Section - 3

Q.4 - Answer ⇒

1) Solar constant ⇒ The solar constant is energy received from the sun on a unit area perpendicular to sun's rays at the mean distance from the sun, outside the atmosphere.

- The standard value of the solar constant based on experimental measurements is 1367 W/m² with an accuracy of ± 1.5%.
- The value of solar constant remains constant throughout the year. However this value change with location because earth to sun distance changes seasonally with time.

2. Hour Angle (ω) ⇒ It is the angle through which the earth must be rotated to bring the meridian of a point directly in line with sun's ray.

- In other words, it is the angular displacement of the sun, east or west of local meridian. due to the rotation of the earth on its axis at an angle of 15° per hour.

- Mathematically hour angle can be expressed as

$$\omega = 15\,(LST - 12)$$

where, LST = Local solar time.

3. Zenith Angle (θ_z) ⇒ It is the vertical angle between the sun's rays and line perpendicular to the horizontal plane through the point.

Mathematically :

$$\theta_z = \frac{\pi}{2} - a$$

4. Global radiation :⇒ Global radiation is the total short wave radiation from the sky falling onto a horizontal surface on the ground. It includes both the direct solar radiation and the diffuse radiation resulting on scattered sunlight.