Motions of the Earth

E. Long-answer questions:

1. Why are days shorter and nights longer during the winter season and vice-versa during summer?

2. What do the terms solstice and equinox mean? Explain with the help of diagrams.

3. What is the importance of the inclination of the earth's axis?

4. What causes the apparent changes in the Sun's position during the day? Explain with an example.

5. Why do poles experience about six months day and six months night?

Solutions

E. Long-answer questions:

1. During the winter season in the Northern Hemisphere, the sun is vertical over the Tropic of Capricorn and the Southern Hemisphere is tilted towards the sun, so days are shorter and nights are longer for the Northern Hemisphere and vice-versa for the Southern Hemisphere. When the Sun is vertical over the Tropic of Cancer, the Northern Hemisphere experiences summer, days are longer and nights shorter. The Southern Hemisphere now experiences winter with longer days and shorter nights.

2. **Solstice** means standing still. Solstice occurs twice a year, when the tilt of the axis is most inclined towards or away from the Sun, causing the Sun's apparent position in the sky to reach its northernmost or southernmost extreme. Equinox-'Equi' means 'equal' and 'nox' means "nighty hence it is the time when we have night and day of equal length all over the earth. Equinox occurs twice a year, when the earth's axis is neither tilted away from the sun nor towards it and the centre of the Sun is in the same plane as the earth's equator. Autumn Equinox occurs on 23rd September and Spring Equinox on 21st March in the Northern Hemisphere when the Sun's rays fall directly at the equator.

3. The importance of the inclination of the Earth's axis is that it causes seasons as a part; of the earth is tilted towards the Sun (summer season) and part of it away from the Sun, (winter season). It also causes varying lengths of days and nights at the same time of the year.

4. The apparent changes in the Sun's position during the day is due to the earth's rotation -so the Sun appears to move across the sky from east to west. But actually the Sun is not changing its position but the earth is. So we see the various changes in the Sun's position-it is lowest at dawn and dusk and highest at noon.

5. Where the Southern Hemisphere is tilted away from the Sun, the Sun's rays do not reach beyond the Antarctic Circle causing continuous darkness for 24 hours for about six months. The Northern Hemisphere will then be having summer. So beyond the Arctic Circle there will be continuous daylight for 24 hours for 6 months.