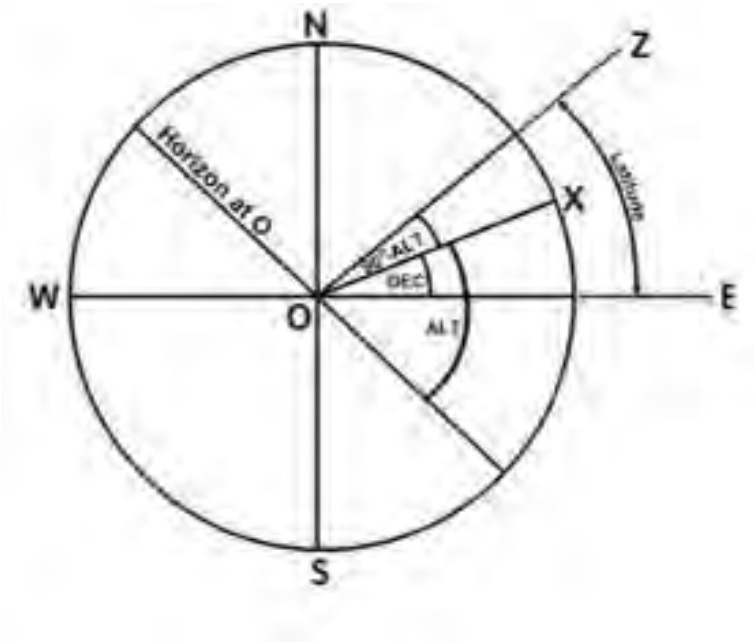

Figure 11.4: Understanding the various angles of declination, altitude, and latitude. The circle represents the earth. OZ is the vertical at the observer's position on the surface of the earth, and a line parallel to horizontal is drawn through the centre of the earth O. The point X denotes the position of the sun, and the angle of OX with the horizontal is the altitude. The angle that OX makes with the East-West line or equator is the declination of the sun, and the angle that OZ makes with the equator is the observer's latitude.

From the figure it is clear that

Latitude = declination + (90°- altitude)

However, this is the case only when declination and latitude are both north or both south, and the latitude is greater than the declination. But there could be other cases.