Ans ⇒ Hours Angle(ω) :- It is the Angle through which the earth must be Rotated to bring the meridian of a point directly in line with the Sun's Ray.

It is the angular displacement of the Sun, East or west of the local meridian, due to Rotation of the earth on its axis at an Angle of 15° per Hours-

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

Where = LST = Local Solar time—

(ii) Day Length :- The time of Sunrise, Sunset and the duration of the day length depend upon the latitude of the location and the month in the year.

at Sunrise and Sunset, the Sunlight is parallel to the ground surface with a zenith angle of 90°

$$\theta_z = 0 \quad \text{and} \quad \omega = \omega_s$$

$$\cos \omega_s = -\tan\phi \tan\delta$$

on tilted surface

$$\omega_s = \cos^{-1}[(-\tan(\phi-\beta)\tan\delta)]$$

The corresponding day length (in Hours) is given by

$$N = \frac{2}{15}\cos^{-1}[-\tan(\phi-\beta)\tan\delta)$$