Example 2:-

Two tangents intersect at Station 4 + 016.77. The deflection angle to the right is 40° 00' 00". It is decided to design the highway for a maximum speed of 90 km/hr., and using AASHTO recommendation for superelevation and friction a minimum radius of 270 meters and a the degree of curve, D is to be 2°. Calculate T, Lc, R and the stationing of the P.C. and P.T. using 200-meter arc length

Sol:-

Sta. P.I = 4+016.77 , Δ = 40° , D = 2° , L = 200 m

Find T, R, Lc, Sta. P.C, and Sta. P.T

$$R = \frac{572.958}{D} = \frac{572.958}{2} = 286.479 > 270 \qquad O.K$$

$$T = R\tan\frac{\Delta}{2} = 286.479 \times \tan 20 = 104.27\ m$$

$$Lc = 2R\sin\frac{\Delta}{2} = 2 \times 286.479 \times \sin 20 = 195.96\ m < L \qquad O.K$$

Sta. P.C = Sta. P.I – T = 4016.77 – 104.27 = 3+912.5

Sta. P.T = Sta. P.C + L = 3912.5 + 200 = 4+112.5

Example 3:-

Two tangents intersect at 6 +26.57. It is proposed to insert a circular curve of radius 304.8 m. The deflection angle being 16°38'. Calculate

a) Change of tangents points (P.C, P.T)

b) Lengths of long chord, mid ordinate and external distance

Sol:-

Sta. P.I = 6+26.57 , Δ = 16°38' , R = 304.8 m

Find Sta. P.C, Sta. P.T, Lc, M, and E

$$T = R\tan\frac{\Delta}{2} = 304.8 \times \tan\frac{16.633}{2} = 44.56\ m$$

$$D = \frac{572.958}{R} = \frac{572.958}{304.8} = 1.88\ degree$$

$$L = \frac{10\,\Delta}{D} = \frac{10 \times 16.633}{1.88} = 88.47\ m$$

Sta. P.C = Sta. P.I – T = 626.57 – 44.56 = 5+82.01

Sta. P.T = Sta. P.C + L = 582.01 + 88.47 = 6+70.48

$$Lc = 2R\sin\frac{\Delta}{2} = 2 \times 304.8 \times \sin\frac{16.633}{2} = 88.17\ m < L \qquad O.K$$

$$M = R\,(1 - \cos\frac{\Delta}{2}) = 304.8 \times \left(1 - cos\frac{16.633}{2}\right) = 3.21m$$

$$E = R\left(sec\frac{\Delta}{2} - 1\right) = 304.8 \times \left(sec\frac{16.633}{2} - 1\right) = 3.24m$$