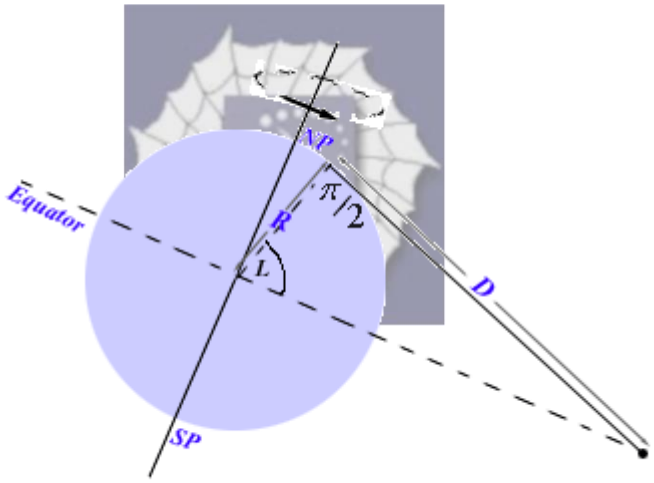
**99.**

**Problem 16.48 (RHK)**

*Spy satellites have been placed in the geosynchronous orbit above the Earth's equator. We have to find the greatest latitude L from which the satellites are visible from the Earth's surface.*




**Solution:**

Distance of geosynchronous orbit from the centre of the Earth is $4.22\times10^{7}$ m.

Radius of the Earth is $6.37\times10^{6}$ m.

From the geometry describing the problem as shown in the diagram, we note

$$\sin\left(\frac{\pi}{2}-L\right)=\frac{R}{D}=\frac{6.37\times10^{6}}{4.22\times10^{7}}=0.151\,,$$

or

$$\cos L=0.151\,,$$

This gives

$$L=\cos^{-1}0.151=81.3^{0}\ .$$