* **Choose the correct alternative from those given below each questions** [33]

1. If Earth's tilt increased from 23.5° to 40°, what would happen to the seasons?
   (A) They would disappear (B) They would become more extreme
   (C) They would reverse (D) No change

   Ans. : (B) They would become more extreme

2. Why do we not experience solar and lunar eclipses every month?
   (A) Earth does not rotate enough
   (B) Earth does not rotate enough
   (C) The Moon's orbit is tilted
   (D) Earth's orbit is a perfect circle

   Ans. : (C) The Moon's orbit is tilted

3. What is the most accurate explanation for equal day and night during an equinox?
   (A) Earth is closest to the Sun
   (B) Earth's axis is tilted at 0°
   (C) Earth's axis is perpendicular to Sun's rays
   (D) Earth is moving faster

   Ans. : (C) Earth's axis is perpendicular to Sun's rays

4. In which direction would stars appear to move if Earth rotated East to West?
   (A) From East to West (B) From North to South
   (C) From West to East (D) From South to North

   Ans. : (C) From West to East

5. Why can lunar eclipses be seen from more places on Earth than solar eclipses?
   (A) The Moon is bigger (B) Earth's shadow is larger
   (C) Sunlight spreads faster (D) It happens more often

   Ans. : (B) Earth's shadow is larger

6. What is the duration of a sidereal day (Earth's true rotation period)?
   (A) 24 hours (B) 23 hours 56 minutes
   (C) 22 hours (D) 12 hours

   Ans. : (B) 23 hours 56 minutes

7. One complete rotation of the Earth takes nearly in:
   (A) 12 hours (B) 24 hours (C) 365 days (D) 7 days

Ans. : (B) 24 hours

8. The Sun appears to rise in the East because:

(A) The Sun moves
(B) The Earth rotates from West to East
(C) The Earth moves around the Sun
(D) None of these

Ans. : (B) The Earth rotates from West to East

9. The phenomenon of day and night is caused by:

(A) Revolution of Earth
(B) Moon's rotation
(C) Earth's rotation
(D) Solar eclipse

Ans. : (C) Earth's rotation

10. One revolution of the Earth around the Sun takes approximately:

(A) 30 days
(B) 24 hours
(C) 365 days and 6 hours
(D) 100 days

Ans. : (C) 365 days and 6 hours

11. Which motion causes the change in seasons?

(A) Rotation (B) Revolution (C) Eclipse (D) Tides

Ans. : (B) Revolution

12. What is the shape of the Earth's orbit?

(A) Perfect circle (B) Oval (C) Straight line (D) Spiral

Ans. : (B) Oval

13. On which date does the Northern Hemisphere experience the longest day?

(A) 21 March (B) 23 September (C) 21 June (D) 22 December

Ans. : (C) 21 June

14. What is the term for equal day and night?

(A) Solstice (B) Equinox (C) Eclipse (D) Hemisphere

Ans. : (B) Equinox

15. A total solar eclipse occurs when:

(A) Earth covers the Moon
(B) Moon partially covers the Sun
(C) Moon completely blocks the Sun
(D) Sun is farthest from Earth

Ans. : (C) Moon completely blocks the Sun

16. The Moon looks similar in size to the Sun during an eclipse because:

(A) It is actually the same size
(B) It is much closer
(C) It is made of light
(D) It moves faster

Ans. : (B) It is much closer

17. Which celestial body remains nearly fixed in the sky from Earth's view?

(A) Venus (B) Mars (C) Pole Star (D) Jupiter

Ans. : (C) Pole Star

18. Which part of India experiences least variation in seasons?

(A) Rajasthan (B) Himachal Pradesh

(C) Arunachal Pradesh (D) Kerala

Ans. : (D) Kerala

19. At the poles, how long can the Sun remain above the horizon continuously?

(A) 1 month (B) 3 months (C) 6 months (D) 12 hours

Ans. : (C) 6 months

20. Which Indian scientist is known as the father of modern Indian astronomy?

(A) C.V. Raman (B) Vikram Sarabhai

(C) M.K. Vainu Bappu (D) Homi Bhabha

Ans. : (C) M.K. Vainu Bappu

21. Which device first demonstrated Earth's rotation?

(A) Microscope (B) Foucault Pendulum

(C) Telescope (D) Barometer

Ans. : (B) Foucault Pendulum

22. When does the summer solstice occur in the Northern Hemisphere?

(A) 21 march (B) 22 december (C) 21 june (D) 23 september

Ans. : (C) 21 june

23. What is a lunar eclipse?

(A) When the Sun is hidden behind the Earth

(B) When the Earth comes between the Sun and the Moon

(C) When the Moon comes between the Earth and the Sun

(D) When the Moon disappears from the sky

Ans. : (B) When the Earth comes between the Sun and the Moon

24. What causes the apparent movement of the Sun in the sky?

(A) Earth’s rotation (B) Earth’s revolution

(C) Sun’s rotation (D) Moon’s orbit

Ans.: (A) Earth’s rotation

25.

Column A	Column B
Q.1. Equinox	(A) Longest day in Northern Hemisphere

Q.2. Summer Solstice	(B) Equal day and night duration
Q.3. Lunar Eclipse	(C) Earth between Sun and Moon
Q.4. Apparent motion of Sun	(D) Due to Earths rotation

(A) (1)-(B), (2)-(A), (3)-(C), (4)-(D)
(B) (1)-(A), (2)-(D), (3)-(B), (4)-(C)
(C) (1)-(D), (2)-(B), (3)-(A), (4)-(C)
(D) (1)-(B), (2)-(C), (3)-(D), (4)-(A)

Ans.: (A) (1)-(B), (2)-(A), (3)-(C), (4)-(D)

26. What causes day and night on Earth?
(A) Earth's revolution around the Sun
(B) Moon's rotation
(C) Earth's rotation on its axis
(D) Sun's movement

Ans. : (C) Earth's rotation on its axis

27. In which direction does the Earth rotate?
(A) East to West (B) West to East (C) North to South (D) South to North

Ans. : (B) West to East

28. How long does Earth take to complete one rotation?
(A) 30 days (B) 1 year (C) 24 hours (D) 12 hours

Ans. : (C) 24 hours

29. What is the motion of the Earth around the Sun called?
(A) Rotation (B) Revolution (C) Spinning (D) Orbiting

Ans. : (B) Revolution

30. What is the name of the star that appears fixed in the sky?
(A) Sirius (B) Alpha Centauri (C) Pole Star (D) Vega

Ans. : (C) Pole Star

31. During which month does the Northern Hemisphere experience summer?
(A) December (B) March (C) June (D) September

Ans. : (C) June

32. How long does Earth take to complete one revolution?
(A) 30 days
(B) 12 hours
(C) 365 days and 6 hours
(D) 60 days

Ans. : (C) 365 days and 6 hours

33. Four friends used the following ways to see the solar eclipse. Who among them was being careless?
(A) Ravikiran used a solar eclipse goggle.
(B) Jyothi used a mirror to project the Sun's image.
(C) Adithya saw the Sun directly with his eyes.

(D) Aruna attended a programme arranged by a planetarium.

Ans. : (C) Adithya was being careless because he looked at the Sun directly with his eyes, which can damage eyesight. The safe ways to view a solar eclipse are using solar eclipse glasses, indirect viewing methods, or attending guided programmes.

*** a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.** [11]

34. Assertion (A): The Earth experiences different seasons.
Reason (R): Earth is tilted on its axis and revolves around the Sun.
(A) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).
(B) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).
(C) (A) is true, but (R) is false.
(D) (A) is false, but (R) is true.

Ans.: (A) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).

35. Assertion (A): Lunar eclipses can be observed from any location where the Moon is visible.
Reason (R): Earth's shadow is larger than the Moon.
(A) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).
(B) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).
(C) (A) is true, but (R) is false.
(D) (A) is false, but (R) is true.

Ans.: (A) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).

36. Assertion (A): The stars appear to move in the sky from East to West.
Reason (R): The Earth rotates from West to East.
(A) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).
(B) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).
(C) (A) is true, but (R) is false.
(D) (A) is false, but (R) is true.

Ans.: (A) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).

37. Assertion (A): On 21 June, places in Northern Hemisphere experience the longest day.
Reason (R): The North Pole tilts toward the Sun during this period.
(A) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).

(B) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).

(C) (A) is true, but (R) is false.

(D) (A) is false, but (R) is true.

Ans.: (A) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).

38. Assertion (A): The Sun and Moon appear to be the same size in the sky.
Reason (R): The Moon is much closer to the Earth than the Sun.

(A) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).

(B) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).

(C) (A) is true, but (R) is false.

(D) (A) is false, but (R) is true.

Ans.: (A) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).

39. Assertion (A): The Moon can completely cover the Sun during a solar eclipse.
Reason (R): The apparent sizes of the Moon and the Sun from the Earth are similar.

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

Ans.: (A) Both A and R are true and R is the correct explanation of A.

40. Assertion (A): The Earth experiences different seasons during the year.
Reason (R): The Earth's axis is tilted and it revolves around the Sun.

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

Ans.: (A) Both A and R are true and R is the correct explanation of A.

41. Assertion (A): The Sun appears to rise in the east and set in the west.
Reason (R): The Earth rotates from west to east.

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

Ans.: (A) Both A and R are true and R is the correct explanation of A.

42. Assertion (A): The Earth's revolution around the Sun causes day and night.
Reason (R): The Earth takes about 24 hours to complete one rotation on its axis.

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

Ans. : (D) A is false but R is true.

43. Assertion (A): A total lunar eclipse occurs when the Moon completely blocks sunlight from reaching the Earth.
Reason (R): A total lunar eclipse happens when the Earth's shadow completely covers the Moon.

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

Ans. : (D) A is false but R is true.

44. Assertion (A): We should never look at the Sun directly during a solar eclipse.
Reason (R): Looking at the Sun through sunglasses or binoculars during a solar eclipse is completely safe.

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

Ans. : (C) A is true but R is false.

*** State Whether The Following Sentences Are True Or False.[1 Marks Each]** **[21]**

45. A solar eclipse occurs when the Earth comes between the Moon and the Sun.

Ans. : false

46. The Earth's axis is tilted.

Ans. : true

47. Solar eclipses are safe to view without protection.

Ans. : false

48. Lunar eclipses are visible only in the Southern Hemisphere.

Ans. : false

49. The seasons in the Southern Hemisphere are opposite to those in the Northern Hemisphere.

Ans. : true

50. The stars move because they revolve around Earth.

Ans. : false

51. Earth's shadow causes lunar eclipses.

Ans. : true

52. The Sun moves across the sky from East to West.

Ans. : true

53. Foucault's pendulum demonstrates Earth's revolution.

Ans. : false

54. Earth's orbit is perfectly circular.

Ans. : false

55. Lunar eclipse occurs when the Sun comes between the Earth and the Moon.

Ans. : false

56. Sunrise happens earlier in Gujarat than in Jharkhand.

Ans. : false

57. In Chennai, the longest day occurs on the summer solstice.

Ans. : false

58. We should watch the solar eclipse directly with our naked eye spherical shape.

Ans. : false

59. The Earth’s revolution around the Sun causes day and night.

Ans. : false

60. The Earth rotates on its axis from east to west.

Ans. : false

61. The Moon produces its own light which we see at night.

Ans. : false

62. A lunar eclipse occurs when the Earth comes between the Sun and the Moon.

Ans. : true

63. The Pole Star changes its position in the sky every night.

Ans. : false

64. Day and night occur due to the Earth’s revolution around the Sun.

Ans. : true

65. Seasons occur due to the tilt of Earth's axis of rotation and its spherical shape.

Ans. : True

*** Fill In The Blanks With Correct Alternative.[1 Marks Each]** **[15]**

66. The Earth's rotation causes _____ and _____ .

Ans. : day,night

67. _____ eclipse is safe to watch with naked eyes.

Ans. : Lunar

68. The Sun appears to move from _____ to _____ .

Ans. : East ,West

69. During a _____ eclipse, the Moon blocks sunlight from Earth.

Ans. : solar

70. _____ demonstrates the rotation of Earth.

Ans. : Foucault's pendulum

71. At the equator, day and night are almost always _____ .

Ans. : equal

72. _____ are caused due to the Earth's revolution and tilted axis.

Ans. : Seasons

73. Stars rise in the _____ and set in the _____ .

Ans. : east, west

74. Day and night are caused by the Earth's _____ .

Ans. : rotation

75. When the Moon fully covers the Sun from our view, it is called a _____ solar eclipse.

Ans. : total

76. When the Earth rotates, only one side faces the Sun and the other side remains in _____ .

Ans. : darkness

77. The time taken by the Earth to complete one revolution is about _____ days and 6 hours.

Ans. : 365

78. The _____ Hemisphere has summer when it is tilted towards the Sun.

Ans. : Northern

79. Eclipses were once feared because they were not _____

Ans. : understood

80. The Big Dipper appears to move around the _____ Star in the sky.

Ans. : Pole

*** Answer The Following Questions In One Sentence.[1 Marks Each]** **[51]**

81. Name the star that appears fixed in the sky.

Ans. : The star that appears nearly stationary in the sky from the Earth is the Pole Star.

82. What is the cause of day and night on Earth?

Ans. : The Earth's rotation causes day and night.

83. What is an equinox?

Ans. : An equinox is when the daytime lasts for 12 hours. It occurs around March 21 and September 23.

84. On which date does the Northern Hemisphere experience winter solstice?

Ans. : The Northern Hemisphere experiences winter solstice around December 22.

85. Which two motions of the Earth occur simultaneously?

Ans. : Rotation,Revolution

86. What is the shape of the Earth's orbit?

Ans. : The Earth's orbit is nearly circular.

87. How day and night occur on the Earth due to its rotation?

Ans. : Day and night occur because the Earth rotates on its axis from west to east. As it rotates, the side facing the Sun experiences day, and the side away from the Sun experiences night.

88. Since the Earth is rotating, shouldn't the stars also appears to move in the sky like the Sun?

Ans. : Yes, since the Earth rotates from west to east, the stars appear to move across the sky from east to west, just like the Sun. This movement is only apparent it happens because the Earth is spinning on its axis.

89. Why do different stars appear in the night sky over the course of a year?

Ans. : We see different stars at night during the year because the Earth moves around the Sun. As it moves, the part of the sky we can see at night also changes, so new stars and constellations become visible in different months.

90. Why days are longer in summer than in winter?

Ans. : Days are longer in summer than in winter because the Earth's axis is tilted. During summer, your part of the Earth is tilted towards the Sun, so it gets more sunlight for a longer time each day.

91. Padmashree saw the Orion constellation nearly overhead at 8 pm yesterday. When will she see Orion overhead today?

Ans. : Padmashree will see the Orion constellation overhead about 4 minutes earlier each day due to Earth's revolution. If she saw it at 8:00 pm yesterday, she will see it at 7:56 pm today

92. Abhay noticed that when it was daytime in India, his uncle who was in the USA was generally sleeping as it was night-time there. What is the reason behind this difference?

Ans. : The Earth rotates, which creates different time zones around the world. India is ahead of the USA in time. So when it's daytime in India, it is night-time in the USA, and Abhay's uncle is asleep.

93. What is the Earth's axis?

Ans. : It is an imaginary line passing through the North and South Poles around which the Earth rotates.

94. What direction does the Sun appear to move in the sky?

Ans. : The Sun appears to move from east to west in the sky.

95. What causes the apparent movement of stars in the night sky?

Ans. : The Earth's rotation makes stars appear to move from east to west.

96. What is meant by the term "revolution" in the context of Earth?

Ans. : It refers to the movement of the Earth around the Sun.

97. What is the Big Dipper called in Indian astronomy?

Ans. : Saptarishi

98. Name the two solstices experienced in a year.

Ans. : Summer solstice and winter solstice.

99. What happens on 21st June in the Northern Hemisphere?

Ans. : It is the longest day, known as the summer solstice.

100. What are equinoxes?

Ans. : Days when day and night are of equal length, around 21 March and 23 September.

101. What is a lunar eclipse?

Ans. : It happens when the Earth comes between the Sun and the Moon, casting a shadow on the Moon.

102. Can we safely view a lunar eclipse with the naked eye?

Ans. : Yes, it is safe to view a lunar eclipse without any eye protection.

103. Why can't Mercury or Venus block the Sun completely?

Ans. : Because they are too small and too far from Earth.

104. What is the name of the Indian observatory in Tamil Nadu for solar studies?

Ans. : Kodaikanal Solar Observatory.

105. Who was M.K. Vainu Bappu?

Ans. : A famous Indian astronomer known as the father of modern Indian astronomy.

106. Explain how the rotation of the Earth causes day and night.

Ans. : The Earth rotates on its axis from west to east. As it spins, the part facing the Sun experiences day, and the side away from it has night. This rotation completes in about 24 hours.

107. What would happen if the Earth stopped rotating?

Ans. : If the Earth stopped rotating, one side would always face the Sun and have continuous day, while the other would have permanent night. This would disturb life, weather, and temperature balance.

108. Why does the Pole Star appear fixed in the sky?

Ans. : The Pole Star lies nearly along Earth's axis of rotation, directly above the North Pole. As the Earth spins, stars appear to move, but the Pole Star stays almost in the same position.

109. How does the Earth's tilt lead to the formation of seasons?

Ans. : The Earth's axis is tilted. As it revolves around the Sun, this tilt causes different parts of the Earth to receive more or less sunlight at different times, leading to seasons.

110. Why does the Sun appear to rise in the east and set in the west?

Ans. : The Earth rotates from west to east. Because of this, the Sun appears to move across the sky from the eastern horizon to the western one.

111. What does the changing view of the night sky throughout the year tell us?

Ans. : As Earth revolves around the Sun, our view of space changes. This makes different constellations visible in different months, helping us track Earth's position in orbit.

112. Why is it dangerous to look at a solar eclipse without protection?

Ans. : During an eclipse, the Sun's rays are strong enough to damage the eyes. Looking directly at it without proper filters can cause permanent blindness.

113. Differentiate between total and partial solar eclipse.

Ans. : A total solar eclipse happens when the Moon completely covers the Sun. A partial eclipse occurs when only a part of the Sun is blocked by the Moon.

114. How do we know the Earth is rotating if we do not feel it?

Ans. : We observe apparent movements like the rising and setting of the Sun and stars. Experiments like Foucault pendulum also prove the Earth's rotation.

115. What is the tilt of the Earth's axis responsible for?

Ans. : The tilt of the Earth's axis is responsible for the change of seasons.

116. Why are seasons not prominent near the equator?

Ans. : Seasons are not prominent near the equator because the Sun's rays fall almost vertically throughout the year, causing little variation in temperature.

117. Why do scientists study solar eclipses?

Ans. : Scientists study solar eclipses to learn about the Sun's corona, solar flares, and other solar phenomena.

118. Which Indian text predicted eclipses accurately in ancient times?

Ans. : The Surya Siddhanta is an ancient Indian text that predicted eclipses accurately.

119. What do we call the path of the Earth around the Sun?

Ans. : The path of the Earth around the Sun is called its orbit.

120. Why is the apparent size of the Moon and the Sun similar in our sky?

Ans. : The apparent size of the Moon and the Sun is similar because the Sun is much farther away from Earth than the Moon, making both appear nearly the same size from Earth.

121. What precautions must be taken during a solar eclipse event in schools?

Ans. : Students should never look directly at the Sun and use special eclipse glasses or pinhole projectors to view the eclipse safely.

122. What causes the appearance of day and night on Earth?

Ans. : Rotation

123. In which direction does the Earth rotate?

Ans. : West to East

124. How long does it take for the Earth to complete one full rotation on its axis?

Ans. : 24 hours

125. What is the term for the movement of the Earth around the Sun?

Ans. : Revolution

126. How many days does the Earth take to complete one revolution around the Sun?

Ans. : 365 days and 6 hours

127. What causes the different seasons on Earth?

Ans. : Tilted Earth's axis of rotation and revolution of Earth around the Sun.

128. What is the phenomenon that occurs when the Sun, Earth, and Moon align in a straight line?

Ans. : Eclipse

129. What happens during a solar eclipse?

Ans. : Moon blocks Sun

130. What occurs during a lunar eclipse?

Ans. : Earth blocks Sun

131. What is the term used for the path followed by the Earth as it revolves around the Sun?

Ans. : Orbit

*** consists of questions of 2 marks each.** **[90]**

132. Differentiate between rotation and revolution.

Ans. :

Feature	Rotation	Revolution
Definition	Spinning of Earth on its axis	Movement of Earth around the Sun in a fixed path
Causes	Day and night	Seasons, changing view of night sky

133. Why does the Sun appear to rise in the East and set in the West?

Ans. : The Sun appears to rise in the East and set in the West because the Earth rotates from West to East. As we stand on Earth, this rotation makes it seem like the Sun is moving around us. So, the Sun's apparent movement is due to Earth's spin.

134. What causes the seasons on Earth?

Ans. : The seasons on Earth are caused by the Earth's axial tilt of 23.5 degrees and its revolution around the Sun. This tilt causes different hemispheres to receive more direct sunlight at different times of the year, leading to variations in temperature and day length that define the seasons.

135. Why do the poles experience six months of day and six months of night?

Ans. : The poles experience six months of day and six months of night because the Earth's axis is tilted. This tilt causes each pole to lean towards the Sun for half of the year, resulting in continuous sunlight. During the other half of the year, the same pole leans away from the Sun, causing continuous darkness.

136. Explain the tilt of the Earth's axis and its effects.

Ans. : The Earth's axis is tilted at an angle of about 23.5 degrees from the perpendicular to its orbital plane. This tilt causes different parts of the Earth to receive varying amounts of sunlight throughout the year, leading to the change in

seasons. The hemisphere tilted towards the Sun experiences summer, while the one tilted away experiences winter.

137. Why do eclipses not occur every month?

Ans. : Eclipses do not occur every month because the Moon's orbit around the Earth is tilted at an angle of about 5 degrees relative to the Earth's orbit around the Sun. This tilt means that the Sun, Earth, and Moon only align in a straight line (or nearly so) a few times each year, which is when eclipses can occur.

138. What is a solstice? Explain with examples.

Ans. : A solstice is an astronomical event that occurs twice each year when the Sun reaches its highest or lowest point in the sky relative to the Earth. The summer solstice (around June 21 in the Northern Hemisphere) marks the longest day of the year, while the winter solstice (around December 21 in the Northern Hemisphere) marks the shortest day of the year.

139. Why should we not view a solar eclipse directly?

Ans. : It's super important not to look directly at a solar eclipse because the Sun's rays are still very strong, even when it's partially covered. Staring at the sun without protection can seriously hurt your eyes and even cause blindness. Normal sunglasses aren't enough to protect you, so it's best to use special glasses or watch the eclipse indirectly to keep your eyes safe.

140. If Earth's axis was not tilted, what would be the effect on climate and seasons?

Ans. : If the Earth's axis had no tilt, there would be no distinct seasons. Every region would receive a consistent amount of sunlight year-round, resulting in a uniform climate. The absence of seasons would affect agriculture, ecosystems, and weather patterns, leading to significant environmental changes.

141. Why is it that total solar eclipses are visible only from a narrow region on Earth?

Ans. : Total Solar Eclipses visbile only from narrow view because The Moon, much smaller than the Sun, casts a limited shadow. During a total solar eclipse, only the small area covered by the darkest part of the Moon's shadow (the umbra) experiences complete darkness.As the Moon orbits Earth, this shadow traces a narrow path across the Earth's surface. Only observers within this specific path can witness the total solar eclipse. Those outside this narrow path see only a partial eclipse or none at all.

142. Why is the Moon able to block the entire Sun even though it is much smaller?

Ans. : During a solar eclipse, the Moon and the Sun appear to be of similar size from the Earth. This is called apparent size*. It depends on both the object's actual physical size and its distance from the observer.
Even though the Moon's actual physical size is much smaller than the Sun, the Moon is much closer to the Earth than the Sun. Because of the difference in distances, the

apparent sizes of the Sun and the Moon are nearly the same when viewed from Earth. When the Moon passes directly between the Earth and Sun, the Moon's apparent size is large enough to block the Sun's light, resulting in a solar eclipse.

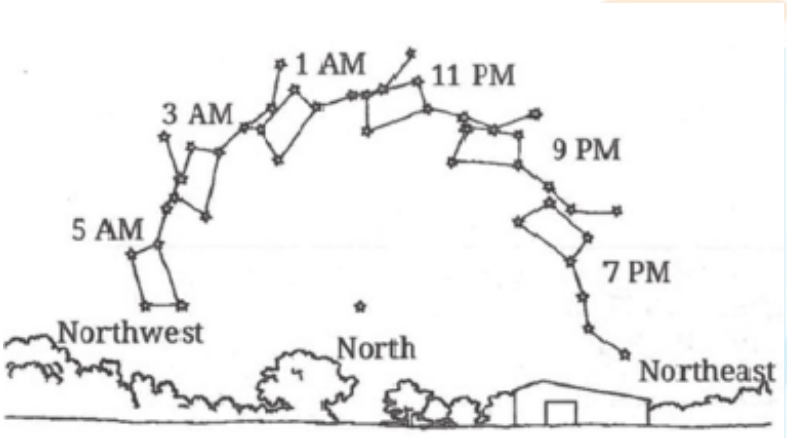
143. A place experiences continuous daylight in June. Where is this location and why does this happen?

Ans. : In June, the Northern Hemisphere is tilted towards the Sun.Due to this tilt, the North Pole receives sunlight for all 24 hours during its rotation.

144. Suppose Earth's orbit became a perfect circle. What impact would it have on seasons?

Ans. : If Earth's orbit became a perfect circle, the seasons would be less extreme and more uniform. The consistent distance from the Sun throughout the year would result in more stable temperatures, reducing the intensity of summer and winter.

145. Refer to the sketch provided, which shows the positions of the Big Dipper constellation in the night sky from 7 PM to 5 AM, as observed by a student in Pune on the night of 1-2 April.

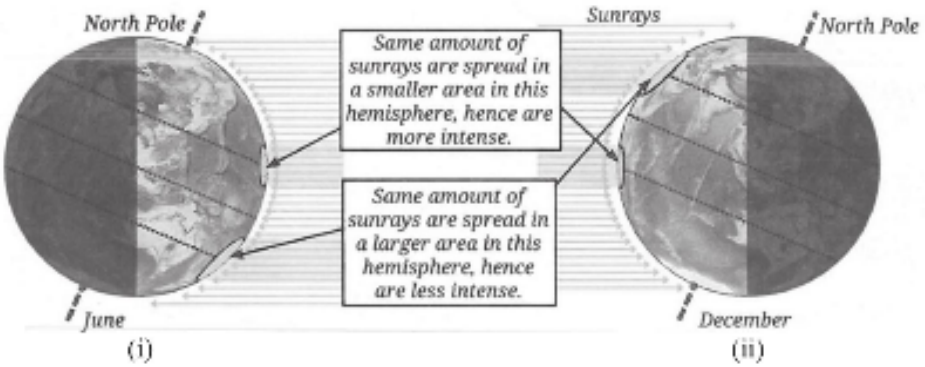


(a) What causes the Big Dipper to appear to move across the night sky in a circular path around the Pole Star? Explain the scientific reason behind this observation.

(b) Based on the positions shown in the sketch, describe the apparent direction of movement of the Big Dipper. What does this tell us about the Earth's motion?

Ans. : self

146. Study the diagram carefully. It shows how the tilt of the Earth's axis affects the distribution of sunlight on the Earth's surface during different months - June (i) and December (ii).



(a) Why does the Northern Hemisphere receive more intense sunlight in June and less intense sunlight in December? Explain using the concept of the Earth's tilt and the distribution of sunrays.

How does the variation in sunlight intensity between the two hemispheres affect the occurrence of seasons on Earth? Support your answer with reference to the image.

Ans. : self

147. Shine light from the torch placed at 1.5 m , on the globe in a dark room and record your observation. State how day and night occur on the earth due to its rotation on the basis of your observation.

Ans. :

When a torch shines on a globe in a dark room, only half of the globe is lit, representing daylight, while the other half is in darkness, representing night.

The Earth's rotation causes day and night as different parts of the Earth move into and out of the sunlight, creating a continuous cycle of light and darkness.

148. Draw the orientation of the Big Dipper in the sky with respect to the pole star after two hours intervals. You find pole star appears nearly stationary while all the stars move around it in the sky. Why?

Ans. : self

149. We go through a cycle of seasons every year. Is it related to the revolution of the Earth around the Sun in some way?

Ans. : Yes, the cycle of seasons is related to the Earth’s revolution around the Sun. As the Earth revolves around the Sun, its tilted axis causes different parts of the Earth to receive different amounts of sunlight at different times of the year. This change in sunlight causes the seasons.

150. Could the light from the Sun get blocked by the two planets which are revolving between the Earth and the Sun?

Ans. : No, the light from the Sun does not usually get blocked by the two planets (Mercury and Venus) because they are very small compared to the Sun and are far

away from the Earth. Sometimes they do come between the Earth and the Sun, but they block only a small part of the sunlight and it's hardly noticeable from Earth.

151. In Fig, how many hours of sunlight do the North Pole and the South Pole receive during one rotation of the Earth?

Ans. : In the given figure, the North Pole is in darkness, which means it is winter in the Northern Hemisphere. During this time, the North Pole receives 0 hours of sunlight, while the South Pole, experiencing summer, receives 24 hours of sunlight during one rotation of the Earth. This occurs due to the tilt of the Earth's axis.

152. Nandhini saw a group of stars rising at midnight on 21 June. When will she see the same group of stars rising at midnight next year?

Ans. : Stars rise about 4 minutes earlier each day because of Earth's orbit around the Sun. Over a year, this adds up to a 24-hour shift. This means Nandhini will see the same stars rising at midnight on 20 June next year, as they rise one day earlier on the calendar each year.

153. The Moon is much smaller than the Sun, yet it can block the Sun completely from our view during a total solar eclipse. Why is it possible?

Ans. : The Moon and the Sun look almost the same size from Earth, even though the Moon is much smaller. This happens because the Moon is much closer to Earth than the Sun. Since the Moon appears nearly the same size as the Sun in the sky, it can completely cover the Sun during a total solar eclipse.

154. The Indian cricket team matches in Australia are often held in December. Should they pack winter or summer clothes for their trip?

Ans. : They should pack summer clothes for their trip. In Australia, December falls in summer because it is in the Southern Hemisphere, where the seasons are opposite to those in India. So while it's winter in India in December, it is summer in Australia.

155. Why do you think lunar eclipses can be seen from a large part of the Earth when they happen, but total solar eclipse can be seen by only a small part of the Earth?

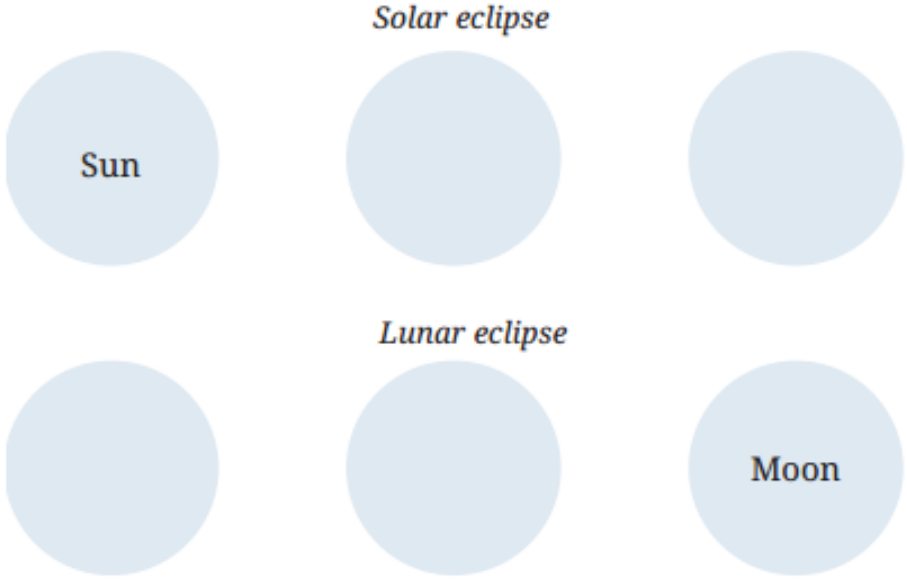
Ans. : A lunar eclipse can be seen from a large part of the Earth because the Earth's shadow is big, and it covers the Moon for a longer time. Everyone on the night side of the Earth can see it. But a total solar eclipse is visible only for a few minutes and

from a small area, because the Moon's shadow is small and moves quickly across the Earth due to the Moon's motion and Earth's rotation.

156. If the Earth's axis were not tilted with respect to the axis of revolution, explain what would be the effect on seasons?

Ans. : If the Earth's axis were not tilted, there would be no seasons. Every place on Earth would get the same amount of sunlight throughout the year. As a result, the weather would stay almost the same all year round no summer, winter, spring, or autumn. The length of days and nights would also stay nearly equal every day.

157. Fill in the circles in Fig. appropriately with one of the following: Sun, Moon, Earth.



Ans. :

158. Obeserve the figure :

Fig. A girl observing objects around her while riding a merry-go-round

Ans. : Observation and conclusion :

- When we are on a rotating object, like a merry- go-round, the surroundings seem to move in the opposite direction.
- When we fix our gaze at a particular tree, the tree appears to move around us in the opposite direction, that is, clockwise direction.
- In the same way, as the Earth rotates from west to east, the Sun appears to move from east to west. Therefore, it is actually the Earth's rotation that makes the Sun appear to move.

159. Obeserve the figure :

Fig. (a): Using a globe to understand rotation of the Earth, (b): Using a globe and a torchlight to understand day and night

Ans. : Observation and conclusion : This activity helps us understand how the Earth's rotation from west to east causes day and night. As the globe turns, different parts move into light (day) and then into darkness (night). The Sun appears to rise in the east, move across the sky, and set in the west. This shows that the movement of the Sun in the sky is due to the Earth's rotation.

160. Obeserve the figure :

Fig. Trying to cover a friend's head with the thumb

Ans. : Observation and conclusion : This activity shows that the apparent size of an object depends on both its actual size and how far it is from the observer. Even though the Sun is much bigger than the Moon, they look similar in size from Earth because the Moon is much closer to us. That's why the Moon can also appear to cover the entire Sun during a solar eclipse.

161. How does the Earth's rotation affect what we observe in the sky each day?

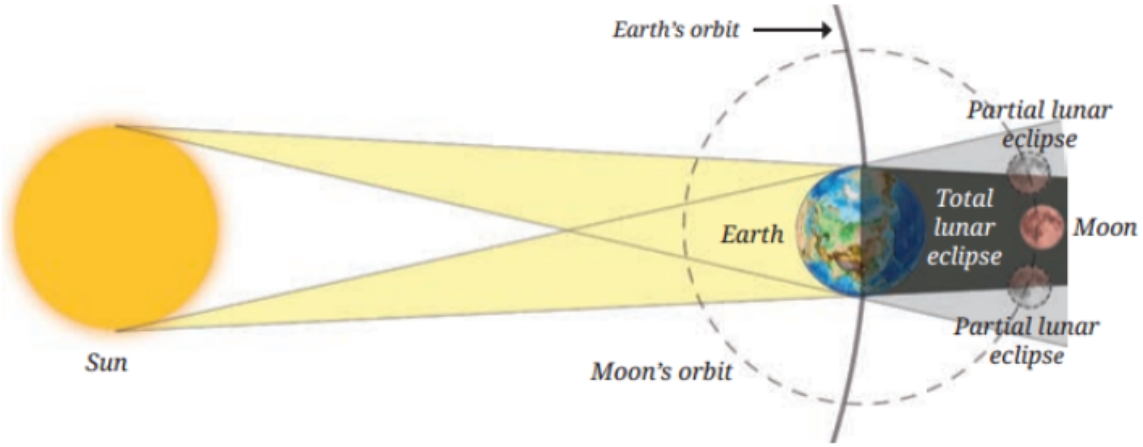
Ans. : The Earth rotates from west to east on its axis. As a result, we see the Sun rises in the east and sets in the west, even though the Sun is not actually moving. The same applies to the stars—they appear to shift across the sky because we are on a moving Earth. The Pole Star, however, seems fixed because it lies almost directly above Earth's rotational axis. This apparent movement is a result of our rotating viewpoint.

162. What are equinoxes and how are they different from solstices? Give examples with months.

Ans. : Equinoxes are days when the duration of day and night are equal, occurring around 21 March and 23 September. Solstices, on the other hand, are the longest and shortest days of the year. The summer solstice (around 21 June) has the longest day in the Northern Hemisphere, while the winter solstice (around 22 December) has the shortest. These changes are caused by the tilt of the Earth's axis during its yearly journey around the Sun.

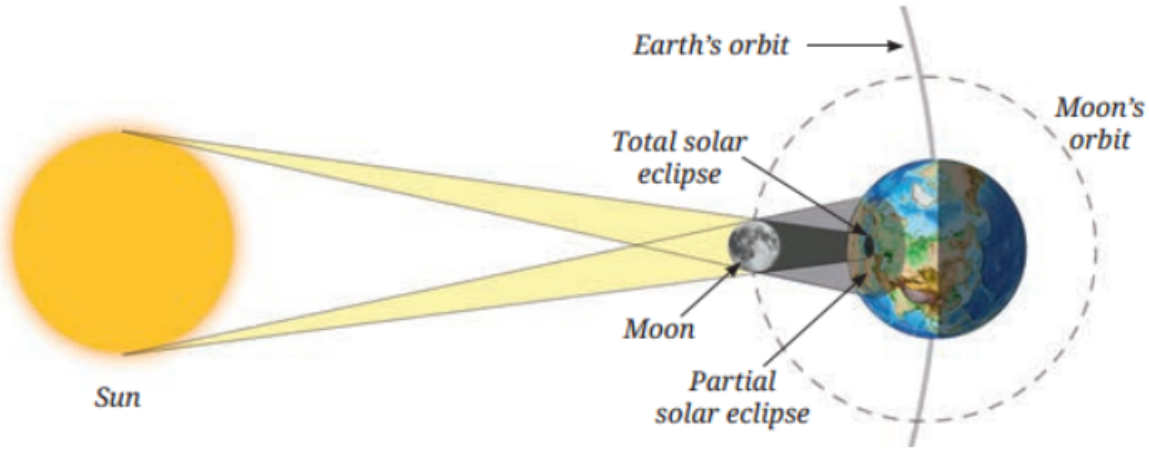
163. Draw and label a diagram showing the positions of the Sun, Earth, and Moon during a lunar eclipse.

Ans. :



164. Draw and label a diagram showing the positions of the Sun, Earth, and Moon during a solar eclipse.

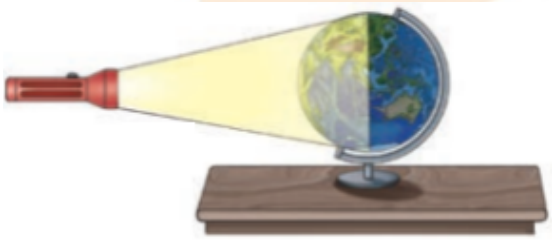
Ans. :



165. Use a torch and a ball in a dark room to show how only half of the Earth receives sunlight. Describe your observation and also draw the diagram.

Ans. :

Shining the torch on one side of the ball shows only half is lit. This represents how sunlight falls on Earth. The bright side shows day, and the dark side shows night due to rotation.



Using a globe and a torchlight to understand day and night

166. Draw a neat and clean diagram to explain the rotation of the Earth.

Ans. : self

167. State two ancient Indian contributions in the field of astronomy related to eclipses.

Ans. : -The Surya Siddhanta accurately predicted solar and lunar eclipses using mathematical calculations.
-Ancient astronomers could calculate the timings of eclipses and describe the movement of the Sun, Moon, and planets.

168. Describe the position of the Earth, Sun, and Moon during a lunar eclipse.

Ans. : self

169. Explain how the seasons would be affected if the Earth's axis were not tilted.

Ans. : If the Earth's axis were not tilted, there would be no variation in sunlight at different times of the year. As a result, seasons would not occur, and the temperature would remain fairly constant throughout the year everywhere on Earth.

170. Draw a diagram to explain the different seasons on Earth.

Ans. : self

171. Write out the difference between a total solar eclipse and a partial solar eclipse.

Ans. :

Feature	Total Solar Eclipse	Partial Solar Eclipse
Coverage	The Sun is completely covered by the Moon	The Sun is partially covered by the Moon
Area	Visible in a small area on Earth	Visible in a larger area on Earth
Appearance	Day becomes dark briefly	Sun appears crescent-shaped

172. What do you mean by spring and autumn equinox?

Ans. : The spring equinox and autumn equinox occur when the day and night are of equal duration all over the Earth. These occur around 21 March (spring) and 23 September (autumn).

173. Why does only a small area experience a total solar eclipse while lunar eclipses are visible over a larger area?

Ans. : During a total solar eclipse, the Moon's shadow (umbra) falls on a small part of the Earth, so only that area sees the total eclipse. During a lunar eclipse, the Earth's shadow falls on the Moon, which can be seen by anyone on the night side of Earth, covering a much larger area.

174. Write a brief report on the Kodaikanal Solar Observatory and the contributions of M.K. Vainu Bappu to Indian astronomy.

Ans. : The Kodaikanal Solar Observatory, established in 1899 in Tamil Nadu, is famous for studying the Sun, solar phenomena, and eclipses. M.K. Vainu Bappu

contributed significantly to Indian astronomy by discovering the Bappu-Bok-Newkirk comet, establishing modern observatories, and advancing solar and stellar studies in India.

175. Describe how ancient Indian astronomers predicted eclipses and what modern instruments we use today.

Ans. : Ancient Indian astronomers used observations of the Sun, Moon, and planetary positions along with mathematical calculations to predict eclipses. They recorded patterns and developed texts like Surya Siddhanta. Today, modern instruments such as telescopes, satellites, and computers help astronomers predict eclipses with great accuracy.

176. Four friends used the following ways to see the solar eclipse. Who among them was being careless?
(i) Ravikiran used a solar eclipse goggle.
(ii) Jyothi used a mirror to project the Sun's image.
(iii) Adithya saw the Sun directly with his eyes.
(iv) Aruna attended a programme arranged by a planetarium.

Ans. : (iii) Adithya was being careless because he looked at the Sun directly with his eyes, which can damage eyesight. The safe ways to view a solar eclipse are using solar eclipse glasses, indirect viewing methods, or attending guided programmes.

*** consists of questions of 3 marks each.** **[12]**

177. Read the passage and answer the questions :
Rashmika noticed that the shadows of trees on her way to school were long in the morning and much shorter in the afternoon. She began to wonder why the size of the shadows changed throughout the day.
Q.1. What causes the length of a shadow to change during the day?
(a) The shape of the object
(b) The movement of the Earth around the Sun
(c) The change in the Sun's position in the sky due to Earth's rotation
(d) The distance between the Earth and the Sun
Q.2. When would Rashmika observe the shortest shadow of a tree?
(a) Early morning (b) Late evening
(c) Noon (d) Midnight
Q.3. Which direction does a shadow point at noon in India?
(a) East (b) West
(c) South (d) North

Ans. : (c) The change in the Sun's position in the sky due to Earth's rotation
(c) Noon
(d) North

178. Read the passage and answer the questions :
During a school science event, students watched a solar eclipse. Some used solar viewing goggles, some projected the image on a wall using a mirror, and one student tried looking directly at the eclipse.
Q.1. Which method of solar eclipse viewing is unsafe?
(a) Using a mirror to project the image
(b) Using solar eclipse glasses
(c) Watching a live stream online
(d) Looking at the eclipse directly with the naked eye
Q.2. Why does the Sun temporarily disappear during a total solar eclipse?
(a) The Earth comes between the Sun and the Moon
(b) The Sun moves behind the Moon
(c) The Moon blocks sunlight from reaching Earth
(d) The Sun burns out temporarily
Q.3. What is the correct alignment of celestial bodies during a solar eclipse?
(a) Earth - Moon - Sun
(b) Moon - Sun - Earth
(c) Sun - Earth - Moon
(d) Sun - Moon - Earth

Ans. : (d) Looking at the eclipse directly with the naked eye
(c) The Moon blocks sunlight from reaching Earth
(d) Sun - Moon - Earth

179. During a visit to an observatory, Maya observed a solar eclipse through a special protective lens. The Moon was between the Earth and the Sun, blocking the Sun's light. Maya was told that it was important never to look directly at the Sun during such an event.
(i) Why is it dangerous to look directly at the Sun during a solar eclipse?
(ii) What happens during a solar eclipse?
(iii) How should one safely observe a solar eclipse?

Ans. : (i) Looking directly at the Sun can damage the eyes and cause blindness.
(ii) The Moon comes between the Earth and the Sun, blocking the Sun's light.
(iii) By joining eclipse viewing events organised by astronomy clubs or planeteria as they provide specialised eye protection for viewing eclipse.

180. Rahul was observing the sky one evening when he noticed that the Sun appeared to set in the western sky. The next day, his friend told him that the Earth rotates from west to east, which is why the Sun rises in the east and sets in the west. Rahul was curious and asked his teacher how this phenomenon happens.
(i) Why does the Sun appear to rise in the east and set in the west?
(ii) How does the Earth's rotation affect the appearance of the Sun in the sky?
(iii) What is the reason for the Sun's movement across the sky?

Ans. : (i) Since the Earth rotates from west to east and we are viewing the Sun from the Earth.

(ii) The Earth's rotation makes the Sun appear to move across the sky in opposite direction.

(iii) The Earth's rotation causes the Sun to appear to rise in the east and set in the west.

*** consists of questions of 5 marks each.** **[35]**

181. Describe how day and night occur using a globe and a torch model.

Ans. : → The occurrence of day and night can be demonstrated using a globe and a torch in a darkened room.

→ The globe represents the Earth, and the torch simulates the Sun.

→ When the torchlight shines on the globe, only one side of the globe is illuminated, indicating daytime on that part of the Earth.

→ The opposite side, which is not lit by the torch, experiences nighttime.

→ As the globe is slowly rotated, different areas move into and out of the light, replicating Earth's rotation on its axis.

→ This rotation causes a continuous cycle where locations on Earth transition from darkness to light, resulting in the cycle of day and night.

→ The Earth's approximately 24-hour rotation period defines the length of a day-night cycle, and the axis of rotation passes through the North and South Poles, influencing how different regions experience daylight and darkness.

182. Explain the position and role of the Sun, Moon, and Earth in a solar and a lunar eclipse.

Ans. : 1. Solar Eclipse

Position: *During a solar eclipse, the Moon passes* between the Sun and Earth, blocking the Sun's light and casting a shadow on Earth. So, the order is: Sun → Moon → Earth.

→ **Role of Each Body:**

→ **Sun:** The source of light, which is being blocked.

→ **Moon:** Acts as an obstacle, blocking the sunlight and casting a shadow on Earth.

→ **Earth:** A portion of the Earth falls under the Moon's shadow, causing people in that area to experience the solar eclipse.

2. Lunar Eclipse

Position: *During a lunar eclipse, the Earth passes* between the Sun and the Moon, casting a shadow on the Moon. So, the order is: Sun → Earth → Moon.

→ **Role of Each Body:**

→ **Sun:** The source of light.

→ **Earth:** Acts as an obstacle, casting a shadow on the Moon.

→ **Moon:** Moves into the Earth's shadow, causing it to dim and appear reddish.

In a solar eclipse, the Moon blocks the Sun as seen from the Earth, and in a lunar eclipse, the Earth blocks the Sun from reaching the Moon.

183. How do seasons occur? Support your answer with diagrams showing Earth's tilt.

Ans. : self

184. Compare and contrast solar and lunar eclipses in detail.

Ans. :

Feature	Solar Eclipse	Lunar Eclipse
Cause	Moon blocks the Sun's light	Earth blocks the Sun's light
Alignment	Sun - Moon - Earth	Sun - Earth - Moon
Visibility	Small area on Earth	Large area on Earth
Occurrence	Daytime	Nighttime
Safety	Requires eye protection	Safe to view with the naked eye

185. How did ancient Indian astronomers explain celestial motions?

Ans. : → Ancient Indian astronomers, including Aryabhata, made significant observations and explanations of celestial motions.

→ Aryabhata, in his treatise "Aryabhatiya," explained that the Earth rotates on its axis, causing the apparent daily motion of celestial objects such as the Sun, Moon, planets, and stars.

→ He used an analogy of a person in a moving boat seeing stationary objects moving backward to illustrate how observers on Earth perceive the stars as moving from east to west due to the Earth's rotation.

→ Aryabhata also calculated the time taken by the Earth to complete one rotation on its axis, estimating it to be approximately 23 hours, 56 minutes, and 4.1 seconds, a value remarkably close to modern measurements.

→ This understanding of Earth's rotation as the cause of apparent celestial movements marked a significant contribution to astronomy.

186. Describe the motion of the Earth using a labelled diagram showing rotation and revolution.

Ans. : The Earth spins on its axis once every 24 hours. This is called rotation and it causes day and night. At the same time, the Earth travels around the Sun in an orbit, completing one revolution in about 365 days. The combination of rotation and revolution, along with the tilt of the Earth's axis, explains the cycles of day, night, and seasons.

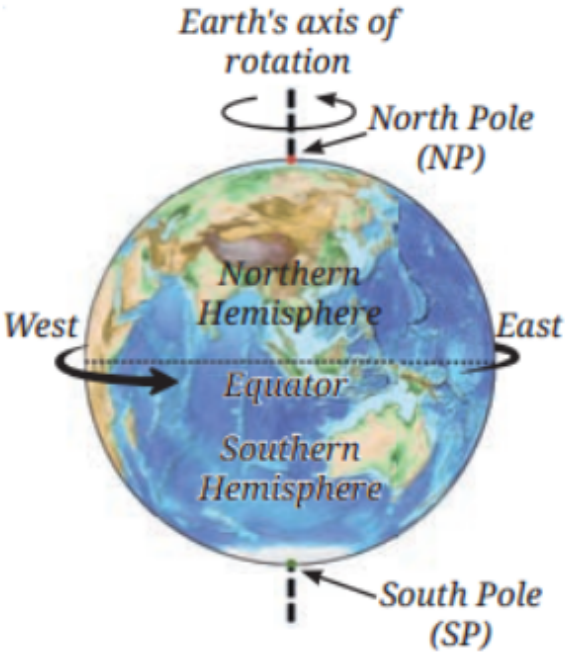


Fig. Rotation of the Earth

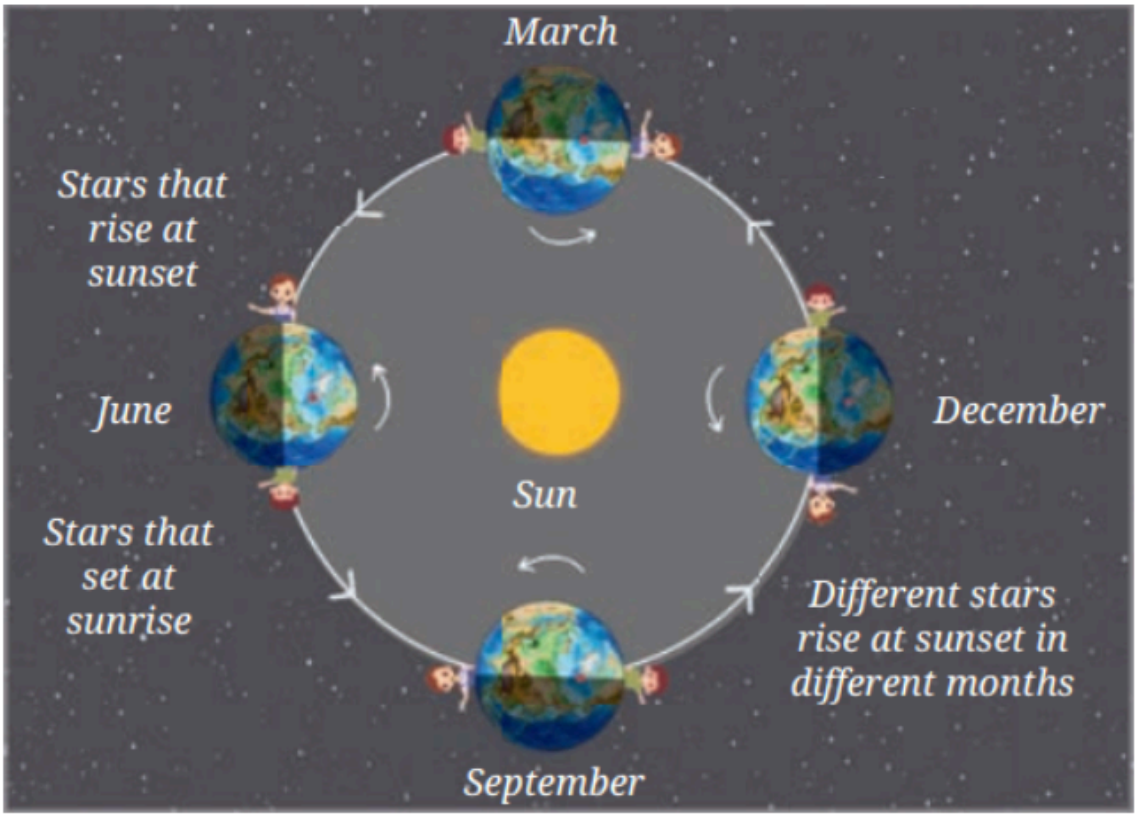


Fig. Changing view of the night sky

187. Draw a diagram of the solar and lunar eclipse and write down about the
(i) total solar eclipse
(ii) partial solar eclipse
(iii) total lunar eclipse
(iv) partial lunar eclipse

Ans. : self

* Match the Following. [8]

Column A	Column B
188. Rotation	(a) Causes change in seasons
189. Revolution	(b) Longest day in Northern Hemisphere
190. Equator	(c) 24 hours
191. Lunar eclipse	(d) Receives nearly equal sunlight all year
	(e) Earth between Sun and Moon

Ans. : (1-c,b-a,3-d,4-e)

Column A	Column B
192. Earth's rotation	(a) Causes seasons
193. Earth's revolution	(b) Stellarium app
194. Solar and Lunar eclipse	(c) Causes day and night
195. Revolution + Tilt	(d) Sunlight falls unequally on Earth

Ans. :

Column A	Column B
1. Earth's rotation	(c) Causes day and night
2. Earth's revolution	(a) Causes seasons
3. Solar and Lunar eclipse	(b) Stellarium app
4. Revolution + Tilt	(d) Sunlight falls unequally on Earth

----- -----