

## 23. Earth and Beyond

### Exercises

#### 1 A. Question

The constellation that helps to locate North Star is

A. Cassiopeia

B. Orion

C. Taurus

D. Leo

#### Answer

Constellation is a group of stars which forms a recognisable pattern. They also help to identify direction, time month approximately.

Cassiopeia is the constellation which is located in the northern region of sky and therefore can be used to locate North Star. Other constellations like Orion is used to locate Sirius star, and Taurus and Leo are located on the zodiac belt which follows a path from east to west and are therefore is not used to locate the north star.

Therefore, correct option is (a) Cassiopeia.

#### 1 B. Question

The second biggest planet of the solar system has

A. lowest density

B. density equal to water

C. highest density

D. density equal to earth

#### Answer

Saturn is the second biggest planet and it has lowest density among all planets in the solar system. It is made up of hydrogen and helium and its density is even lower than the density of water.

Density of earth is highest among all planets in the solar system. Earth is quite denser as compared to Saturn therefore density of Saturn can't be equivalent to earth.

Therefore correct option is (a) lowest density.

### **1 C. Question**

The poles of this planet face the sun for longer periods of time than any other planet.

- A. Mars
- B. Uranus
- C. Jupiter
- D. Saturn

### **Answer**

Uranus is the planet whose poles face the sun for longer periods of time than any other planet. It is because due to the extreme tilt of the Uranus from its axis. Also, its period of revolution around the sun is also very high, due to which the poles of Uranus faces sun for extreme long time.

Other planets also have tilt but not as large as in the case of Uranus and also they don't have revolution period as long as Uranus.

Therefore, correct option is (b) Uranus.

### **1 D. Question**

Polar ice caps of the planet Mars are due to

- A. Solidified water
- B. Solidified carbon dioxide
- C. Volcano eruption near the poles
- D. Cover of dust particles that reflect light.

### **Answer**

Frozen carbon dioxide is present at the poles of the mars which appears like ice caps and is therefore known as polar ice caps. No frozen water is present at the poles, there was no volcanic eruption and poles of mars are also not covered with the dust particles. Only frozen carbon dioxide is present which looks like ice caps.

Therefore, correct option is (b) Solidified carbon dioxide.

### **1 E. Question**

Heat waves are trapped to maximum extent in the planet

- A. Mercury

- B. Venus
- C. Earth
- D. Neptune

**Answer**

Venus is the planet which is farther from the sun as compared to mercury but exhibit a surface temperature close to mercury. It is because of the presence of the carbon dioxide. Maximum portion of the atmosphere of Venus is made up of carbon dioxide which is a greenhouse gas and traps the heat rays. Due to trapping of the heat inside by carbon dioxide in venus its temperature becomes comparable to mercury.

Since, maximum portion is made up of greenhouse gas carbon dioxide maximum trapping takes place in Venus.

Therefore, correct option is (b) Venus.

**2 A. Question**

Fill in the blanks with suitable words

Radio signals are emitted by the planet \_\_\_\_\_.

**Answer**

Radio signals are emitted by the planet Jupiter.

Explanation: Jupiter emits most radio signals after sun in the solar system. It is because a very strong magnetic field is present around the Jupiter which is stronger than the field present around the other planets. Due to this strong magnetic field Jupiter emits radio signals.

**2 B. Question**

Fill in the blanks with suitable words

The colour of the planet Mars is \_\_\_\_\_.

**Answer**

The colour of the planet Mars is Red.

Explanation: The surface of the mars appears red when looked by naked eyes in space. It is due to the presence of Iron oxide on the surface of the mars which makes it distinct from other planet by providing red colour appearance.

**2 C. Question**

Fill in the blanks with suitable words

A Winter season constellation is \_\_\_\_\_.

## Answer

A Winter season constellation is Cassiopeia.

Explanation: Cassiopeia is one of the major winter season constellations which is also used to locate pole star. There are many other winter season constellations. Cassiopeia is one of them.

## 2 D. Question

Fill in the blanks with suitable words

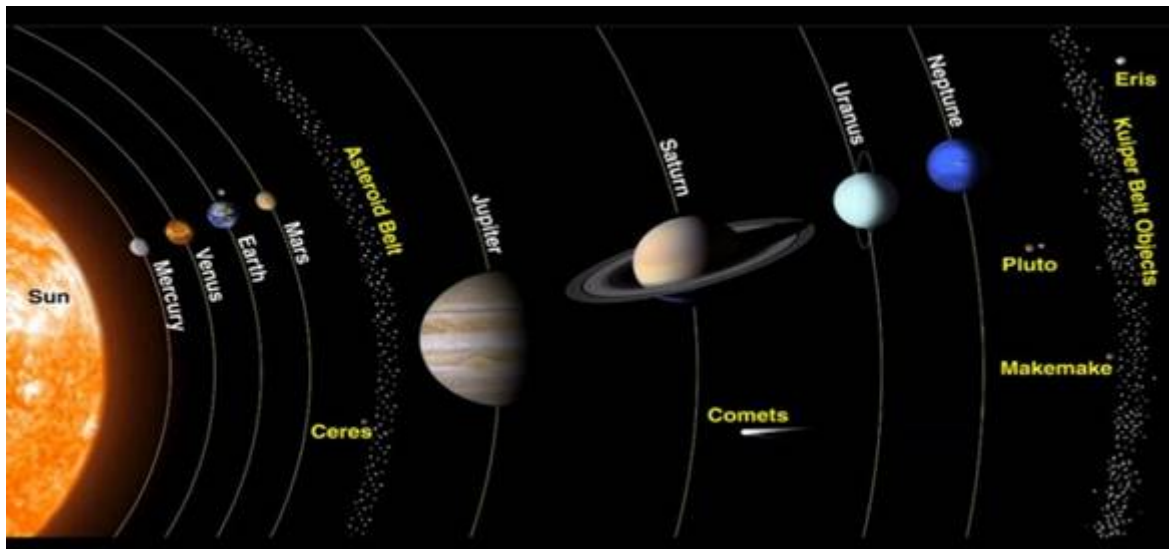
Asteroids are mainly found between the orbits of \_\_\_\_\_.

## Answer

Asteroids are mainly found between the orbits of Mars and Jupiter.

Explanation: Asteroids are large pieces of rocks that revolve around the sun. They are extensively present in between the orbits of mars and Jupiter. Some other asteroids are present in other parts of solar system but most of them are present in between the orbits of mars and Jupiter.

Following picture also depict the asteroid belt present in solar system:



## 2 E. Question

Fill in the blanks with suitable words

Ultraviolet rays from the sun can be filtered by the earth's atmospheric layer called \_\_\_\_\_.

## Answer

Ultraviolet rays from the sun can be filtered by the earth's atmospheric layer called Stratosphere.

Explanation: Ozone layer protects earth from the harmful Ultraviolet rays. The ozone layer is present in the stratosphere. Therefore, stratosphere is the atmospheric layer which protects us from the ultraviolet rays.

### 3. Question

Match the following :

A	B
1. Highly tilted planet	a. Earth
2. Satellite of Jupiter	b. Titan
3. Constellation	c. Halley
4. Third Planet from the sun	d. Io
	e. Uranus
	f. Ursa Major
	g. Sirius

#### Answer

1. Highly tilted planet- (e) Uranus

Explanation: Except venus, all planets rotates with some tilt but Uranus exhibit maximum tilt. Axis of rotation of Uranus is tilted by  $82^{\circ}\text{C}$ .

2. Satellite of Jupiter- (d) Io

Explanation: Jupiter is the largest planet and has satellites Io, Europa, Ganymede, Callisto. Io is one of them which is satellite of Jupiter.

In the given options only Io was given. Therefore, it is the correct match.

3. Constellation- (f) Ursa Major

Explanation: Constellation refers to a group of stars which makes a distinct pattern. Ursa Major is also one such constellation also known as Saptarishi, Big bear. No other option provided was a constellation. Therefore, Ursa Major is the correct match.

4. Third planet from the sun- (a) Earth

Explanation: Earth is the third planet from the sun. Sequence of planets from the sun is as follows:

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

So, the correct match is earth as it is the third planet.

### 4 A. Question

Answer the following :

Which planet is called morning or evening star ?

#### Answer

Venus is the planet which is known as morning or evening star because Venus is the planet which can be seen with the naked eyes before the sunrise and before night in the evening. Since, this planet can be seen with the naked eyes at the time of morning and evening this planet is known as morning and evening star.

#### **4 B. Question**

Answer the following :

Which planet was removed from the list of 9 planets in 2006?

#### **Answer**

Pluto is the planet that was removed from the list of 9 planets in 2006. Before that Pluto was also considered as a planet of solar system. But after that International Astronomical Union had given a new definition and characteristics of planet. According to that definition Pluto did not fulfilled all the characteristics that a planet must possess and therefore was removed from the list of 9 planets.

However, we treat it as a member of solar system now also.

#### **4 C. Question**

Answer the following :

Express the following in km

- a. 10 light minutes
- b. 10 light days
- c. 10 light years.

#### **Answer**

(a) 10 light minutes

1 light minute = 17,987,547 km

10 light minute =  $10 \times 17,987,547$  km

= 179,875,470 km

(b) 10 light days

1 light day = 25902068370 km

10 light days =  $10 \times 25902068370$  km

= 259020683700 km

(c) 10 light years

$$1 \text{ light year} = 9.4607305 \times 10^{12} \text{ km}$$

$$\begin{aligned} 10 \text{ light years} &= 10 \times 9.4607305 \times 10^{12} \text{ km} \\ &= 9.4607305 \times 10^{13} \text{ km} \end{aligned}$$

#### 4 D. Question

Answer the following :

Name the following:

- Most fascinating planet with a set of ring system as viewed from a telescope.
- Nearest planet to the earth.
- Nearest planet to the sun
- Biggest planet of the solar system

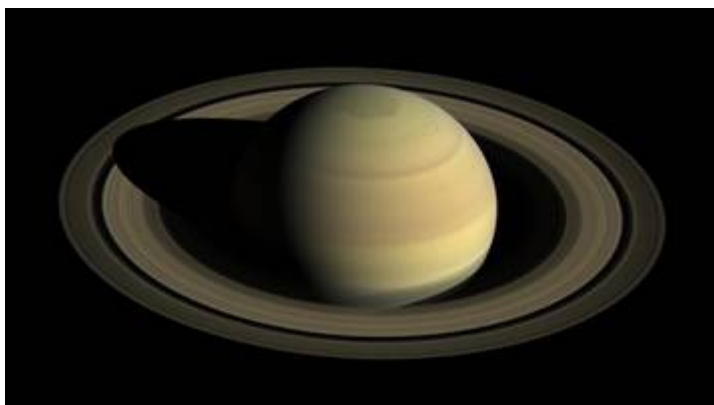
#### Answer

(a) Saturn is the most fascinating planet with a set of ring system as viewed from a telescope. It consists of a ring system which is further made up of small ringlets.

It seems very beautiful when it is viewed using a telescope due to its distinct feature- presence of ring system.

Those ringlets are made up of icy, rocky matter.

Following picture exhibit Saturn with its ring system:



(b) The order of the planets in solar system from the sun is as follows:

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

From this we conclude that there are two planets which can be nearest to the earth i.e. Venus and Mars.

It totally depends on the position of these two planets that which will remain nearest to the earth. Sometimes, Venus is found to be closer to earth while at

the other time we found mars closer.

So, it totally depends on position of these three planets that which will remain closer to the earth.

So, we can't specify a single planet as nearest planet to the earth.

(c) Mercury is the nearest planet to the sun. The order of the planets in solar system from the sun is as follows:

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

As it is present closer among all planets to the solar system it is the nearest planet to the sun.

(d) Jupiter is the biggest planet of the solar system. It is largest as compared to all other planets present in solar system in terms of its mass and size.

#### **4 E. Question**

Answer the following :

How are satellites different from planets?

**Answer**

<b>Satellite</b>	<b>Planet</b>
Satellite revolves around planetary bodies which are not stars.	Planets always revolve around stars.
Satellites can be both natural and artificial.	Planets are always natural.
It is not necessary that satellite will exhibit spherical shape.	Planets more or less exhibit spherical shape.
Example- Moon is the natural satellite of earth.	Example- Earth is a planet.

#### **4 F. Question**

Answer the following :

Which satellite has active volcanoes?

**Answer**

Io is the satellite which has active volcanoes. Io is the satellite of Jupiter which has active volcanoes.

#### **4 G. Question**

Answer the following :

Give reason for the following:



- a. A person in England can recognize the pole star easily than a person in Bengaluru.
- b. Mercury is difficult to observe.
- c. A day on Venus is longer than its year.
- d. Green house effect is prominent on Venus.

### **Answer**

(a) Pole star is also known as North Star. England is located in the northern hemisphere of the earth whereas Bengaluru which is present in Karnataka is located in the Southern hemisphere. Due to this it is easy to locate pole star from the England as compared to Bengaluru.

(b) Mercury is the nearest planet to the sun. It is most difficult to observe mercury because due to the brightness of sun mercury can't be seen clearly or a good view of mercury can't be obtained. Due to extreme brightness of sun mercury is too difficult to observe.

(c) Yes, given statement is true that a day on Venus is longer than its year. The time taken by a planet to complete one rotation on its axis is termed as day and Venus takes 243 days to complete one rotation on its axis. Whereas the time taken by a planet to revolve around the sun is termed as a year and Venus take 225 days to complete one revolution to complete one revolution.

Since, time of rotation on its own axis is greater than the time of revolution around the sun in Venus, a day on Venus is longer than its year.

(d) Yes, green house effect is prominent on Venus. It is due to the atmosphere that exists on the Venus. The atmosphere on Venus comprises of Carbon dioxide. Carbon dioxide is a green house gas. It entraps all the heat coming to the surface of Venus and therefore it is the hottest planet.

Due to abundance of carbon dioxide which is a greenhouse gas, green house effect is prominent on Venus.

### **5 A. Question**

State true or false :

Saturn has the highest density.

### **Answer**

Given statement is False.

Explanation: Earth is the planet which has highest density. Saturn is the planet made up of hydrogen and helium and had lowest density among all planets of solar system.

Therefore, the given statement is false.

### **5 B. Question**

State true or false :

Venus can be seen overhead in the night sky.

**Answer**

Given statement is false.

Explanation: Venus is not visible in the night sky. It is visible at the time of evening and morning only and is therefore known as the morning and evening star. For seeing a planet there exist some angle between earth and sun, at that time only we can see a planet. For Venus that angle exists only at the time of morning and evening. Therefore, it is visible at the time of morning and evening only.

### **5 C. Question**

State true or false :

Aries (Mesha) is a Zodiacal constellation.

**Answer**

Given statement is true.

Explanation: Aries (Mesha) is a constellation which is present in the zodiacal belt which is an apparent path formed by the movement of sun, planets and moon from east to west.

Aries is one of the twelve constellation present in this belt and is therefore known as a zodiacal constellation.

### **5 D. Question**

State true or false :

Mars contains oxygen in its atmosphere.

**Answer**

Given statement is true.

Explanation: Mars contains oxygen, nitrogen and water in its atmosphere. Therefore, given statement is true.

### **5 E. Question**

State true or false :

Moon has no atmosphere.

**Answer**

Given statement is true.

Explanation: No gas exists on the surface of the moon due to very low gravitational pull. Since, no gas is present on the surface of moon, there is no atmosphere and hence given statement is true.

### **5 F. Question**

State true or false :

Titan is a satellite of Jupiter.

### **Answer**

Given statement is false.

Explanation: Titan is the satellite of Saturn which has its own atmosphere. Titan is not a satellite of Jupiter. Satellites of Jupiter are Io, Europa, Ganymede, Callisto.

Therefore, given statement is false.