Earth as a Planet

Exercises

I. Short Answer Questions

Question 1.
How can you prove that the earth is a sphere by looking at the Pole Star ?
Answer:
The Pole Star can be seen at an angle of 90° at the North Pole, as it lies directly at the line of axis of the earth, while its angle decreases towards the Equator i.e. it is 0° at the equator. It is only possible in an quarter arc of a circle. It proves that the earth is a sphere with circular surface.

Question 2.
Briefly describe the shape of the earth.
Answer:
The earth has got a spherical shape, slightly bulging at the equator and flattened at the poles. The spherical shape is confirmed by the arrival of a ship seen first by its mast and later on the ship. The satellite picture of the earth, shadow of the earth on the moon as circular, and the views of circular horizons from the height etc. all these prove the spherical shape of the earth.

Question 3.
What is the earth's mean temperature ? State its one advantage.
Answer:
The earth's mean temperature is 17° C, which is ideal to support the survival of the life-system.

Question 4.
Why is the earth called a watery planet ?
Answer:
The earth is called a watery planet, as its major part i.e. 70% is covered by water or hydrosphere. The earth is seen blue in the satellite pictures due to the majority of water.

Question 5.
What is 'biosphere' ?
Answer:
Biosphere is the narrow zone of contact amidst lithosphere, hydrosphere and atmosphere.

Question 6.
Name the conditions necessary for life on earth.
Answer:
The conditions necessary for life on earth, are ideal temperature range with an average between 10°C and 35°C, solar radiation, humidity, wind, water, land etc.

Question 7.
Give any two features of the earth that make it a 'Unique Planet'.
Answer:
The earth is so for the only planet which consists of life- system. It is due to its ideal average temperature of 17°C to support the life and provide with atmosphere and hydrosphere to impart air and water essential for life.

Question 8.
Why is the planet Venus hotter than the planet Mercury?
Answer:
Venus is hotter than Mercury because the atmosphere around Venus is mainly composed of carbon dioxide. The carbon dioxide produces Greenhouse effect on the surface of Venus. Thus, the tempreature on its surface remain very high.

Question 9.
Name the two sources of heat in the interior of the earth.
Answer:
Two sources of heat in the interior of the earth are the radioactive elements trapped inside and the immense temperature and pressure in the deep interior.

Question 10.
What is meant by Terrestrial Life ?
Answer:
On the surface of the earth, there are continents and oceans. The life on the continents or on land is called 'Terrestrial Life'.

Question 11.
Name the members of the Solar System.
Answer:
Members of the solar system includes the Sun and everything that orbits it like planets (Mercury, Venus, Earth, Mars, Jupiter, Saturn,.Uranus and Neptune), their satellites, asteroids, comets, interplanetary gas and dust.

Question 12.
What is a planet ?
Answer:
A planet is a rocky or gaseous mass that revolves around a star.

Question 13.
What is meant by Inner Planets ? Name them.
Answer:
The planets that lie within the asteroid belt that is Mercury, Venus, Earth and Mars are called the inner planets.

Question 14.
Why are the inner planets called the terrestrial planets?
Answer:
The inner planets are called the terrestrial planets because their structure is similar to that of the earth.

Question 15.
What are Jovian planets ? Name them.
Answer:
The planets whose structure is similar to that of Jupiter are – called Jovian planets. They have ring systems around and have a large number of moons. They are of gaseous origin. Saturn, Uranus and Neptune are Jovian planets.

Question 16.
How big is the sun ? Describe its size with respect to the earth.
Answer:
The sun is a star or a ball of hot gases. Its diameter is 1,392,000 km. i.e. 110 times larger than that of earth and its volume is 1.3 million times larger than the earth.

Question 17.
Distinguish the earth from the other planets in one important aspect.
Answer:
Our earth is also called a Tonely-planet' because of its one important aspect having extensive life system.

Question 18.
How did the earth get its atmospheric blanket ?
Answer:
In the beginning, at the time of evolution of the planets, the earth was also a body of burning clouds of gases and dust. After cooling process, the heavy elements subsided downwards and the gases floated upwards and formed the atmosphere around the earth as a blanket.

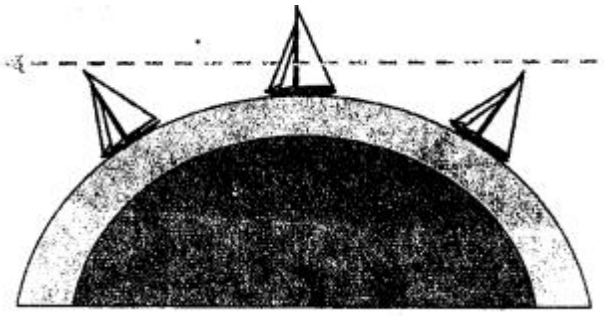
II. Fill in the blanks

1. The Pole Star can be seen at an angle of **90°** at the North Pole.
2. The earth rotates from **west** to **east.**

3. **Biosphere** is the narrow zone of contact between lithosphere, hydrosphere and atmosphere.
4. The earth has an average temperature of **17° C.**
5. **Atmosphere** is the major reservoir of carbon on the earth.
6. In terms of size, the earth is **fifth** planet in the Solar System.
7. Eratosthenes worked out the circumference of the earth to be **46,250** km.
8. A typical galaxy may contain **large cluster of** stars.

III. Long Answer Questions

Question 1.
Study the picture and answer the questions that follow.



(a) What does the picture show you about the earth ?
(b) State briefly the Bedford Level Experiment.
(c) The sun rises and sets at different times in different places. What does the statement show about the shape of the earth.
(d) In what way is the earth's atmosphere beneficial to mankind ?

Answer:

(a) The picture shows the spherical shape of the earth.

(b) Three pillars of equal height were put along the Bedford Level canal area in England each at 5 kms. interval. After observation it came to know that the middle pole was higher than the sideward poles. This proved that the earth's surface was curved and the earth is a spherical body.

(c) The times of sunset and sunrise are different in the different part of the earth, because the earth moves from west to east and the places situated in the east get sunrise first. Japan is called the land of rising sun, as it is in the eastern-most part of the Eastern Hemisphere and the date starts from the Eastern Hemisphere. It proves that the earth is spherical.

(d) The atmosphere is indispensable for life on earth, as it provides air to inhale ; rainfall and fresh waterbodies after the hydro logical cycle. Moreover, it absorbs the extremely hot ultraviolet rays of the sun and makes the temperature ideal on earth. Other planets are either very hot or very cold due to the absence of atmosphere.

Question 2.
Provide reliable evidence to prove that the earth is spherical in shape.
Answer:
The earth can be clearly seen spherical in the photographs from the satellite. Other proofs are the sight of the mast of a ship first before the ship appears, varying heights of the poles fired at different places at an interval of 5 km, through the Bedford Level Experiment and the sight of Pole Star at 90° from North Pole and the view of the earth's horizon as circular from higher attitudes.

Question 3.
Give the distinctive features of the earth as a unique planet. Also give three points of comparison with respect to other planets.
Answer:
The earth possesses all the essential features necessary for maintaining the life-system. It is provided with atmosphere and hydrosphere along with the lithosphere. Moreover the average temperature of 17°C is ideal for survival. Three points of comparison with respect to other planets are as follows.

1. Other planets are either too hot or too cold that are unfavourable for life.
2. Other planets are devoid of atmosphere and hydrosphere and some are surrounded by poisonous gases.
3. Other planets are devoid of fresh water bodies, like rivers and lakes.

Question 4.
Describe the role of each of the following in making earth a habitable planet.

(a) Atmosphere
(b) Water
(c) Temperature

Answer:

(a) Atmosphere — Atmosphere play very important role in making earth a habitant planet. Atmosphere plays following role:

1. The atmosphere receives heat from the sun by solar radiation and loses heat by earth's radiation. In this way a balance is maintained.
2. The earth's atmosphere is made up of life supporting gases like nitrogen, oxygen and carbon dioxide. Other gases include Helium and Aigon.

3. Ozone present in the earth's atmosphere absorbs the harmful ultraviolet rays of the sun.
4. The atmosphere also prevents loss of heat from the earth's surface and helps to keep the earth warm.

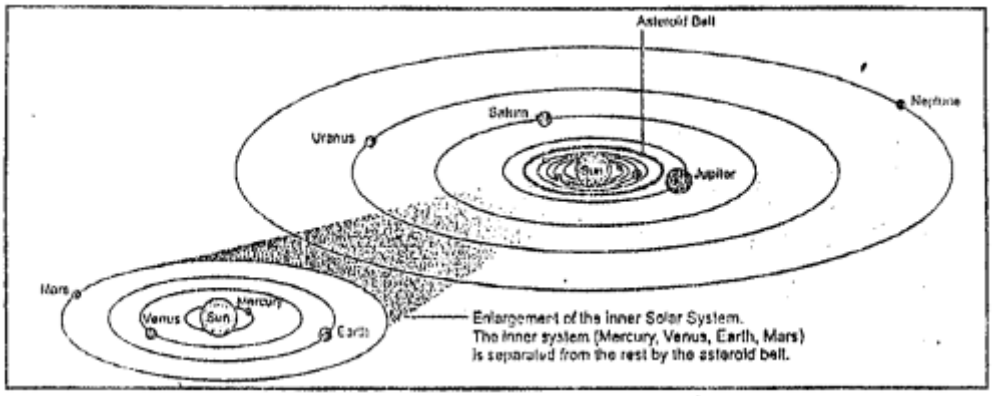
(b) Water — 70% of the earth's surface is covered by water. Water plays following role :

1. It is responsible for moderating the climate and surface condition of the earth.
2. Water from seas, rivers and lakes evaporates into the atmosphere where it condenses and falls back as precipitation. Most of the water on land flows back to the oceans. Thus, water moves in a continuous cycle — the hydrological cycle. There is proper balance between evaporation, condensation and precipitation without which life would not be possible.
3. Water can absorb enormous amounts of heat without causing much change in its temperature. During the day, waterbodies rapidly absorb enormous amount of heat : thus, the earth remains fairly cool. At night the waterbodies release vast amounts of heat that they absorbed during the day, which along with other atmospheric effects, keep most of the surface from freezing at night.

(c) Temperature — The earth is the third planet from the sun. It has an average temperature of 17°C which is suitable for life to exist. If the average temperature on the earth's surface changes by only a few degrees, many species would perish due to extreme heat or cold.

Question 5.
Name the different realms of the earth.
Answer:
The different realms of the earth are lithosphere, hydrosphere and atmosphere.

Question 6.
Study the picture and answer the questions that follow.



(a) What is meant by the Solar System ?
(b) Give two differences between a planet and a star.
(c) Name the planets known as terrestrial planets.
(d) Give two advantages the earth has over other planets.
(e) What are satellites ?

Answer:
(a) The sun along with eight planets and asteroids forms the Solar System.

(b)

1. The stars like the sun radiate heat and light. Planets have no light of their own. They reflect the light of their stars.
2. The stars are large burning masses very far from us while the planets are solid bodies nearer to us.

(c) The planets within the asteroids belt i.e. Mercury, Venus, Earth and Mars, are called the Terrestrial planets.

(d)

1. The earth enjoys an ideal average temperature of 17°C
2. The earth consists of the life-system.

(e) The satellites are the celestial bodies that revolve around the planets.

Question 7.
Write a short note on the planets of the Solar System. Name the planets in order of their distance from the sun.
Answer:
There are total eight planets included in the solar system which revolve around the sun in their particular elliptical tracks. According to their distance from the sun from near to far, these are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

Question 8.
Distinguish between a planet and a star.
Answer:
A Planet :

1. A planet revolves around a star
2. A planet has not got its own light.
3. A planet is a solid body.

A Star :

1. A star remains still on its position.
2. A star has got its own light.
3. A star is a burning gaseous body.

Practice Questions (Solved)

Question 1.
In which unit the distances of universe are measured ?
Answer:
Light year.

Question 2.
How much time does a ray of sunlight take to reach the Earth ?
Answer:
8 minutes approximately.

Question 3.
How much time does a ray of moonlight take to reach the Earth ?
Answer:
One second approximately.

Question 4.
How many planets are there in the Solar System ?
Answer:
Eight

Question 5.
Name the largest planet of the Solar System.
Answer:
Jupiter.

Question 6.
Name the planet closest to the Sun.
Answer:
Mercury

Question 7.
Name the planet farthest from the Sun.
Answer:
Neptune.

Question 8.
What is position of the Earth from the Sun ?
Answer:
Third

Question 9.
Name the planets between the Sun and the earth.
Answer:
Mercury and Venus.

Question 10.
Which planet is known as ‘blue planet’ ?
Answer:
Earth

Question 11.
Which planet is known as ‘red planet’ ?
Answer:
Mars

Question 12.
Which is the brightest planet ?
Answer:
Venus

Question 13.
Which planet has the largest number of satellites ?
Answer:
Jupiter.

Question 14.
Which planet has only one satellite ?
Answer:
Earth

Question 15.
Which planet has three rings round it ?
Answer:
Saturn.

Question 16.
Which star is known as 'Evening Star or "Morning Star" ?
Answer:
Venus

Question 17.
How many satellites are there in Solar System ?
Answer:
100 approximately.

Question 18.
Which is the centre of the Solar System-Sun or Earth?
Answer:
Sun

Question 19.
What is the period of rotation of Moon ?
Answer:
27 days 7 hours 43 minutes.

Question 20.
'Although the Moon has no light of its own, yet it shines'. Why ?
Answer:
Sun's light is reflected from the surface of the moon.

Question 21.
Mention two important features of Earth that make it a planet suitable for life.
Answer:

(a) Presence of atmosphere
(b) Presence of water

Short Answer Questions

Question 1.
State three unique features of the Earth.
Answer:
There unique features of earth are as follows :

1. It is neither too hot nor too cold.
2. It had atmosphere surrounding it.
3. There is plenty of water on it.

Question 2.
State three factors which have made life possible on the Earth and on no other planet.
Answer:
The factors which have made life possible on earth and on no other planet are as follows :

1. Earth is the only planet in the Solar System which is neither too hot nor too cold.
2. The atmospheric blanket around the earth protects it from ultra-violet and other deadly sun rays.
3. The mixture of gases in the atmosphere is suited to growth and survival of life.
4. Plants, through the process of photosynthesis take away carbon dioxide from atmosphere and make oxygen available for animals to breathe.
5. Oceans play a great supportive role. They cover three-fourths of earths surface and are responsible for operation of hydrological cycle which makes water on land surface available.
6. Circulation of many life cycles not make energy and food available but also process the wastes which otherwise would harm life.

Question 3.
Give reasons for the following :

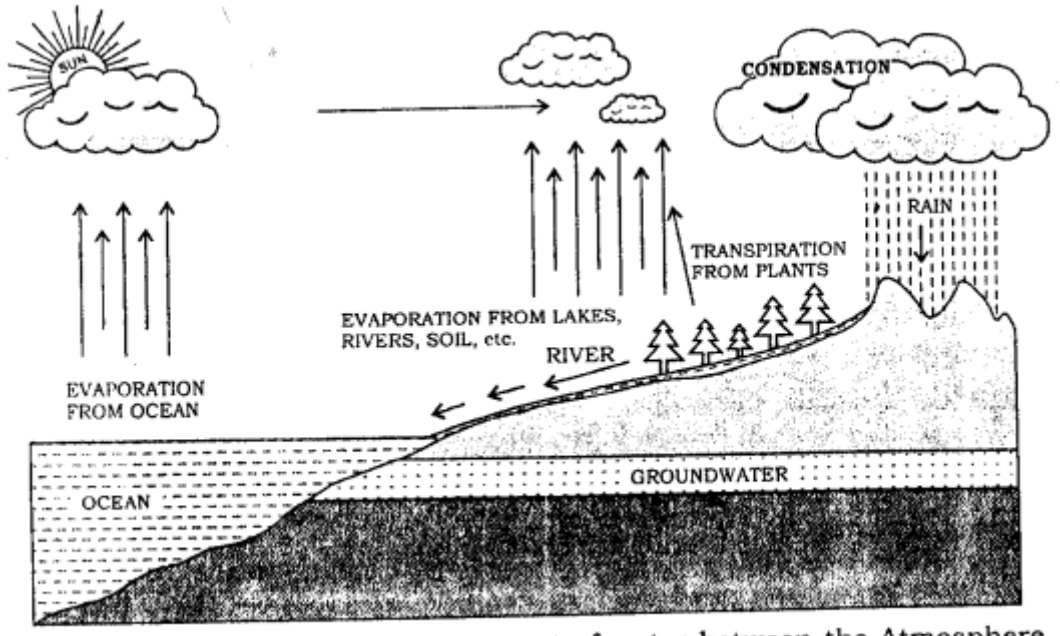
(a) Earth is called a "Watery Planet".
(b) Earth has the most ideal temperature conditions.
(c) Earth and its Moon are called a double planet.

Answer:

(a) Because the Earth is the only planet which has water and 70% if its surface is covered by water.
(b) Earth has the most ideal temperature conditions because it is neither too close nor too distant from the sun. This position in the Solar System makes it possible to receive neither excessive nor totally deficient heat from the Sun. Its average temperature surface temperature is 17 degrees Celsius far more favourable for living conditions than about 500°C on the nearest planets and about 150° to 200° Celsius below freezing point on the sunlit sides of distant planets. Earth is, thus, neither a burning furnace nor an extremely cold planet.
(c) Earth and its Moon are called a double planet because they revolve round the sun nearly in one and the same orbit.

Question 4.
Draw a fully labelled diagram of water cycle and explain its working and significance with reference to the diagram.
Answer:
The water is evaporated from the surfaces of open oceans, seas, rivers, lakes and from

the surface of living organisms. The evaporated water gets condensed, precipitated and form the water droplets. These water droplets are returned to the earth in the form of rain and snow or it may drop directly into the oceans. If it falls on land, it again flows back into the oceans through rivers and streams. The evaporation rainfall cycle repeats several times to get the average rainfall.



Watercycle — the movement of water between the Atmosphere, Hydrosphere and Lithosphere

Question 5.

(a) What makes our Sun as an ordinary star in the universe?
(b) What heavenly bodies are the members of the Solar System?
(c) Arrange the nine planet of the solar system in order of their sizes.
(d) Why do planets, being opaque bodies, shine in the sky?

Answer:
(a) There are several galaxies in the limitless universe. Each galaxy consists of millions of stare like the Sun. Thus, the Sun is an ordinary star in no way different from many of the other stars.
(b) Components of the Solar System : Our Solar System . consists of the Sun and its nine planets, major and minor, 63 satellites, a large number of very small planets called asteroids, millions of other heavenly bodies called meteors or shooting stars and the scores of comets. All these components are held together by the Sun's great gravitational pull.
(c) The largest planet is Jupiter and the smallest is Mercury. According to their size the planets are :

1. Jupiter
2. Saturn

3. Neptune
4. Uranus
5. Earth
6. Venus
7. Pluto
8. Mars
9. Mercury

(d) Planryd are opaque heavenly bodies. They radiate no light of their own but shine with the light that is reflected from the Sun.

Question 6.
Distinguish between the following pairs.

(a) Superior and Inferior planets.
(b) Planet and Planetiods
(c) Periodical and Non-periodical comets
(d) Meteors and Meteorties
(e) Planet and Satellite.
(f) Inner and Outer planets.

Answer:
(a)
Superior Planets :

1. The six planets outside the Earth's Orbit are known as the superior planets.
2. Mars, Jupiter, Saturn and Uranus Neptune and Pluto are superior planets.

Inferior Planets :

1. The two planets inside the Earth's orbit are known as the inferior planets.
2. Mercury and Venus are inferior planets.

(b)
Planets :

1. The planets are bigger bodies and visible as nine planets.
2. These move in their elliptical orbits around the sun in different spans of time.
3. These are nine planets with particular names.

Planetoids :

1. These are smaller bodies planets in the form of debris.
2. These revolve round the Sun once in about 5 years along their own elliptical orbits between Mars and Jupiter in the gap.
3. These are about 50,000 planetoids in the gap.

(c) Periodical comets : The comets which have regular orbits round the Sun and occur at fixed intervals are called periodical comets. Halley's comet is a periodical comet and is one of the most famous comets, which is due next in 2062. It is seen at intervals of 76 years. It was seen in 1910 and in 1986. Non-periodical comets : Such comets are seen very rarely and they are not sighted at regular intervals. There are records of observations of about 1000 comets. Some of these have been named. Comets become visible only when they travel close to the Sun. The ice melts and the gas and dust are swept back to form the tail. The tail always points away from the Sun.

(d)
Meteors :

1. A meteor is a shooting star like a streak of light across the sky at night. It is composed of pieces of stony or metallic rocks.
2. These travel round the world in an eccentric orbit.
3. Big meteors fell down in Siberia in 1980 and 1948.

Meteories :

1. Meteorites are the scattered pieces of the meteors which are unconcerned after burning.
2. These are the dust of meteors falling on the earth as meteorites, same of these are also of great size.
3. About 5000 years back a meteorite fell down in Arizona (USA) and created a hollow, 180 meters deep and of 12,000 meters diameter.

(e)
Planet :

1. Planets are opaque bodies which revolve around the Sun.
2. Planets originate from the Sun.
3. There are nine planets in the Solar System. The earth is a planet.

Satellite :

1. Satellites are small spherical bodies which revolves round a particular planet.
2. Satellites originate from the Sun.

3. There are 33 Satellites in the Solar System. Moon is the Satellite of the Earth.

(f)
Inner Planets :

1. The Planets similar to the Earth are known as inner planet (small, in size)
2. Mercury, Venus, Earth, Mars are inner planets and are known as terrestrial planets.

Outer Planets :

1. The planets which are not similar to Earth are known as outer planets, (large in size)
2. Jupiter, Saturn, Uranus, Neptune and Pluto are outer planets and as known as major planets.

Question 7.

(a) How many satellites are there in the Solar System?
(b) Name the planet having no satellite.
(c) Which planet has the largest number of satellites.

Or
Name the largest known satellite of any planet.
Answer:
(a) There are 57 known satellites in our Solar System.
(b)

1. Mercury
2. Venus
3. Pluto

(c) Titan, one of the 22 satellites of Saturn is the largest known satellite of any planet. Its size is larger than mercury and is surrounded by atmosphere of nitrogen vapours.

Question 8.
Why are the following planets not inhabitable ?

(a) Mercury
(b) Venus
(c) Jupiter
(d) Neptune
(e) Saturn

Answer:
(a) Mercury is not inhabitable due to the following reasons:

1. A part of it turned towards the Sun is always in sunlight. There it is a continuous long day. The temperature reaches 450°C in this hottest part. It experiences a perpetual summer.
2. Its other side is always turned away from the Sun. There is a continuous night on this side. It is like perpetual winter, the temperature going 150°C below freezing point. Therefore, the diurnal range of temperature is very high.
3. There'is very little atmosphere and no .water on this planet. The atmospheric envelope is so thin that Mercury's world is airless.

(b) Venus is not inhabitable because its atmosphere contains 96% of carbon dioxide and the temperature reaches the maximum of 480°C. It is the hottest planet in the solar-system.
(c) Jupiter is not inhabitable due to the following reason :

1. Its surface temperature is very low (-148°C)
2. It has no water and there are tremendous storms on the surface of the Jupiter.
3. The atmosphere of the Jupiter is unbreathable, because of absence of oxygen and presence of poisonous gases like ammonia, methane and ethane etc.

(d) Neptune is not inhabitable because of very low surface temperature (-216°C) and mgthane clouds surrounding it.
(e) Saturn. Saturn is the second largest planet in solar system. The planet itself is mostly made up of light gases and it is less dense than water. If Saturn were placed in a large ocean, it will float on water Scientists, however believe that the planet may have a solid core.

Question 9.
Name the following

(a) Two planets which are nearer to the sun than the Earth.
(b) Two planets which are farther from the sun than the Earth.
(c) The planet farthest from the Sun.
(d) The planet nearest to the Sun.

Answer:

(a) Mercury and Venus
(b) Jupiter and Saturn
(c) Pluto
(d) Mercury

Question 10.

(a) Which is the unit adopted for measuring the distance in the Universe ? Give a reason for its choice.
(b) Find out the number of years to reach the following celestial bodies from the Earth : Nearest star from the Earth (Distance 150 million km)

Answer:

(a) The unit adopted for measuring the distances in the universe is light year. The reason for the choice of this unit is that a kilometer is too short a unit to measure the distances between one heavenly body and another in space.
(b) 15.8 light year

Question 11.
Which unit is used for measuring distances in the universe?
Answer:
The unit used for measuring distances in the Universe is light year. One light year is defined as the distance traveled by light in vacuum in one year.
One light year = 95 × 1012 km

Question 12.
What makes the Sun so hot ?
Answer:
The Sun is a large hot gaseous body. It is 1.3 million times bigger than Earth. The surface temperature of the Sun is about 6000°C. In the core of the Sun, the temperature is estimated to be about 20,000,000°C. Such extremely high temperature is produced by the conversion of hydrogen into helium by the process of fusion. This process releases tremendous amounts of the energy and the Sim radiates the energy in the form of electro magnetic radiation.

Question 13.
Name the three planets which have rings around them.
Answer:

1. Saturn
2. Uranus
3. Neptune

Question 14.
Give reasons for the following :

1. Mercury completes its orbit in less time than the Earth.

2. Venus is considered as the Earth's twin.
3. No life is possible on Saturn.
4. Pluto is the coldest planet.
5. Comets appear very rarely.

Answer:

1. Mercury is closer to the Sun than the Earth. Mercury lies at a distance of 59 millions Kms from the Sun, while the distance between the Earth and the Sun is 150 million kms. Therefore, mercury takes less time to complete its orbit because its orbit is much shorter.
2. Venus is similar to the earth in size, weight and density. Both the planets are very close to each other. Because of its similarity to the Earth, Venus is called 'Earth's Twin.
3. Saturn is the second largest planet in Solar System. The planet itself is mostly made up of light gases and-it is less dense than water. It saturn were placed in a large ocean, it will float on water. Scientists, however believe that the planet may have a solid core.
4. Pluto is the farthest planet in the Solar System, so it is deadly colder. It is about 40 times farther from the Sun than the Earth.
5. The Comets appear very rarely because the orbits of the comets are very large and highly eccentric.

Question 15.
What do you understand by 'Terrestrial Planet' ?
Answer:
The first four planet in order of their distance from the Sun, Mercury, Venus, Earth and Mars are called terrestrial planets, because of their similarity with the Earth.

Question 16.
Why does the moon appear big in the sky though it is smaller than other heavenly bodies ?
Answer:
The moon appears big in the sky though it is smaller than other heavenly bodies because it is nearest to the earth than other heavenly bodies.

Question 17.
The shape of the earth is not exactly that of a sphere Why?
Answer:
The shape of the earth is not exactly that of a sphere due to centrifugal force created by the rotation of the earth around its own axis.

Question 18.
Why is Mercury the hottest planet of the Solar System?
Answer:
Mercury is the smallest planet and the closest to the Sun. It takes only 88 days to orbit the Sun. It has a thin atmosphere. Due to its nearness to the Sun, it is the hottest planet.

Question 19.
Why is Neptune the coldest planet of the Solar System?
Answer:
Neptune is the farthest planet from the Sun. It takes 248 years to orbit the Sun. Its distance from the Sun is about 6000 million km. Due to its extreme remoteness, it is the coldest planet of the Solar System.

Question 20.
'Venus is considered Earth's Twin'. Why ?
Answer:
Venus is similar to the Earth in size, weight and density. Both the planets are very close to each other because of its similarity to the Earth, Venus is called 'Earth's Twin

Question 21.

(a) Describe the position of the Earth in Solar System.
(b) What is the size of the Earth ?
(c) Which is the satellite of the Earth ?

Answer:

(a) The Earth is the third planet of the Solar System. Its position lies between Venus and Mars. It is a spheroid.
(b) Its equatorial diameter is 12,756 km and polar diameter is 12,713 km. It total area is 51.1 crore sq. km. The average distance between the Sun and the Earth is 14,88,00,000 km. No other planet has life. Its circumference is about 40,000 km.
(c) The Moon is the only satellite of the Earth.