NAME:- SADEEQ AFRIDI

ID NO:- 7913

SECTION:- A

Subject :- Advance Engineering
Survey

QNO 1:-
PART (A)

Solution:

Tangent meet at change = 7913 ft

Deflection angle = $14° 13' 23''$

Degree of curve = $5°$

$$R = \frac{5729.58}{D}$$

$$R = \frac{5729.58}{5 ft}$$

$$= 1145.91$$

Now we find

Tagent length = $BT_1 = BT_2 = R \tan\left(\frac{\theta}{2}\right)$

$$BT_1 = BT_2 = 1145.91 \times \tan\left(\frac{14° 13' 23''}{2}\right)$$

$$BT_1 = BT_2 = 142.916 ft$$

Length curve :-

$$L = \left(\frac{\pi R \theta}{180^\circ}\right)$$

$$L = \frac{3.14 \times 1145.91 \times 14^\circ 13' 23''}{180^\circ}$$

$$L = 284.45 ft$$

Now we find change

change of intersect at point B = 7913 ft

So,

$$T_1 = 7913 - 142.9655$$

$$T_1 = 7770.0345$$

Now

$$T_2 = 7770.0345$$

$$T_2 = 8054.4845$$

Now:

Length of chord:-

$$l = 2R\sin\left(\frac{\theta}{2}\right)$$

$$l = 2 \times 1145.916 \sin\left(\frac{14^\circ 13' 23''}{2}\right)$$

$$l = 283.731\, ft^2$$

Mid ordinate:-

$$EF = R\left(1-\cos\left(\frac{\theta}{2}\right)\right)$$

$$EF = 1145.916\left(1-\cos\left(\frac{14^\circ 13' 23''}{2}\right)\right)$$

$$EF = 8.81\, ft^2$$

Now

External distance

$$BF = R\left(\frac{1}{\cos\left(\frac{\theta}{2}\right)}-1\right) \quad \text{OR:} \quad R\left(\sec\frac{\theta}{2}-1\right)$$

$$BF = 1145.916\left(\sec\left(\frac{14^\circ 13' 23''}{2}\right)-1\right)$$

$$\boxed{BF = 8.883\, ft}$$

(4)

Question No 2:-

part B:-

Sol. ID NO = 7913 => 7.913

offset NO	offsets	Simpson multipler	product
0	7.913	1	7.913
30	10.913	4	43.652
60	11.913	2	23.826
90	5.913	4	23.652
120	3.913	2	7.826
150	4.913	1	4.913

$\Sigma = 111.782$

Area (h-ho)

$\Rightarrow \frac{b}{3} \times 111.782$

$= \frac{30}{3} \times 111.782$

$\boxed{\text{TotalArea} = 1117.82}$

(5)

QNo 02

Given Data:

As we assume radius so it becomes

ID - 7000 = 7913 - 7000 = 913 m

R = 913 m

deflection angle = 20°40'

change at point of instersection which alse we assume

~~ID - 3000 = 7913~~

ID - 3000 = 7913 - 3000 = 4913 m

Interval = 20m

So wee can find = Tangent length ~~change~~

change $BT_1 = BT_2 = R\tan\left(\frac{\theta}{2}\right)$

$= 913\tan\left(\frac{20°40'}{2}\right)$

166.468

Now length of curve

$$L = \frac{\pi R \theta}{180^\circ}$$

$$L = \frac{3.14 \times 913 \times 20^\circ 40'}{180^\circ}$$

$$L = 329.153$$

Now chainage

$$T_1 = 4913 - 166.468$$

$$T_1 = 4746.532$$

chainage at $T_2 = 4746.532 + 329.153$

$$T_2 = 5075.685$$

P. t. o

No we can find

~~length of 1st sub cord = 4760.532~~

length of 1st sub cord = 4780 - 4746.532

$$\boxed{C_1 = 33.468\,m}$$

Length of last sub cord = 5075.685 - 5040

$$\boxed{C_{15} = 35.685} \Rightarrow \boxed{C_{15} = 35.685}$$

So we know that

$$C_2 = C_3 = C_4 = C_5 = C_6 = C_7 = C_8 = C_9$$

$$= C_{10} = C_{11} = C_{12} = C_{13} = C_{14} = 20\,m$$

Now we can find no of chords

So No of Chords = $\frac{\text{Length of curve} - C_1}{\text{Internal}}$

$$= \frac{329.153 - 33.468}{20}$$

$$\boxed{= 14.78 = 15 \text{ chords}}$$

Now deflection angle

$$\delta_1 = \frac{1718 \cdot 9 \times c_1}{60R}$$

$$\delta_1 = \frac{1718 \cdot 9 \times 33 \cdot 468}{60 \times 913}$$

$\delta_1 = 1^\circ 3' 0 \cdot 6''$ OR $= \delta_1 = 1^\circ 3' 0 \cdot 600999''$

$$\delta_2 = \frac{1718 \cdot 9 \times 20}{60 \times 913} = 0^\circ 37' 39 \cdot 23''$$

So

$\delta_2 = \delta_3 = \delta_4 \cdot \cdot \cdot \cdot \cdot \delta_{14} = 0^\circ 37' 39 \cdot 23''$

$$\delta_{15} = \frac{1718 \cdot 9 \times 35 \cdot 685}{60 \times 913}$$

$\delta_{15} = 1^\circ 7' 11 \cdot 037''$

p. t. o

Now total deflection (Logentidual) angle For the chords are.

$\Delta_1 = \delta_1 = 1^\circ 3' 0.6''$

$\Delta_2 = \delta_1 + \delta_2 = \Delta_1 + \delta_2 = 1^\circ 40' 39.83''$

$\Delta_3 = \Delta_2 + \delta_3 = 2^\circ 18' 19.06''$

$\Delta_4 = \Delta_3 + \delta_4 = 2^\circ 55' 58.29''$

$\Delta_5 = \Delta_4 + \delta_5 = 3^\circ 32' 47.52''$

$\Delta_6 = \Delta_5 + \delta_6 = 4^\circ 10' 26.75$

$\Delta_7 = \Delta_6 + \delta_7 = 4^\circ 48' 5.98''$

$\Delta_8 = \Delta_7 + \delta_8 = 5^\circ 25' 45.21''$

$\Delta_9 = \Delta_8 + \delta_9 = 6^\circ 3' 24.44''$

$\Delta_{10} = \Delta_9 + \delta_{10} = 6^\circ 41' 3.67''$

$\Delta_{11} = \Delta_{10} + \delta_{11} = 7^\circ 18' 42.9''$

$\Delta_{12} = \Delta_{11} + \delta_{12} = 7^\circ 56' 22.13''$

$\Delta_{13} = \Delta_{12} + \delta_{13} = 8^\circ 34' 1.36''$

$\Delta_{14} = \Delta_{13} + \delta_{14} = 9^\circ 11' 40.59''$

~~$\Delta_{15} = \Delta_{14} + \delta_{15} = 9^\circ 11' 40.59''$~~

$\Delta_{15} = \Delta_{14} + \delta_{15} = 10^\circ 18' 51.627''$

$$\text{Check} = \frac{\phi}{2} = \frac{20^\circ 40' 0''}{2} = 10^\circ 20' 0''$$

Corrected

~~Q13~~

Q3:-

Solution:-

ID NO: 7913

$\alpha = 180° - 130° = 50°$

$\beta = 180° - 140° = 40°$

$\varphi = \alpha + \beta° \Rightarrow 50° + 40° = 90°$

$I = 180° - 90° = 90°$

Radius of 1st arc = 7913 - 300
= 7613

" of 2nd arc = 7913 - 200
= ~~7713~~ 7713

Change at intersection point =

4913 - 400 = 4513 m

$KT_1 = KN = R_S \tan\left(\frac{\alpha}{2}\right) = 7613 \tan\left(\frac{50°}{2}\right)$

$KT_1 = KN = 3550$ m

P.T.O

$MN = M\bar{I}_2 = R_L \tan\left(\frac{\beta}{2}\right)$

$MN = M\bar{I}_2 = 7713 \tan\left(\frac{40}{2}\right)$

$MN = M\bar{I}_2 = 2807.302 m$

Now we find KM

$KM = M\bar{I}_2 + KN = 2807.302 + 3550$

$= 6357.302 m$

Now for further solution.

Find ΔBKM by sin rule

$$\frac{BK}{\sin\beta} = \frac{MK}{\sin(I)}$$

P.T.O

$$\frac{BK}{\sin\beta} = \frac{MK}{\sin(I)}$$

$$BK = \frac{\cancel{KI}\, MK \sin\beta}{\sin(I)}$$

$$BK = \frac{6357.302 \times \sin(40^\circ)}{\sin(90^\circ)}$$

$$\boxed{BK = 4086.394\ m}$$

$$BM = \frac{MK \sin(\alpha)}{\sin(I)} = \frac{6357.302 \times \sin(50^\circ)}{\sin(90^\circ)}$$

$$\boxed{BM = 4869.97\ m}$$

Now we find:-

$$IS = KT_1 + BK = 3550 + 4086.394$$

$$TS = 7636.394\ m$$

p.t.o

Now:

$$T_2 = MT_2 + BM = 2807.302 + 4869.97$$

$$\boxed{T_2 = 7677.272}$$

$$\cancel{T_2 = 7677.272}$$

Now

$$L_S = \frac{\pi R_S \alpha}{180^\circ} = \frac{3.14 \times 7613 \times 50^\circ}{180^\circ}$$

$$\boxed{L_S = 6640.227\ m}$$

$$L_L = \frac{\pi R_L B}{180^\circ} = \frac{3.14 \times 7713 \times 40^\circ}{180^\circ}$$

$$\boxed{L_L = 5381.07\ m}$$

Now we find chainage

Chainage of intersection point minus TS

$T_1 = 7513 - 7636.394$

$T_1 = -123.394$

plus Ls $= -123.394 + 6640.227$

$= 6516.833\,m$

Chainge of $T_2 = 6516.833 + 5381.07$

$T_2 = 11897.903\,m$