



SSC Board: Std 7: Ch 20: In the World of Stars – Q bank - Answers

Question 1:

Write the proper words in the blanks.

(meridian, horizon, twelve, nine, apparent, celestial, ecliptic)

- (a) When seen from a great distance, the sky seems to be touching the ground along a circle. This circle is called the
- (b) The is used while defining the zodiac signs.
- (c) Classified according to seasons, one season will have *nakshatras*.
- (d) The rising of the sun in the east and its setting in the west is the motion of the sun.

Answer:

- (a) When seen from a great distance, the sky seems to be touching the ground along a circle. This circle is called the horizon.
- (b) The ecliptic is used while defining the zodiac signs.
- (c) Classified according to seasons, one season will have nine *nakshatras*.
- (d) The rising of the sun in the east and its setting in the west is the apparent motion of the sun.

Question 2: A star rises at 8 pm tonight. At what time will it rise after a month? Why?

Answer: Each star rises or sets 4 min earlier every day.

Therefore,

$$4 \text{ minutes} \times 30 \text{ days} = 120 \text{ min} = 2 \text{ hours}$$

So, if a star rises at 8 pm today, it will rise before 2 hours earlier i.e. at 6 pm after a month.

Question 3: What is meant by 'The sun enters a *nakshatra*'? It is said that in the rainy season the sun enters the Mrug *nakshatra*. What does it mean?

Answer:

The observer looking at the sun sees not only the sun but also a constellation behind the sun. The constellation cannot be seen in bright sunlight, but it is indeed present behind the sun. As the earth changes its position, a different constellation or zodiac sign or raashi appears behind the sun. This is what we express when we say that the sun enters a particular zodiac sign or raashi.

In rainy season Mrug *nakshatra* or Orion is behind the Sun that is way it is said that in the rainy season the sun enters the Mrug *nakshatra*.

Question 4: Answer the following question.

- (a) What is a constellation?
- (b) What points should be considered before a sky watch?
- (c) Is it wrong to say that the planets, stars and *nakshatras* affect human life? Why?

Answer:

(a) A group of stars occupying a small portion of the celestial sphere and appearing to form certain figures of animals, humans or objects is called a constellation.

(b) Before a skywatch we should keep in mind the following points:

1. The place for sky watching should be away from the city and, as far as possible.
2. It should be a new moon night.
3. Binoculars or telescopes should be used for sky watching.
4. The Pole Star should be used as a reference point for sky watch.
5. As the stars in the west set early, sky watching should begin with stars in the west.
6. As in geographical maps, the east and west are shown to the right and left respectively in a sky map.

(c) Yes, it would be wrong to say that planets, stars and *nakshatras* affect human life because Science has proved that the constituents of the solar system e.g. planets, satellites and comets as also distant stars and constellations do not have any influence on human life.

Question 5: Write a paragraph on the birth and lifecycle of stars using figure 20.1.

Answer:

Nebulae are clouds made up mainly of hydrogen gas and dust particles. The particles in these clouds are attracted towards one another due to the force of gravity. As a result, the cloud contracts and becomes dense and spherical in shape. At the same time, the pressure of the gas at the core of the cloud increases causing the temperature to rise tremendously and energy generation processes start there. Such a spherical cloud of hydrogen is called a 'star'. Later, processes such as contraction, expansion, rise in temperature, etc. bring about changes in the nature of the star. These changes occur over a very long period of time and constitute the lifecycle of stars. The different forms of the stars at various stages during this lifecycle are identified as different types of stars.

Sun-like Stars, Red giant Stars, Super Nova Stars, Binary or Twin Stars and Variable Stars.

Question 6: What is a galaxy? What are the various components of a galaxy?

Answer:

Galaxies are vast spaces containing dust, gas, dark matter and innumerable stars that are held together by gravitational force.

Question 7: What are the different types of stars?

Answer:

The different types of stars are, sun-like stars, red giant stars, super nova stars binary or twin stars and variable stars.

Question 8: Using a Marathi calendar, collect information about the 27 nakshatras and divide them into the following three categories:

Ashwini	Purvaphalguni	Uttarashadha
Bharani	Uttaraphalguni	Shravana
Krittika	Hasta	Dhanishtha
Rohini	Chitra	Shatbhisha
Mrigshirsha	Swati	Poorvabhadrapada
Ardra	Vishakha	Uttarabhadrapada
Punarvasu	Anuradha	Revati
Pushya	Jyeshtha	Abhijit
Ashlesha	Moola	
Magha	Purvashadha	

The monsoon nakshatras are - Punarvasu, Pushya, Ashlesha, Magha, Purva Phalguni or Pubba, Uttara Phalguni or Uttara, Hasta, and Chitra.

The winter nakshatras are - Krittika, Rohini, Mrigashirsha, Arudra, and Punarvasu.

The summer nakshatras are - Visakha, Anuradha, Jyeshtha, Mula, Purva Ashadha, Uttara Ashadha, and Sravana.

Question 9: One zodiac sign = nakshatras.

Answer:

One nakshatra = 4 padas

27 nakshatra = $27 \times 4 = 108$ padas

There are 12 zodiac signs

So, 12 zodiac signs = 108 padas

So, 1 zodiac sign = $108/12 = 9$ padas

One zodiac sign = 9 padas

Question 10. Why is the Pole Star important for sky watch?

Answer:

The pole star is very close to the North Pole, so its position to us on Earth is constant. This helps us to study the position of other stars. Therefore the Pole Star is very important for sky watch.

Question 11. What is the relation between the Pole Star and the constellations Saptarshi and Sharmishtha ?

Answer:

If we extend one side of the quadrangle of Saptarshi, it reaches the Pole Star. The perpendicular bisector of the line joining the third and fourth stars in Sharmishtha goes towards the Pole Star. The Pole Star has Saptarshi on one side and Sharmishtha on the other.

Extra Questions:

Fill in the blanks:

1. Stars are born out of nebulae.
2. Nebulae are clouds made up mainly of hydrogen gas and dust particles.
3. Our solar system is a tiny part of a galaxy called the Milky Way.
4. Some stars, which appear to be close to one another making a particular figure are together known as a constellation.
5. While standing on the ground, the point on the celestial sphere exactly above our head is called the zenith.
6. While standing on the ground, the point on the celestial sphere exactly below our feet is called the nadir.
7. If we extend the axis of rotation of the earth in the north and south directions it will penetrate the celestial sphere at points called the celestial North Pole and the celestial South Pole, respectively.
8. In astronomy, the great circle which passes through both the celestial poles and the observer's zenith and nadir is called a meridian.
9. If we uniformly expand earth's equator in all directions indefinitely, it will penetrate the celestial sphere along a circle. This circle is known as the celestial equator.
10. The circle describing the apparent motion of the sun around the earth is called the ecliptic.
11. The portion of earth's atmosphere and the portion beyond that which can be seen in the form of a roof by our eyes while standing on the earth is called the sky.
12. The continuous, empty space between the spheres (planets, stars, etc.) in the sky is called space.
13. The sun, the moon and the stars are seen to rise in the east and set in the west because the earth rotates from the west to the east.
14. The stars rise and set 4 minutes earlier every day.
15. If a star rises at 8 pm tonight, it will rise at 7:56 pm tomorrow.
16. The place for sky watching should be away from the city and, as far as possible, it should be a new moon night.
17. Binoculars or telescopes should be used for sky watching.
18. Identifying the Pole Star in the north makes the sky watch easier.
19. As the stars in the west set early, sky watching should begin with stars in the west.
20. In geographical maps, the east and west are shown to the right and left respectively in a sky map.
21. A group of stars occupying a small portion of the celestial sphere is called a constellation.
22. Some of these stars appear to form certain figures of animals, humans or objects.
23. The constellations have been named after certain events or beliefs of the times when the constellations were identified.
24. Western observers have divided the celestial sphere into 88 constellations.
25. Ancient western astronomers put forward the idea of 12 zodiac signs, whereas Indian astronomers suggested the 27 nakshatras.
26. The ecliptic has been imagined to be divided into 12 equal parts. 27. Thus each part of the ecliptic subtends 30 degrees at the centre of the celestial sphere.
28. Each part of the ecliptic is called a raashi or zodiac sign.

29. The zodiac signs are named Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricorn, Aquarius and Pisces.
30. The moon completes one revolution around the earth in approximately 27.3 days.
31. The portion traversed by the moon in one day is called a nakshatra.
32. So if we divide 360 degrees into 27 equal parts, each part is about 13 degrees and 20 minutes.
33. The brightest star that a nakshatra contains is called the yogataara.
34. Which nakshatra we can see during a sky watch depends upon the position of the earth along its orbit.
35. During summer nights a particular arrangement of seven stars called Saptarshi.
36. Saptarshi is a group of seven bright stars.
37. Saptarshi is in the shape of a quadrangle with a tail made up of three stars.
38. Saptarshi resembles a kite and can be easily recognized.
39. If we extend one side of the quadrangle of Saptarshi, it reaches the Pole Star or Polaris.
40. In English Saptarshi is called the Great Bear.
41. The constellations of Saptarshi and Sharmishtha or Cassiopeia are useful in locating the Pole Star.
42. Sharmishtha is made up of five bright stars which are distributed along the figure of the letter M.
43. The perpendicular bisector of the line joining the third and fourth stars in Sharmishtha goes towards the Pole Star.
- The Pole Star has Saptarshi on one side and Sharmishtha on the other.
44. As Sharmishtha sets, Saptarshi rises.
45. Thus, we can always use either Saptarshi or Shamishtha as a reference point on any given night to locate the Pole star.
46. Mrug nakshatra or Orion has very bright stars.
47. Mrug nakshatra or Orion has seven - eight stars of which four are at the corners of a quadrangle.
48. The line passing through the three middle stars of the constellation, when extended, meets a very bright star called Vyadh or Sirius.
49. During the month of December, Mruga nakshatra rises at 8 pm on the eastern horizon.
50. Mruga nakshatra is on the meridian during February and in June, it sets around 8 pm.
51. Vrushchik or Scorpio is a constellation with 10 to 12 stars.
52. Jyeshtha or Antares is the brightest among stars of Vrushchik or Scorpio.
53. Vrushchik or Scorpio constellation is below the equator, in the sky of the southern hemisphere.
54. In the third week of April, Vrushchik or Scorpio can be seen in the eastern sky a few hours after sunset.
55. The observer looking at the sun sees not only the sun but also a constellation behind the sun.
56. As the earth changes its position, a different constellation or zodiac sign or raashi appears behind the sun.
57. On Makar Sankranti we say that the sun enters Makar raashi (Capricorn zodiac sign).
58. In reality, the sun does not move, but we perceive it as moving due to the motion of the earth around it. This motion of the sun is called its apparent motion and its path is called the apparent path.
59. The rising of the sun in the east and its setting in the west is also an apparent motion.
60. National Institutions IUCAA (Inter University Centre for Astronomy and Astrophysics) in Pune carries out fundamental research in astronomy.
61. In India, planetariums named after Pandit Jawaharlal Nehru have been established at New Delhi, Bangaluru, Allahabad, Mumbai and at New English School in Pune.
62. Planetariums present a virtual projection of various stars and constellations as if it were a sky watch.
63. Science has proved that the constituents of the solar system e.g. planets, satellites and comets as also distant stars and constellations do not have any influence on human life.
64. Far away, the sky seems to be touching the ground. The line at which they meet is called the horizon.
65. The stars and planets moving in the sky appear to be moving on a virtual sphere called the celestial sphere.

Answer the following questions:

1. What are Nebulae?

Nebulae are clouds made up mainly of hydrogen gas and dust particles.

2. How are stars formed?

The hydrogen gas and dust particles in Nebulae are attracted towards one another due to the force of gravity. As a result, the cloud contracts and becomes dense and spherical in shape. At the same time, the pressure of the gas at the core of the cloud increases causing the temperature to rise tremendously and energy generation processes start there. Such a spherical cloud of hydrogen is called a 'star'.

3. What is a constellation?

A group of stars occupying a small portion of the celestial sphere is called a constellation.

4. What is a horizon?

The line at which the sky seems to be touching the Earth is called the horizon.

5. What is a celestial sphere?

While turning around oneself, the horizon will be seen to form a circle and on looking up, the sky will appear to be a sphere based on this circle. The stars and planets moving in the sky appear to be moving on this sphere. This virtual sphere is called the celestial sphere.

6. What is Zenith?

While standing on the ground, the point on the celestial sphere exactly above our head is called the zenith.

7. What is Nadir?

While standing on the ground, the point on the celestial sphere exactly below our feet is called the nadir.

8. What are Celestial poles?

If we extend the axis of rotation of the earth in the north and south directions it will penetrate the celestial sphere at points called the celestial North Pole and the celestial South Pole, respectively.

9. What is a Meridian?

In astronomy, the great circle which passes through both the celestial poles and the observer's zenith and nadir is called a meridian.

10. What is a Celestial equator ?

If we uniformly expand earth's equator in all directions indefinitely, it will penetrate the celestial sphere along a circle. This circle is known as the celestial equator. It is in the same plane as the earth's equator.

11. Describe Ecliptic?

The earth moves around the sun, but, seen from the earth, the sun appears to move along a circle on the celestial sphere. This circle describing the apparent motion of the sun around the earth is called the ecliptic.

12. Describe sky?

The portion of earth's atmosphere and the portion beyond that which can be seen in the form of a roof by our eyes while standing on the earth is called the sky.

13. What is space?

The continuous, empty space between the spheres (planets, stars, etc.) in the sky is called space. It may contain gas and dust particles. Numerous star clusters have formed in space.

14. Why do the sun, moon and the stars are seen to rise in the east and set in the west?

The sun, the moon and the stars are seen to rise in the east and set in the west because the earth rotates from the west to the east.

15. What is a Zodiac sign?

The ecliptic has been imagined to be divided into 12 equal parts. Thus each part subtends 30 degrees at the centre of the celestial sphere. Each of these parts is called a raashi or zodiac sign.

16. Name the twelve zodiac signs?

The twelve zodiac signs are Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricorn, Aquarius and Pisces.

17. What is a Nakshatra?

The moon completes one revolution around the earth in approximately 27.3 days. The portion traversed by the moon in one day is called a nakshatra.

18. What is the brightest star in the nakshatra called?

The brightest star in a nakshatra is called the yogatara.

19. Describe Saptarshi.

During summer nights one can see a particular arrangement of seven stars. We call them Saptarshi. In the month of February, this constellation rises around 8 pm in the north-east. It is on the meridian in the month of April and in the month of October, it sets around 8 pm. As the name suggests, Saptarshi is a group of seven bright stars. It is in the shape of a quadrangle with a tail made up of three stars. It thus resembles a kite and can be easily recognized.

20. How can Saptarshi help identify the Pole Star?

If we extend one side of the quadrangle, it reaches the Pole Star or Polaris.

21. What is the English name for Saptarshi?

In English it is called the Great Bear.

22. What is the English name for Sharmishtha?

In English Sharmishtha is called Cassiopeia.

23. What is the English name for Mrug nakshatra?

Mrug nakshatra is known as Orion in English.

24. What is the English name for Vrushchik?

The English name for Vrushchik is Scorpion.

25. Describe Mrug nakshatra.

Mrug nakshatra or Orion has very bright stars. On winter nights, they can be easily identified. It has seven - eight stars of which four are at the corners of a quadrangle. The line passing through the three middle stars of the constellation, when extended, meets a very bright star. This is Vyadh or Sirius. During the month of December, Mruga nakshatra rises at 8 pm on the eastern horizon. It is on the meridian during February and in June, it sets around 8 pm.

26. Describe Vrushchik nakshatra.

Vrushchik or Scorpion is a constellation with 10 to 12 stars. Jyeshtha or Antares is the brightest among them. This constellation is below the equator, in the sky of the southern hemisphere. In the third week of April, it can be seen in the eastern sky a few hours after sunset.

27. Describe the apparent motion and apparent path of the sun.

In reality, the sun does not move, but we perceive it as moving due to the motion of the earth around it. This motion of the sun is called its apparent motion and its path is called the apparent path. The rising of the sun in the east and its setting in the west is also an apparent motion.

28. Write the full form of IUCAA? What does it do?

The full form of IUCAA is Inter University Centre for Astronomy and Astrophysics in Pune. It carries out fundamental research in astronomy.

29. Name the places in India where you will find planetariums.

In India, planetariums named after Pandit Jawaharlal Nehru have been established at New Delhi, Bangaluru, Allahabad, Mumbai and at New English School in Pune.

30. What is a planetarium?

Planetarium presents a virtual projection of various stars and constellations as if it were a sky watch.