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7983

Section B

ADvance engineering Survey.

Anol: (9)-

Given:

Tangent meet at chainage = 79839ft

Deflection angle = 14° 13' 23"

Degree of curve = 5

Solution:

$$= \frac{5729.58}{5^\circ}$$

$$= 1145.91$$

Tangent length = $BT_1 = BT_2$

$$R\tan(\phi/2)$$

$$= 1145.91 \times \tan\left(\frac{14^\circ 13' 23''}{2}\right)$$

$$= 143.98 ft.$$

$$L = \frac{\pi R \phi}{180}$$

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

$L = 984.45\,ft$

Chainage of intersection.

Point $= 7933$

Minus Tangent length $= -142.96\,ft$

Chainage of $T_1 = 7790.04$

Plus $L = 884.45\,ft$.

Chainage of $T_2 = 8174.49\,ft$

Length of chord $= 2R\sin(\phi/2)$

$= 2 \times 1145.91 \sin\left(\frac{14^\circ 13' 23''}{2}\right)$

$= 983.72\,ft$

Mid ordinate $= R(1 - \cos(\phi/2))$

$= 1145.91\,(1 - \cos(\frac{14^\circ 13' 23''}{2}))$

$= 8.81\,ft$

External distance $= 1145.91\,(\sec(\frac{14^\circ 13' 23''}{2}) - 1$

$= 8.88\,ft$

Anol:

(b) -

offset No	offset	simpson multiplier	Product
1	7.983	1	7.983
2	10.983	4	43.932
3	11.983	2	83.966
4	5.983	4	11.932
5	3.983	2	7.966
6	4.983	1	4.983

$\Sigma = 100.762$

Area $(h_1 - h_6)$

$= \frac{b}{3} \times 100.762$

$= \frac{30}{3} \times 100.762$

$= 1007.62$ Answer.

Q no 9:

Given:

Circular radius = 7983 - 7683

= 300m

Deflection angle = 20°40'

Point of intersection.

= 7983 - 500 = 9983

Interval = 9om.

Solution:

300 x 9 = 600m

$BT_1 = BT_2 = R\tan^{\Phi}/_2$

$= 600 \frac{\tan 2°40'}{9}$

= 109.19

Length of curve:

$L = \frac{\pi R \Phi}{180}$

$= \frac{3.14 \times 600 \times 2°40'}{180}$

$= 209.33$

Chainage of point of intersection:

$= 2983$

Minus Tangent $= -109.19$

Chainage of $T_1 = 2873.81$

plus $L = 209.33$

Chainage of $T_2 = 3083.14$

Length of 1st chord C_1

$= 2460 - 2443.44$ ~~2873.81~~

$= 16.56$

$C_{11} = 3083.14 - 2630$

$= 453.14$

By Deflection method:

$$\delta_1 = \frac{1718.9 \times C_1}{60R}$$

$$= \frac{1718.9 \times 16.56}{60(600)}$$

$$S_1 = 0^\circ 79' - 19''$$

$$S_g = \frac{1718.9 \times 20}{60(600)}$$

$$= \frac{34378}{36000}$$

$$= 0^\circ 95' 49.9''$$

$$S_2 = S_3 = S_4 = S_5 = S_6 = S_7 = S_8 = S_9 = S_{10}$$

$$S_{11} = \frac{1718.9 \times 453.14}{60(600)}$$

$$= 91^\circ 63' 60''$$

Total Deflection angle for the chord is

$$\Delta_1 = S_1 = 0^\circ 79' - 69''$$

$$\Delta_2 = S_1 + S_2 = 1^\circ 75' 18''$$

and so on.

Δ_3, Δ_4, Δ_5, Δ_6 etc.

Q.no 3:

Given:

$\Delta AKM = 130^{\circ}$

$\Delta kmc = 140^{\circ}$

1st arc radius = (7983-300)

= 7683m

2nd arc radius = (7983-200)

= 7783

Chainage of intersection point

=> (7983 - 400) = 7583

Required:

1)- Tangent point.

Compound curvature.

Solution:

$\alpha = 180^{\circ} - 130^{\circ} = 50^{\circ}$

$\beta = 180^{\circ} - 140^{\circ} = 40^{\circ}$

$\phi = \alpha + \beta$

$= 50^{\circ} + 40^{\circ} = 90^{\circ}$

$I = 120 - \phi$

$KT_1 = R \tan(\alpha/2)$

$= 7673 \tan(50/2)$

$= 3529.64$

$MN = MT_2 = R \tan \beta/2$

$= 7723 \tan(40/2)$

$= = 9239.7$

$MT_2 + KT_1 = 3529.64 + 9239.7$

$KM = 6415.34$

Now,

$$\frac{3k}{mk \sin\beta} : \frac{1}{\sin I}$$

$$Bk = \frac{mk \sin\beta}{\sin I}$$

$$= \frac{6415.34 \times \sin 40}{\sin 90} = \frac{4123.7}{\sin 90}$$

$$= 4123.7$$

$$BM = \frac{mk \sin\alpha}{\sin I}$$

$$= \frac{6415.34 \times \sin 50}{\sin 90}$$

$$= 4914.43$$

$$T_L = 4123.7 + 4914.43$$

$$= 9038.13$$

$$L_L = \frac{\pi B_L \alpha}{180} = \frac{\pi \times 7683 \times 40}{180}$$

$$= 5361.08$$

$$L_S = \frac{\pi B_S \beta}{180} = \frac{\pi \times 7783 \times 40}{180}$$

$$= 5340.20$$

Chainage of intersection point:
= 7583

$-T_L = -9038.13$

Chainage of $T_1 = -1455.13$

plus $L = 5361.02$

Chainage of compound curvature

Plus $L_s = 5340.80$
$= 10,701.83$