9th Science Lesson 9 Questions in English

9] Universe

1. Which Greek astronomer in 2nd century held geocentric model i.e., Earth is the centre of all the objects in the space?

a) **Ptolemy**
b) Euclid
c) Copernicus
d) Kepler

Explanation

In the earlier days, before the invention of astronomical instruments, people thought that Earth is the centre of all the objects in the space. This was known as the geocentric model, held by Greek astronomer Ptolemy (2nd Century), Indian astronomer Aryabhata (5th Century) and many astronomers around the world.

2. Which polish astronomer proposed the heliocentric model (helios = Sun), with Sun at the centre of the solar system?

a) Eratosthenes
b) Euclid
c) **Copernicus**
d) Kepler

Explanation

Later Polish astronomer Nicolaus Copernicus proposed the heliocentric model (helios = Sun), with Sun at the centre of the solar system.

3. Where telescope was invented in 1608, created a revolution in astronomy?

a) German
b) Japan
c) **Netherland**
d) America

Explanation

Invention of the telescope in the Netherlands, in 1608, created a revolution in astronomy.

4. Which among the following statement is correct

1) The basic constituent of the universe is luminous matter i.e., galaxies which are really the collection of billions of stars. The universe contains everything that exists including the Earth, planets, stars, space, and galaxies. This includes all matter, energy and even time.
2) No one knows how big the universe is. It could be infinitely large. Scientists, however, measure the size of the universe by what they can see. This is called the 'observable universe'.
3) One of the interesting things about the universe is that it is currently expanding. It is growing larger and larger all the time. Not only is it growing larger, but the edge of the universe is expanding at a faster and faster rate. However, most of the universe what we think of is empty space.
    a) Both 1 and 2
    b) Both 1 and 3
    c) Both 2 and 3
    d) All 1, 2 and 3

5. All the atoms together only make up around what percent of the universe?

a) 4%
b) 8%
c) 12%
d) 18%

Explanation

All the atoms together only make up around four percent of the universe.

6. The majority of the universe consists of something scientists call _____

a) Light matter and light energy
b) Dark matter and dark energy
c) Grey matter and grey energy
d) None of the above

Explanation

The majority of the universe consists of something scientists call dark matter and dark energy.

7. Scientists think that the universe began with the start of a massive explosion called ____

a) Creation theory
b) Steady state
c) Big Bang
d) Extra dimensional holography

Explanation

Scientists think that the universe began with the start of a massive explosion called the Big Bang.

8. About how many years ago, an explosion occurred and all the matter were ejected in all directions in the form of galaxies?

a) 14.1 million years ago
b) 13.7 billion years ago
c) 15.3 trillion years ago
d) 18.3 million years ago

Explanation

According to Big Bang theory, all the matter in the universe was concentrated in a single point of hot dense matter. About 13.7 billion years ago, an explosion occurred and all the matter were ejected in all directions in the form of galaxies.

9. Nearly all of the matter in the universe that we understand is made of what that created in the Big Bang.?

a) Nitrogen and oxygen
b) Carbon and nitrogen
c) Oxygen and helium
d) Hydrogen and helium

Explanation

Nearly all of the matter in the universe that we understand is made of hydrogen and helium, the simplest elements, created in the Big Bang.

10. The oxygen, the carbon, calcium, and iron, and silicon are formed in the cores of what?

a) Dark matter
b) Star
c) Earth
d) Black hole

Explanation

The oxygen, the carbon, calcium, and iron, and silicon are formed in the cores of stars. The gravity that holds these stars together generally keeps these elements deep inside their interiors. When these stars explode, these fundamental building blocks of planetary systems are liberated throughout the universe.

11. Which is a massive collection of gas, dust, and billions of stars and their solar systems?

a) Black hole
b) Sun
c) Galaxy

d) Warm hole

Explanation

Immediately after the Big Bang, clouds of gases began to compress under gravity to form the building blocks of galaxies. A galaxy is a massive collection of gas, dust, and billions of stars and their solar systems.

12. Which among the following statement is correct

1) Scientists believe that there are one million (10^6) galaxies in the observable universe. Galaxies are also in different shapes. Depending on their appearance, galaxies are classified as spiral, elliptical, or circular.
2) Galaxies occur alone or in pairs, but they are more often parts of groups, clusters, and super clusters. Galaxies in such groups often interact and even merge together. Our Sun and all the planets in the solar system are in the Milky Way galaxy.
    a) Only 1
    b) Only 2
    c) Both 1 and 2
    d) None

Explanation

Scientists believe that there are one hundred billion (1011) galaxies in the observable universe. Galaxies are also in different shapes. Depending on their appearance, galaxies are classified as spiral, elliptical, or irregular.

13. Which is our closest neighbouring galaxy?

a) Andromeda
b) Antenna
c) Cigar
d) Circinus

Explanation

There are many galaxies besides our Milky Way. Andromeda galaxy is our closest neighbouring galaxy. The Milky Way galaxy is spiral in shape. It is called Milky Way because it appears as a milky band of light in the sky. It is made up of approximately 100 billion stars and its diameter is 1,00,000 light years.

14. Our solar system is how many light years away from the centre of our galaxy?

a) 250 light years
b) 25000 light years
c) 2500 light years

d) 25 million light years

Explanation

Our solar system is 25,000 light years away from the centre of our galaxy.

15. How many years does it takes the Sun goes around the centre of the galaxy?

a) 25000 years
b) 25 million years
c) 250 million years
d) 2500 million years

Explanation

Just as the Earth goes around the Sun, the Sun goes around the centre of the galaxy and it takes 250 million years to do that.

16. Stars are built by which among the following gases?

a) Nitrogen gases
b) Sulphur gases
c) Carbon gases
d) Hydrogen gases

Explanation

Stars are the fundamental building blocks of galaxies. Stars were formed when the galaxies were formed during the Big Bang. Stars produce heat, light, ultraviolet rays, x-rays, and other forms of radiation. They are largely composed of gas and plasma (a superheated state of matter). Stars are built by hydrogen gases.

17. In star, Hydrogen atoms fuse together to form which atoms and in the process they produce large amount of heat?

a) Oxygen atoms
b) Helium atoms
c) Nitrogen atoms
d) All the above

Explanation

Hydrogen atoms fuse together to form helium atoms and in the process they produce large amount of heat. In a dark night we can see nearly 3,000 stars with the naked eye. We don't know how many stars exist. Our universe contains more than 100 billion galaxies, and each of those galaxies may have more than 100 billion stars.

18. The distance of Andromeda, our nearest galaxy is approximately what?

a) **2.5 million light year**
b) 25 million light year
c) 250 million light year
d) 2500 million light year

Explanation

The distance of Andromeda, our nearest galaxy is approximately 2.5 million light-years. If we move at the speed of the Earth (30 km/s), it would take us 25 billion years to reach it.

19. What colour does hot stars appears?

a) Red
b) Orange
c) Green
d) **Blue**

Explanation

Though the stars appear to be alone, most of the stars exist as pairs. The brightness of a star depends on their intensity and the distance from the Earth. Stars also appear to be in different colours depending on their temperature. Hot stars are white or blue, whereas cooler stars are orange or red in colour. They also occur in many sizes.

20. A group of stars forms an imaginary outline or meaningful pattern on the space, this group of stars is called _____

a) Capricornus
b) **Constellations**
c) Missoula
d) Kalispell

Explanation

A group of stars forms an imaginary outline or meaningful pattern on the space. They represent an animal, mythological person or creature, a god, or an object. This group of stars is called constellations. People in different cultures and countries adopted their own sets of constellation outlines.

21. How many formally accepted constellations are there?

a) 22
b) 44
c) 68

d) 88

Explanation

There are 88 formally accepted constellations. Aries, Gemini, Leo, Orion, Scorpius and Cassiopeia are some of the constellations.

22. Which force between sun and celestial bodies keep them revolving around it?

a) Frictional force
b) Gravitational force
c) Tension force
d) Thermal force

Explanation

Sun and the celestial bodies which revolve around it form the solar system. It consists of large number of bodies such as planets, comets, asteroids and meteors. The gravitational force of attraction between the Sun and these objects keep them revolving around it.

23. How many quarters of the Sun has hydrogen gas?

a) Two
b) Three
c) Four
d) One

Explanation

The Sun is a medium sized star, a very fiery spinning ball of hot gases. Three quarters of the Sun has hydrogen gas and one quarter has helium gas. It is over a million times as big as the Earth.

24. Hydrogen atoms combine together to form helium under enormous pressure. This process, called _____

a) Nuclear fusion
b) Nuclear fission
c) Nuclear convention
d) Both nuclear fission and fusion

Explanation

Hydrogen atoms combine or fuse together to form helium under enormous pressure. This process, called nuclear fusion releases enormous amount of energy as light and heat. It is this energy which makes Sun shine and provide heat.

25. Sun is believed to be more than how many years old?

a) **4.6 billion**
b) 7.8 billion
c) 9.3 billion
d) 14.8 billion

Explanation

Sun is situated at the centre of the solar system. The strong gravitational fields cause other solar matter, mainly planets, asteroids, comets, meteoroids and other debris, to orbit around it. Sun is believed to be more than 4.6 billion years old.

26. Which among the following statement is incorrect

1) At the time of the Big Bang, helium gas condensed to form huge clouds, which later concentrated and formed the numerous galaxies. Some of the helium gas was left free and started floating around in our galaxy. With time, due to some changes, this free-floating helium gas concentrated and paved way for the formation of the Sun and solar system.
2) Gradually, the Sun and the solar system turned into a slowly spinning molecular cloud, composed of hydrogen and helium along with dust. The cloud started to undergo the process of compression, as a result of its own gravity. Its excessive and high-speed spinning ultimately resulted in its flattening into a giant disc.

a) **Only 1**
b) Only 2
c) Both 1 and 2
d) None

Explanation

At the time of the Big Bang, hydrogen gas condensed to form huge clouds, which later concentrated and formed the numerous galaxies. Some of the hydrogen gas was left free and started floating around in our galaxy. With time, due to some changes, this free-floating hydrogen gas concentrated and paved way for the formation of the Sun and solar system.

27. A planet revolves around the Sun along a definite curved path which is called _____

a) Sphere
b) Milky way
c) **Orbit**
d) Satellite

Explanation

A planet revolves around the Sun along a definite curved path which is called an orbit. It is elliptical. The time taken by a planet to complete one revolution is called its period of revolution. Besides revolving around the Sun, a planet also rotates on its own axis like a top.

28. Which among the following statement is correct

1) The time taken by a planet to complete one rotation is called its period of axis. The period of rotation of the Earth is 23 hours and 56 minutes and so the length of a day on Earth is taken as 24 hours. The planets are spaced unevenly
2) The first four planets are relatively close together and close to the Sun. They form the inner solar system. Farther from the Sun is the outer solar system, where the planets are much more spread out. Thus, the distance between Saturn and Uranus is much greater (about 20 times) than the distance between the Earth and the Mars.
    a) Only 1
    b) Only 2
    c) Both 1 and 2
    d) None

Explanation

The time taken by a planet to complete one rotation is called its period of rotation. The period of rotation of the Earth is 23 hours and 56 minutes and so the length of a day on Earth is taken as 24 hours.

29. Which among the following planet doesn't come under inner planets of solar system?

a) Venus
b) Earth
c) Jupiter
d) Mars

Explanation

The four planets grouped together in the inner solar system are Mercury, Venus, Earth and Mars. They are called inner planets. They have a surface of solid rock crust and so are called terrestrial or rocky planets. Their insides, surfaces and atmospheres are formed in a similar way and form similar pattern. Our planet, Earth can be taken as a model of the other three planets.

30. The outer planets are also called as ____

a) Rocky planets
b) Gaseous planets
c) Silver planets
d) Cold planets

Explanation

The four large planets Jupiter, Saturn, Uranus and Neptune spread out in the outer solar system and slowly orbit the Sun are called outer planets. They are made of hydrogen, helium and other gases in huge amounts and have very dense atmosphere. They are known as gas giants and are

called gaseous planets. The four outer planets Jupiter, Saturn, Uranus and Neptune have rings whereas the four inner planets do not have any rings.

31. The gaseous planet have rings which is actually tiny pieces of rock covered with what?

a) Lava
b) Dark matter
c) Fire
d) Ice

Explanation

The gaseous planet has rings which actually tiny pieces of rock covered with ice.

32. Which is a rocky planet nearest to the Sun?

a) Mercury
b) Venus
c) Mars
d) Pluto

Explanation

Mercury is a rocky planet nearest to the Sun. It is very hot during day but very cold at night. Mercury can be easily observed thorough telescope than naked eye since it is very faint and small. It always appears in the eastern horizon or western horizon of the sky.

33. Which among the following is known as red planet?

a) Venus
b) Jupiter
c) Mars
d) Saturn

Explanation

The first planet outside the orbit of the Earth is Mars. It appears slightly reddish and therefore it is also called the red planet. It has two small natural satellites (Deimos and Phobos).

34. Which among the following planet has the longest summers and winters each lasting 42 years?

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

Explanation

Uranus is a cold gas giant and it can be seen only with the help of large telescope. It has a greatly tilted axis of rotation. As a result, in its orbital motion it appears to roll on its side. Due to its peculiar tilt, it has the longest summers and winters each lasting 42 years.

35. Which among the following planet is the hottest planet in our solar system?

a) Mercury
b) Venus
c) Saturn
d) Mars

Explanation

Venus is a special planet from the Sun, almost the same size as the Earth. It is the hottest planet in our solar system. After our moon, it is the brightest heavenly body in our night sky.

36. Which is called as Giant planet?

a) Jupiter
b) Uranus
c) Saturn
d) Earth

Explanation

Jupiter is called as Giant planet. It is the largest of all planets (about 11 times larger and 318 times heavier than Earth).

37. Which planet spins in the opposite direction to all other planets in solar system?

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

Explanation

Venus spins in the opposite direction to all other planets. So, unlike Earth, the Sun rises in the west and sets in the east here. Venus can be seen clearly through naked eye. It always appears in the horizon of eastern or western sky.

38. Which among the following planet appear as greenish star?

a) Mars
b) Uranus
c) Saturn
d) Neptune

Explanation

Neptune spins in the opposite direction to all other planets. So, unlike Earth, the Sun rises in the west and sets in the east here. Venus can be seen clearly through naked eye. It always appears in the horizon of eastern or western sky.

39. From space, the Earth appears which colour due to the reflection of light from water and land mass on its surface?

a) Reddish blue
b) Bluish green
c) Reddish green
d) Brownish blue

Explanation

The Earth where we live is the only planet in the solar system which supports life. Due to its right distance from the Sun it has the right temperature, the presence of water and suitable atmosphere and a blanket of ozone. All these have made continuation of life possible on the Earth. From space, the Earth appears bluish green due to the reflection of light from water and land mass on its surface.

40. Which is the largest moon of our solar system?

a) Triton
b) Ganymede
c) Titan
d) Nagato

Explanation

Jupiter has 3 rings and 65 moons. Its moon Ganymede is the largest moon of our solar system.

41. Which is the second biggest and a giant gas planet in the outer solar system?

a) Neptune
b) Pluto
c) Saturn
d) Jupiter

Explanation

Saturn Known for its bright shiny rings, Saturn appears yellowish in colour. It is the second biggest and a giant gas planet in the outer solar system.

42. Which is the only moon in the solar system that moves in the opposite direction to the direction in which its planet spins?

a) **Triton**
b) Deimos
c) Titan
d) Nagato

Explanation

Neptune has 13 moons – Triton being the largest. Triton is the only moon in the solar system that moves in the opposite direction to the direction in which its planet spins.

43. Which is the only moon in the solar system with clouds?

a) Phobos
b) Deimos
c) **Titan**
d) Nagato

Explanation

Saturn has at least 60 moons are present - the largest being Titan. Titan is the only moon in the solar system with clouds. Having least density of all (30 times less than Earth), this planet is so light.

44. A broad belt containing about half a million pieces of rocks occupied between the orbits of Mars and Jupiter that were left over when the planets were formed is called as ____

a) Comets
b) **Asteroids**
c) Satellites
d) All the above

Explanation

There is a large gap in between the orbits of Mars and Jupiter. This gap is occupied by a broad belt containing about half a million pieces of rocks that were left over when the planets were formed and now revolve around the Sun. These are called asteroids.

45. Which among the following are lumps of dust and ice that revolve around the Sun in highly elliptical orbits?

a) **Comets**
b) Meteorites
c) Satellites

d) Meteors

Explanation

Comets are lumps of dust and ice that revolve around the Sun in highly elliptical orbits. Their period of revolution is very long. When approaching the Sun, a comet vaporizes and forms a head and tail. Some of the biggest comets ever seen had tails 160 million (16 crores) km long. This is more than the distance between the Earth and the Sun.

46. A body moving in an orbit around a planet is called _____

a) Meteors
b) Meteorites
c) Satellite
d) Comets

Explanation

A body moving in an orbit around a planet is called satellite. In order to distinguish them from the man-made satellites (called as artificial satellites), they are called as natural satellites or moons. Satellite of the Earth is called Moon (other satellites are written as moon). We can see the Earth's satellite Moon, because it reflects the light of the Sun.

47. Which among the following statement is correct

1) Meteorites are small piece of rocks scattered throughout the solar system. Traveling with high speed, these small pieces come closer to the Earth's atmosphere and are attracted by the gravitational force of Earth.
2) Most of them are burnt up by the heat generated due to friction in the Earth's atmosphere. They are called meteors. Some of the bigger meteorites may not be burnt completely and they fall on the surface of Earth. These are called meteors.
    a) Only 1
    b) Only 2
    c) Both 1 and 2
    d) None

Explanation

Meteors are small piece of rocks scattered throughout the solar system. Traveling with high speed, these small pieces come closer to the Earth's atmosphere and are attracted by the gravitational force of Earth. Most of them are burnt up by the heat generated due to friction in the Earth's atmosphere. They are called meteors. Some of the bigger meteors may not be burnt completely and they fall on the surface of Earth. These are called meteorites.

48. Which among the following planet doesn't have natural satellite?

a) Mars
b) Venus
c) Jupiter
d) Neptune

Explanation

Satellite moves around the planets due to gravity, and the centripetal force. Among the planets in the solar system all the planets have moons except Mercury and Venus.

49. The time taken by the sun to complete one revolution around the Milky Way is called as ____

a) Century year
b) Cosmic year
c) Solar year
d) Inferno year

Explanation

The Sun travelling at a speed of 250 km per second (9 lakh km/h) takes about 225 million years to complete one revolution around the Milky Way. This period is called a cosmic year.

50. Match the following planets with its corresponding moons

i. Saturn – 1. Phobos
ii. Jupiter – 2. Titan
iii. Mars – 3. Triton
iv. Neptune – 4. Ganymede

a) 2 – 4 – 1 – 3
b) 3 – 4 – 2 – 1
c) 4 – 1 – 2 – 3
d) 1 – 3 – 2 – 4

Explanation

Mars has two small natural satellites (Deimos and Phobos). Jupiter has 3 rings and 65 moons. Its moon Ganymede is the largest moon of our solar system. At least 60 moons are present in Saturn - the largest being Titan. Neptune has 13 moons – Triton being the largest.

51. Which among the following was the first artificial satellite launched in 1956?

a) Skylab
b) Rohini
c) Orion
d) Sputnik

Explanation

We saw that there are natural satellites moving around the planets. There will be gravitational force between the planet and satellites. Nowadays many artificial satellites are launched into the Earth's orbit. The first artificial satellite Sputnik was launched in 1956.

52. Which was the first Indian artificial satellite launched on April 19, 1975?

a) Rohini
b) Kalpana-1
c) Aryabhata
d) SARAL

Explanation

India launched its first satellite Aryabhata on April 19, 1975. Artificial satellites are made to revolve in an orbit at a height of few hundred kilometres. At this altitude, the friction due to air is negligible. The satellite is carried by a rocket to the desired height and released horizontally with a high velocity, so that it remains moving in a nearly circular orbit.

53. The horizontal velocity that has to be imparted to a satellite at the determined height so that it makes a circular orbit around the planet is called ____

a) Orbital velocity
b) Horizontal velocity
c) Circular velocity
d) Asteroid velocity

Explanation

The horizontal velocity that has to be imparted to a satellite at the determined height so that it makes a circular orbit around the planet is called orbital velocity.

54. Which among the following statement is incorrect

1) The orbital velocity of the satellite depends on its altitude above Earth. Nearer the object to the Earth, the faster is the required orbital velocity. At an altitude of 200 kilometres, the required orbital velocity is little more than 27,400 kph. That orbital speed and distance permit the satellite to make one revolution in 24 hours.
2) Since Earth also rotates once in 24 hours, a satellite stays in a fixed position relative to a point on Earth's surface. Because the satellite stays over the same spot all the time, this kind of orbit is called 'stationary orbit'.
    a) Only 1
    b) Only 2
    c) Both 1 and 2
    d) None

Explanation

Since Earth also rotates once in 24 hours, a satellite stays in a fixed position relative to a point on Earth's surface. Because the satellite stays over the same spot all the time, this kind of orbit is called 'geostationary'.

55. Which among the following formula can be used to calculate orbital velocity?

a) v = √ ((R+h)/GM)
b) v = √ (GM/(R+h))
c) v = (R+h)/GM
d) v = GM/(R+h)

Explanation

V = √ (GM/(R+h))

G = Gravitational constant (6.673 × 10−11 Nm2 kg-2)

M = Mass of the Earth (5.972 × 1024 kg)

R = Radius of the Earth (6371 km)

h = Height of the satellite from the surface of the Earth.

56. Which is the condition in which people or objects appear to be weightless?

a) Microgravity
b) Macrogravity
c) Nano gravity
d) Neo gravity

Explanation

Microgravity is the condition in which people or objects appear to be weightless. The effects of microgravity can be seen when astronauts and objects float in space. Micro- means very small, so microgravity refers to the condition where gravity 'seems' to be very small.

57. Can you calculate the orbital velocity of a satellite orbiting at an altitude of 500 km?

a) v = 5818 ms^{-1}
b) v = 6813 ms^{-1}
c) v = 7613 ms^{-1}
d) v = 9724 ms^{-1}

Explanation

G = 6.673 × 10^{-11} SI units; M = 5.972 × 10^{24} kg; R = 6371000 m; h = 500000 m

V = √ (GM/(R+h))

$= \sqrt{((6.67 \times 10^{-11} \times 5.972 \times 10^{24}) / (6371000+500000))}$

$= 7613\ ms^{-1}$ or $7.613\ kms^{-1}$

58. Time taken by a satellite to complete one revolution round the Earth is called ____

a) Satellite period
b) Time period
c) Earth period
d) All the above

Explanation

Time taken by a satellite to complete one revolution round the Earth is called time period.

Time period, T = Distance covered / Orbital velocity

$T = 2\pi r / v$ Substituting the value of v, we get

$T = 2\pi (R + h) / \sqrt{GM (R + h)}$.

59. What is the name of the one star which appears to us stationary in its position?

a) Equator star
b) Oceanic star
c) Yellow star
d) Pole star

Explanation

All stars appear to us as moving from east to west, where as there is one star which appears to us stationary in its position. It has been named as Pole star. The pole star appears to us as fixed in space at the same place in the sky in the north direction because it lies on the axis of rotation of the Earth which itself is fixed and does not change its position in space. It may be noted that the pole star is not visible from the southern hemisphere.

60. At an orbital height of 500 km, find the orbital period of the satellite.

a) T = 75 min
b) T = 84 min
c) T = 95 min
d) T = 101 min

Explanation

$h = 500 \times 10^3$ m, $R = 6371 \times 10^3$ m, $v = 7616 \times 10^3\ kms^{-1}$.

$T = 2\pi (R + h) / v = 2 \times (22/7) \times \{(6371+500) / 7616\}$

$= 5.6677 \times 10^3$ s = 5667 s

Thus, T = 95 min

61. In the early 1600s, who among the following proposed three laws of planetary motion?

a) **Kepler**
b) Newton
c) Copernicus
d) Aristotle

Explanation

In the early 1600s, Johannes Kepler proposed three laws of planetary motion. Kepler was able to summarize the carefully collected data of his mentor, Tycho Brahe with three statements that described the motion of planets in a Sun-cantered solar system. Kepler's efforts to explain the underlying reasons for such motions are no longer accepted; nonetheless, the actual laws themselves are still considered an accurate description of the motion of any planet and any satellite.

62. Which among the following is not the Kepler's three laws of planetary motion?

a) All planets revolve around the Sun in elliptical orbits with Sun at one of their foci.
b) The line connecting the planet and the Sun covers equal areas in equal intervals of time.
c) **The planets rotes itself while revolving around the sun in a fixed axis around it**
d) The square of time period of revolution of a planet around the Sun is directly proportional to the cube of the distance between sun and the planets.

Explanation

First Law – The Law of Ellipses: All planets revolve around the Sun in elliptical orbits with Sun at one of their foci.

Second Law – The Law of Equal Areas: The line connecting the planet and the Sun covers equal areas in equal intervals of time

Third Law – The Law of Harmonies: The square of time period of revolution of a planet around the Sun is directly proportional to the cube of the distance between sun and the planets.

63. Which is a large spacecraft which can house astronauts?

a) Planetary station
b) Star ship
c) International Cloud station
d) **International space station**

Explanation

ISS is a large spacecraft which can house astronauts. It goes around in low Earth orbit at approximately 400 km distance. It is also a science laboratory. It's very first part was placed in orbit in 1998 and its core construction was completed by 2011. It is the largest man-made object in space which can also be seen from the Earth through the naked eye.

64. In which year the first human crew went to the ISS?

a) **2000**
b) 2004
c) 2008
d) 2010

Explanation

The first human crew went to the ISS in 2000. Ever since that, it has never been unoccupied by humans. At any given instant, at least six humans will be present in the ISS. According to the current plan, ISS will be operated until 2024, with a possible extension until 2028. After that, it could be deorbited, or recycled for future space stations.

65. Which among the following statement is correct

1) Using the technology developed for the ISS, areas having water scarcity can gain access to advanced water filtration and purification systems. The water recovery system (WRS) and the oxygen generation system (OGS) developed for the NASA have already saved a village in Mexico from being deserted due to lack of clean water.
2) The Eye Tracking Device, built for a microgravity experiment, has proved ideal to be used in many laser surgeries. Also, eye tracking technology is helping disabled people with limited movement and speech. For example, a kid who has severe disability in body movements can use his eye-movements alone and do routine tasks and lead an independent life.
3) Robotic arms developed for research in the ISS are providing significant help to the surgeons in removing inoperable tumours (e.g., brain tumours) and taking biopsies with great accuracies. Its inventors say that the robot could take biopsies with remarkable precision and consistency.
    a) Both 1 and 2
    b) Both 1 and 3
    c) **Both 2 and 3**
    d) All 1, 2 and 3

Explanation

Using the technology developed for the ISS, areas having water scarcity can gain access to advanced water filtration and purification systems. The water recovery system (WRS) and the

oxygen generation system (OGS) developed for the ISS have already saved a village in Iraq from being deserted due to lack of clean water.

66. Which among the following country is matched incorrectly with its space organisation?

a) USA – NASA
b) China – CSA
c) Japan – JAXA
d) ESA – Europe

Explanation

NASA (USA), Roskosmos (Russia), ESA (Europe), JAXA (Japan) and CSA (Canada).

67. Which among the following country is not the member 16 countries provides, maintains and operates the ISS?

a) Brazil
b) Italy
c) India
d) Denmark

Explanation

As great as the ISS' scientific achievements are, no less in accomplishment is the international co-operation which resulted in the construction of the ISS. An international collaboration of five different space agencies of 16 countries provides, maintains and operates the ISS. They are: NASA (USA), Roskosmos (Russia), ESA (Europe), JAXA (Japan) and CSA (Canada). Belgium, Brazil, Denmark, France, Germany, Italy, Holland, Norway, Spain, Sweden, Switzerland and the UK are also part of the consortium.

68. Which among the following is the value of 1 light year?

a) 9.4607×10^{10} km
b) 9.4607×10^{12} km
c) 8.1836×10^{10} km
d) 8.1836×10^{12} km

Explanation

The observable universe is around 93 billion light years (1 light year = the distance that light travels in one year, which is 9.4607×10^{12} km) across.