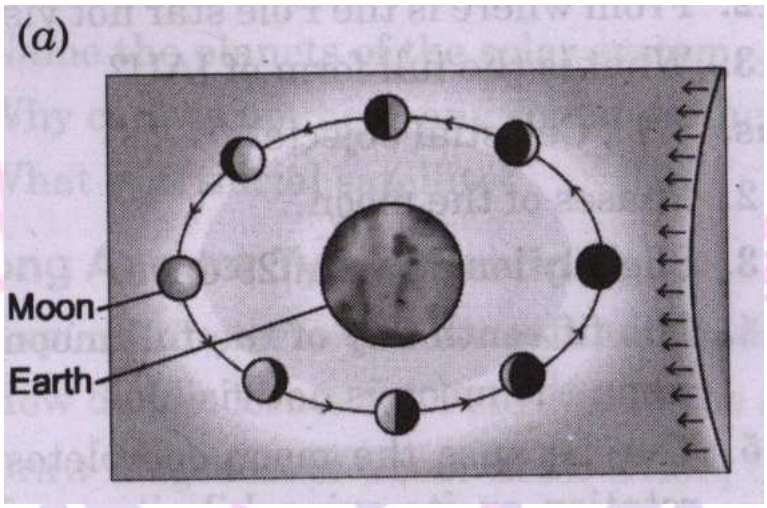
(b) There is only one moon of the earth.

(c) Mercury is a planet which has no moon.

2. (a) Draw a diagram to show various phases of the moon.

(b) What do you mean by a full moon day?

(c) What is a new moon day?



(b) The day on which the whole disc of the moon is visible is known as the full moon day.

(c) The day on which moon is not visible is known as new moon day.

3. (a) Draw a diagram to show the location of the Pole star.

(b) Why is it known as Pole star?

(c) On which pole of the earth does the Pole star exist?

(d) What are the special characteristics of the Pole star?

(a)

(b) It is known as Pole star because it exists on the pole of the earth.

(c) Pole star exists on the north pole of the earth.

(d) Pole star does not move as other stars move.

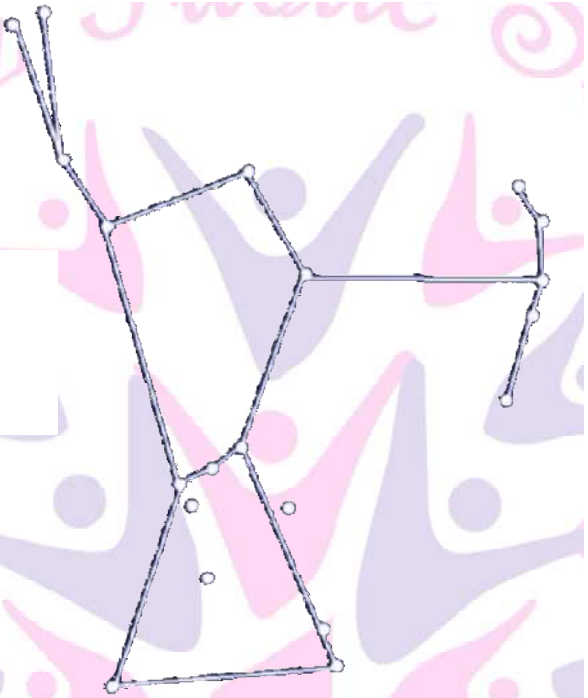
4. Identify the following figure and answer the following questions.

(a) What are such group of stars called?

(b) How many stars are there in this figure?

(c) Why is it also called Hunter?

(d) How is it used to locate Sirius star?



The given figure is of the constellation Orion.

(a) Such groups of stars are called constellations.

(b) There are 7 or 8 bright stars in this constellation.

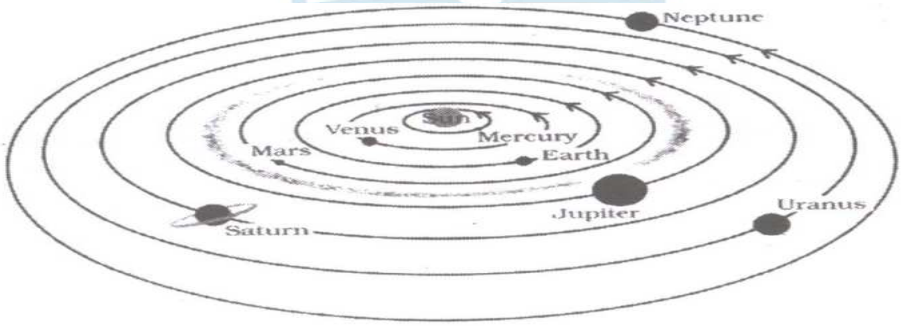
(c) It looks like a hunter so it is also called Hunter.

(d) To locate Sirius, imagine a straight line passing through the three middle stars of Orion.

5. (a) Draw a diagram of the solar system.

(b) How many planets are there in the solar system? Name them.

(a)

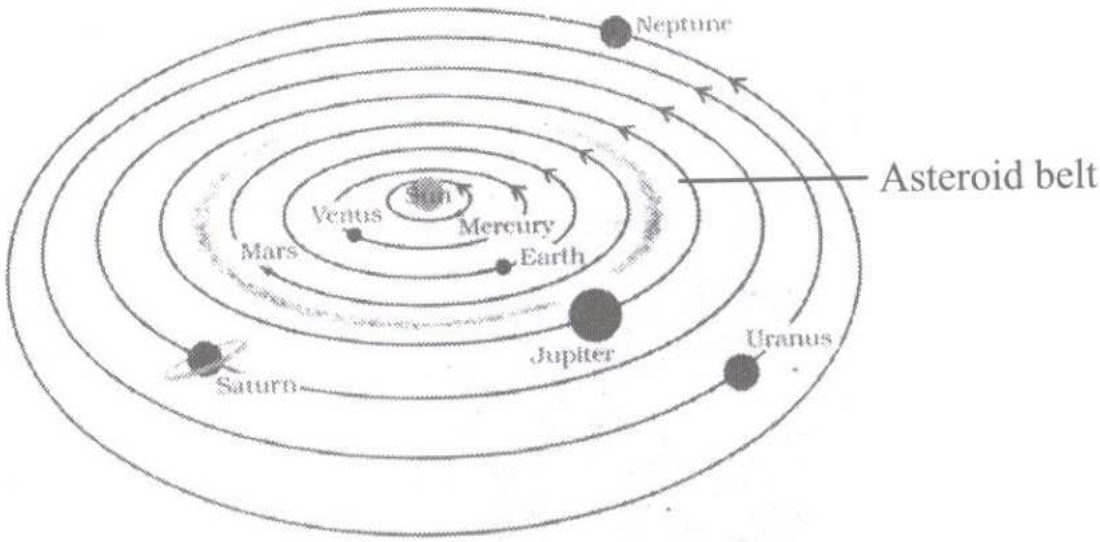


(b) There are eight planets in the solar system namely : Mercury , Venus , Earth , Mars, Jupiter, Saturn , Uranus and Neptune.

6. (a) Draw a diagram to show the asteroid belt.

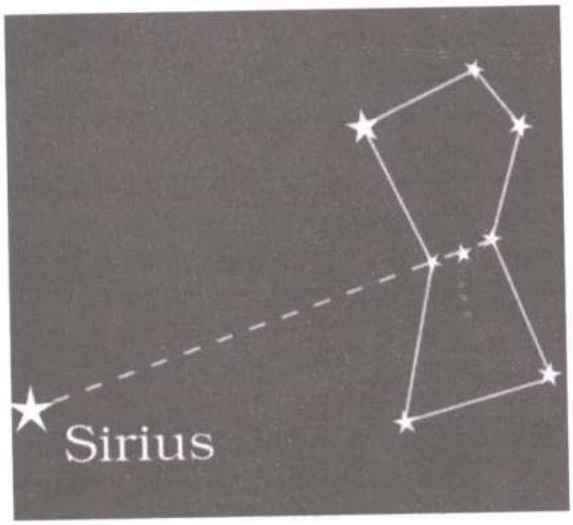
(b) Name the planets between which the asteroid belt occurs.

(a)



(b) Asteroid belt occurs between Mars and Jupiter.

7. Draw diagram to locating – Sirius.



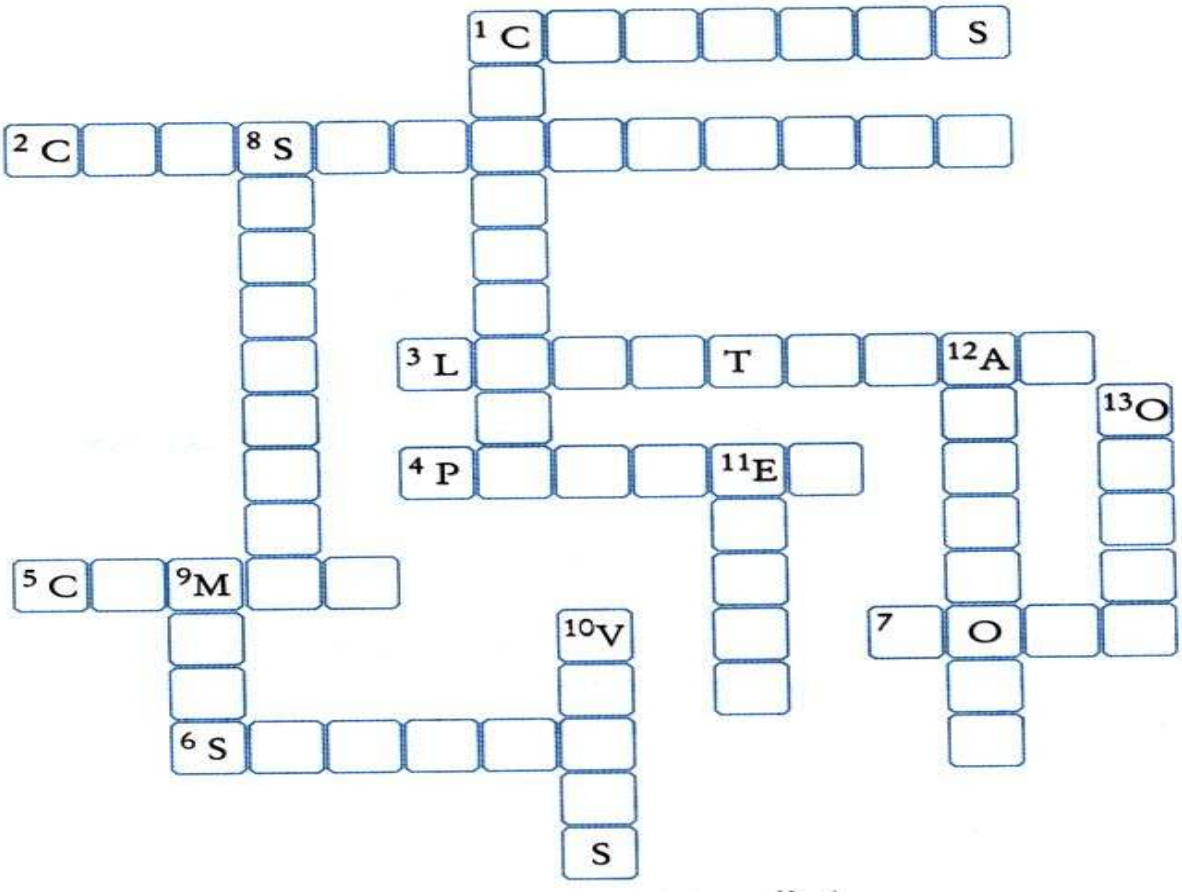
Cross the Puzzle

Across

1. Deeps pits on the moon
2. Stars that form a pattern
3. Distance travelled by light in one year
4. heavenly body with no heat and light in one year
5. Lumps of ice and dust with a head and a tail
6. A planet with rings
7. Natural satellite of the earth

Down

1. Natural objects seen in the night sky
8. A heavenly body that orbits a planet
9. The red planet
10. The morning and evening star
11. The only planet on which life exists
12. A rocky object that revolves around the sun
13. A constellation meaning ' hunter'



Across

1. Craters	2. Constellation	3. Light year	4. Planet
5. Comet	6. Saturn	7. Moon	

Down

1. Celestial	8. Satellite	9. Mars	10. Venus
11. earth	12. Asteroid	13. Orion	