

Stars & The Solar System

Check point 1

Q. 1. Name any two celestial objects which we can see easily in the night sky.

Answer: The two celestial bodies which we can see easily in the night sky are stars and moon. During daytime due to glare of sunlight, we cannot see any other celestial objects in the sky. But as soon as the sun sets in the evening and it becomes dark, we can see these celestial bodies in the sky.

Q. 2. After how many days, the moon achieves its full moon phase?

Answer: We can have one 'new moon' and one 'full moon' during a month which is the time taken by the moon to complete one revolution around the earth. The time period between one full moon and the next full moon is actually the 29.5 days.

Q. 3. Name two objects other than planets which are members of the solar system.

Answer: In addition to the sun, planets and satellites, the solar system also includes asteroids, comets and meteoroids. Asteroids, comets and meteoroids revolve around the sun just like the planets but they are much smaller than the planets.

Q. 4. Mention the relation between the size of moon and the size of the Earth in terms of their diameters.

Answer: Diameter of the moon is 3474km and diameter of Earth is 12742km. so, Radius of earth is four times the radius of moon.

Q. 5. Can we hear any sound on the moon?

Answer: No, we can't hear sound on moon as sound needs medium to travel and there is no medium on moon in which sound can travel not even air.

Check point 2

Q. 1. Mention the name of the star which remains fixed at the same place in the sky in the north.

Answer: Pole star remains fixed at the same position in the sky in the north and does not change its position. The pole star appears to be stationary and does not change its position with time because it lies on the axis of rotation of Earth.

Q. 2. Explain the statement, 'a star is 8 light years away from the Earth'.

Answer: Light year is the distance light can travel in one year. One light year is equal to 9.4607×10^{12} km. The statement, 'a star is 8 light years away from the Earth' mean that a star is $8 \times 9.4607 \times 10^{12}$ km = 75.6856 km away from earth. By saying that a star is 8 light years away from the earth, we mean that the distance of this star from the earth is so much that the light from the star takes eight years to reach the earth.

Q. 3. Name the star (after the Sun) which is closest to the Earth.

Answer: Alpha Centauri is the closest star to the Earth after the sun. The star is very bright as it is a combination of two stars Alpha Centauri A and Alpha Centauri B. The star is averagely at a distance of 4.3 light years from the Earth.

Q. 4. Do all the stars in the sky move? Explain.

Answer: Stars in the sky do not move but they appear as they are moving, due to rotation of earth. Only the pole remains fixed at the same position because it lies above the axis of rotation of earth.

Check point 3

Q. 1. Give two other names of Ursa Major constellation.

Answer: Ursa Major constellation consists of 7 stars arranged in the pattern of big bear. It is also known as 'big bear' and 'great bear'. And Indian name of Ursa Major constellation is 'saptarishi'.

Q. 2. In which season of the year is the constellation Orion visible in the sky?

Answer: The Orion constellation consists of seven or eight bright stars. The Orion constellation is visible in the sky during winter season in the late evenings.

Q. 3. From which constellation, you can locate Pole star?

Answer: We can locate pole star from Ursa Major constellation. The Ursa Major constellation appears to revolve around the pole star in the night sky.



Q. 4. Name two prominent constellations in the northern sky.

Answer: Ursa Major and Cassiopeia are two prominent constellations in northern sky.

Check point 4

Q. 1. Name two planets which can be seen as morning star.

Answer: Mercury and Venus can be seen as the morning star because they lie inside the orbit of earth. The planet Mercury and Venus can be seen as morning star in the eastern sky just before the sun-rise.

Q. 2. Give the name of the planet which is known as red planet.

Answer: Mars is known as the red planet due to its orange-red colour.

Q. 3. Which characteristic of the planet Saturn makes it unique in the solar system?

Answer: Saturn is the second biggest planet of solar system after Jupiter. Saturn is the unique planet of solar system due to presence of well-developed colorful rings around it. The rings of Saturn can be only seen by telescope. Saturn is least dense among all the planets of the solar system. Its density is even less than that of the water.

Q. 4. Name two planets which show phases like the moon.

Answer: Mercury and Venus are two planets which show phases like moon because they lie inside the orbit of Earth.

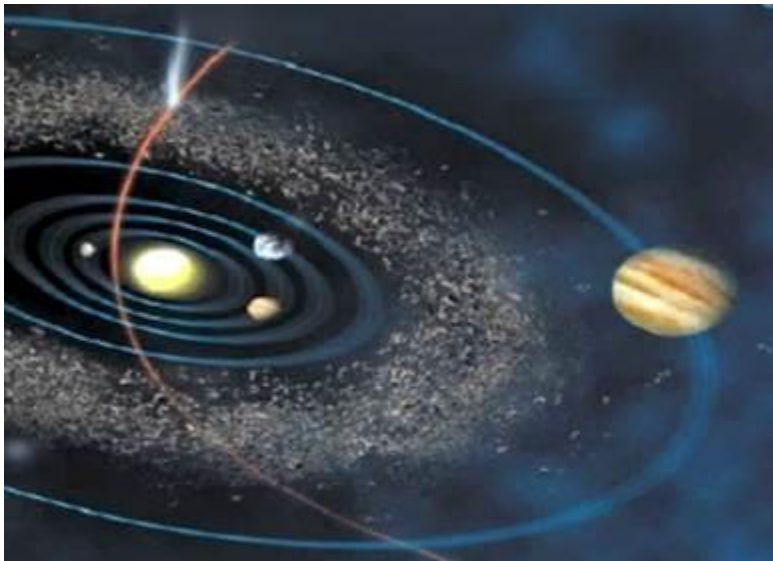
Check point 5

Q. 1. Name two planets having asteroids between them.

Answer: There is a wide space in between the orbits of Mars and Jupiter. A large number of small objects made of rocks revolve around the sun in the wide space between the orbits of Mars and Jupiter in the solar system. These are called asteroids. So, Mars and Jupiter have asteroids between them.

Q. 2. Explain the meaning of asteroid belt.

Answer: Asteroid belt is the region between Mars and Jupiter which contains most of the asteroids.



Q. 3. Name the celestial body which can be seen as a right streak of light coming down in the night sky.

Answer: Meteors are the celestial bodies from the sky which we see as a bright streak of light that flashes for a moment across the sky. The meteors are commonly called as shooting stars.



Q. 4. Name the agency responsible for development of space science programmes in India.

Answer: The agency responsible for development of space science programmes in our country is Indian Space Research Organization (ISRO).

Chapter Test

Q. 1. The distance between stars and planets expressed in light year. Explain why?

Answer: Stars and planet are so far away from each other that it is so difficult to measure distance in km or any other unit. So to make easy measurement the distance between them is measured in light year.

1 light year is equal to 9.49×10^{12} .

Q. 2. Explain why the number of meteors striking the moon's surface is quite large whereas very few reach the Earth's surface.

Answer: While entering the earth's atmosphere most of the meteors burn due to air friction and hence the number of meteors striking the moon's surface is quite large than meteors reaching earth's atmosphere.

Q. 3. What is the name of that planet which has 28 moons?

Answer: Jupiter has 28 moons or satellites. We can see four of its satellite through a telescope.

**Q. 4. Name the constellation which appears to have the shape of (a) distorted M
(b) a hunter.**

Answer: (a) Cassiopeia constellations have the shape of distorted M or W. It consists of 5 main stars.



(b) Orion constellation has the shape of hunter. And due to its shape it is also known as 'Hunter'.



Q. 5. Which is the largest planet?

Answer: Jupiter is the largest planet of solar system. Its diameter is 11 times the diameter of earth, and its mass is about 318 times the mass of earth.

Q. 6. Moon has no atmosphere. Why?

Answer: Moon has no atmosphere because the moon's gravity is $\frac{1}{6}$ th of Earth's gravity and that's not simply strong enough to prevent the atmosphere from escaping. In fact, the moon does have a very thin atmosphere which is very thin to be felt.

Q. 7. The Ursa Major consists of how many stars?

Answer: The Ursa Major consists of seven bright stars which are arranged in a pattern resembling somewhat a big bear.

Q. 8. What is the mass of the earth?

Answer: Mass of the Earth is 6×10^{24} Kgs.

Q. 9. In which direction do stars appear to move in the sky? Why do they appear to move in this direction?

Answer: The star appears to move in the sky from east to west direction. This apparent motion of the stars in the sky from east to west direction is due to rotation of Earth from west to east on its axis. So, star appears to move in opposite direction: from east to west.

Q. 10. Stars appear as point while planets appear as discs. Explain why.

Answer: The stars are much bigger than our Earth. Many of the stars are even bigger than the sun. The star appears as point because they are very, very far from us. Whereas planets are quite close to Earth so appear as discs.

Q. 11. Explain the factors which differentiate the pole star from other stars.

Answer: Pole star is like any other star. But the only difference between pole star and any other star is that the pole star lies on the axis of rotation of the Earth so it remains fixed at its position with respect to the position of the Earth whereas other stars appear to be moving with respect to the Earth. The brightest pole star is Polaris lying above the earth's North Pole.

Q. 12. Distinguish between a meteor and a meteorite.

Answer:

<u>Meteors</u>	<u>Meteorites</u>
Meteors are the celestial bodies from the sky which we see as bright streak of light that flashes for a moment across the sky.	A meteor which does not burn up completely on entering the Earth's atmosphere and lands on the Earth is known as meteorites.
It's meteor when it is in the atmosphere	It's a meteorite If it reaches the ground without burning completely
Most of the meteors are small and burn up completely on entering the Earth's atmosphere.	Meteorites are usually big. That's why it reaches the Earth's surface without being burned up.

Q. 13. Sun is a star. Comment.

Answer: The sun is a star. It is the star around which the earth and other planets revolve. Stars are the celestial objects that are extremely hot and have light of their own. Sun is also a star. Sun is the star which is nearest to the earth. The sun looks much bigger and brighter because it is much nearer to us than any other star.

Q. 14. What do you mean by light year?

Answer: The distances in universe are so large that 'km' becomes an extremely small unit to express such large distances. So the distances between various celestial bodies are expressed in the unit of 'light year'. Light year is the distance light can travel in one year. One light year is equal to 9.46×10^{12} kms.

Q. 15. Write the difference between star and planet.

Answer:

<u>Stars</u>	<u>Planets</u>
Stars have their own light.	Planets don't have their own light. They reflect their own light.
Stars twinkle at night.	Planets do not twinkle.
Stars appear as point object as they are very far from Earth as compared to planets.	Planets appear as disc as it is closer to the Earth.
The stars do not change their positions with respect to each other as they are fixed at a point.	Planets change their position with respect to each other as they revolve around the sun.
There are millions of star in the galaxy.	There are only eight planets in the galaxy.
A star has a very high temperature.	Planets have low temperature as compared to stars.

Q. 16. Explain in brief about the celestial objects. Also, mention the name of any two celestial objects.

Answer: Those objects which are present in the sky or in the outer space are celestial objects. These objects are also known as heavenly objects. Stars, planets, satellites, asteroids, comets, etc are some example of celestial objects.

Q. 17. Write in brief about the phases of the moon. What are the causes of phases of the moon?

Answer: Different shapes of the bright, visible part of the moon as seen from the earth during a whole month are called phases of moon. If we observe the moon continuously every night for a month, we'll find that there is one day in the month when the moon cannot be seen in the night.

- The day on which the moon is not visible at all is called the new moon day.
- On next day, only a small curve like portion of the moon appears in the night sky. This is known as crescent moon.
- Thereafter, every night, the size of the bright, visible part of the moon appears to become bigger and bigger, giving us many shapes including the half moon and more than moon.
- After 15 days, we can see the whole bright disc of the moon in the night sky. So there is also one day in the month when the moon is visible as a perfectly round ball of light in the sky. The day on which the whole bright disc of moon is visible to us on earth is called the 'full moon day'.
- Thereafter, every night the size of the moon goes on becoming smaller and smaller and after 15 days the moon is not visible again. This moon we again change in full moon after 15 days, and the process is repeated endlessly.

Q. 18. State the difference between full moon and a new moon. After how many days a full moon changes into new moon?

Answer:

New moon	Full moon
When sun and moon are on the same side of earth, a new moon appears.	When sun and moon are on the opposite side of the earth, a full moon appears.
A new moon is when no part of moon is visible from the Earth.	A full moon is when the whole moon is visible.
A solar eclipse can only happen at new moon.	A lunar eclipse can only happen at full moon.

A full moon changes into new moon after 15 days. The day on which the whole bright disc of moon is visible to us on earth is called the 'full moon day'. Thereafter, every night the size of the moon goes on becoming smaller and smaller and after 15 days the moon is not visible again.

Q. 19. Write a short note on the unit in which astronomical distances are measured.

Answer: The distances in universe are so large that 'km' becomes an extremely small unit to express such large distances. For example the various stars are millions of kilometers away, so 'kilometer' unit is not suitable to express the distances between the stars and other celestial objects. So the distances between various celestial bodies are expressed in the unit of 'light year'. Light year is the distance light can travel in one year. We can calculate the value of 'one light year' in 'kilometers' by multiplying the speed of light (300000km/s) by the number of seconds in one year (31536000 s). One light year is equal to $9.46 \times 10^{12}\text{kms}$.

Light year is not a unit of time but a unit of distance. If a star is 8 light years away from the earth, it mean that the distance of the star from the earth is so much that light from the star takes 8 years to reach the earth.

Q. 20. Write the names of members of solar system with their distances from the sun.

Answer: Solar system consists of the sun, the 8 planets and their satellites (or moons), and millions of smaller celestial object such as asteroids, comets and meteoroids. The sun is at the centre of the solar system.

The eight planets of the solar system (in order of their increasing distances from the sun) are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

S.no.	Name of the planet	Distance from the sun
1.	Mercury	$58 \times 10^6\text{ km}$
2.	Venus	$108 \times 10^6\text{ km}$
3.	Earth	$150 \times 10^6\text{ km}$
4.	Mars	$228 \times 10^6\text{ km}$
5.	Jupiter	$778 \times 10^6\text{ km}$
6.	Saturn	$1427 \times 10^6\text{ km}$
7.	Uranus	$2870 \times 10^6\text{ km}$
8.	Neptune	$4504 \times 10^6\text{ km}$