

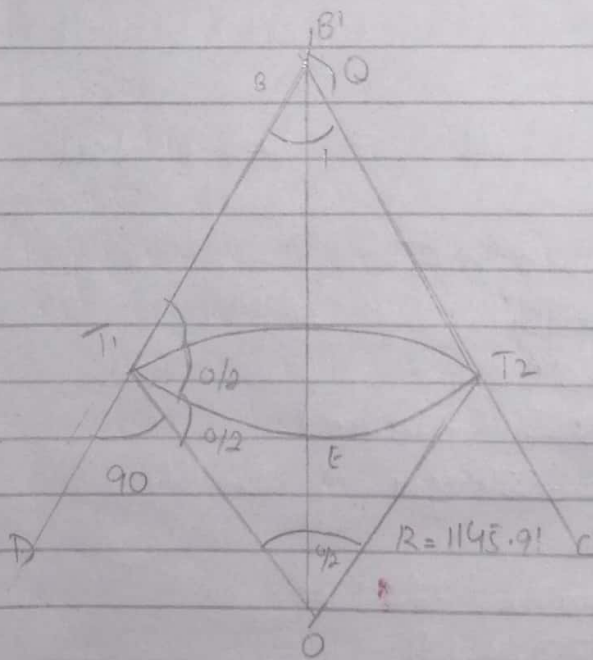
NAME = ASTANDYAR ANWAR

ID = 7274

INSTRUCTOR: ENGR ABDUL FARHAN

SUBJECT = ADVANCED ENGINEERING

SURVEY :-



Q. NO 1)

(a) Two tangents meet at a chainage of (LD) 7274 with the deflection angle of $14^{\circ}13'23''$. Degree of Curve is 5 = (5 marks).

- 1) Chainage the beginning and end of the curve
- 2) Length of long chord.
- 3) Mid ordinate and External distance

Taxonomy	Program Learning Objective
Domain	
C-3	2.

Ans) Q = 5 change (LD) 7274
 Radius $R = 5729.58$

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

Radius $R = 1145.91$
To find T.L.

Tangent length = $BT_1 = BT_2 = R \tan(\theta/2)$
 $BT_1, BT_2 = 1145.91 \times \tan(141323')$

$|BT_1| = |BT_2| = 142.961$

Now,

Length of curve, $L = \frac{\Delta BQ}{180}$
 $= \frac{3.14 \times 1145.91 \times (141325)}{180}$

$L = 28418.8$

Chainage of intersection
Point B = 7274

Minus tangent length BT_1
(142.96)

Chainage of $T_1 = 7131.04$
plus $L = 28418.8$

Chainage of $T_2 = 35549.84$

* Solution 2 :-

Mid ordinate & external
dist.

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

$E_f = 1145.91 (1 - 0.99)$

($E_f = 8.021$)

External distance (B_f)

$B_f = R (\sec \theta/2 - 1)$

$B_f = 1145.91 \left(\frac{1}{\cos(141323')} - 1 \right)$

($B_f = 8.89$)

(b) Find the area from the data obtained from chain survey as shown in the table below using Simpson one third rule. The first offset your ID ÷ 1000. For example is someone having and ID of 7932. then his/her first offset will be 7.932 and so on

Chainage (m)	0	30	30 60	90	120	150
offset (m)	7.932	7.932 ÷ 3	7.932 ÷ 4	7.932 - 2	7.932 - 4	7.932 - 3

ID No = 7274, b = 30m
 Chainage (m) = 0 ~~30~~ 30 ~~60~~ 90 ~~120~~ 150
 offset (m) = 7.274 10.274 11.274 5.274 3.274
 0 01 02 03 04

150
 4.274
 05

$$\text{Area} = \frac{b}{3} (a_0 + a_4 + 2a_2 + 4a_3) + \left(\frac{a_4 + a_5}{2} \right) \times b$$

Area = 952.88 + 113.22
 Area = 1066.1 m² Ans.

Q No (2)

A circular curve of radius (LD-200) m deflecting right through 20°40' is to be set out between two straights having chainage of the point of intersection as (LD-400) m.

Taxonomy Domain	Program Learning objective
C-3	2

Calculate all the data necessary for setting out the curve using deflection angle method, with peg interval being 50m.

Ans)

Peg interval 20m
Given data:-

$$\text{Radius} = 1D - 200 = 7274 - 200 = 7074$$

$$\phi = 20'40''$$

$$\text{Chainage of B} = 1D - 400 = 7274 - 400 = 6874$$

Peg interval = 20m

Required -

Deflection Angle = ?

Sol.

$$\text{Tangent length - } BT_1 = BT_2 = R \tan \frac{\phi}{2}$$

$$= (7074) (\tan (20'40''/2))$$

$$= 1289.81 \text{ m}$$

$$\text{length of curve} = L = \pi R \frac{\phi}{180}$$

$$L = 3.14 \times 7074 \times 20'40''/180$$

$$(L = 2550.308 \text{ m})$$

$$\text{Chainage of } T_1 = \text{Chainage of B} - BT_1$$

$$= 6874 - 1289.81$$

$$= 5584.19 \text{ m}$$

$$\text{Chainage of } T_2 = \text{Chainage of } T_1 + L$$

$$= 5584.19 + 2250.308$$

$$= 7834.498 \text{ m}$$

ch of T_1

5584.19

5600

ch of T_2

----- 7820

7834.49

C1

||| chords

C2

(fall)

C3

$$G_1 = \frac{1718.91 \times C_1}{60 \times 13} = \frac{1718.91 \times 5.81}{60 \times 7074} = 0' 350.5''$$

$$G_2 = G_{12} = \frac{1718.91 \times C_3}{60 \times R} = \frac{1718.91 \times 20}{60 \times 7074} = 0' 452''$$

$$G_3 = \frac{1718.91 \times C_{112}}{60 \times R} = \frac{1718.91 \times 14.49}{60 \times 7074} = 0' 331.26''$$

Deflection Angles:-

$$\Delta_1 = G_1 = 0' 3' 50.5''$$

$$\Delta_2 = \Delta_1 + G_2 = 0' 8' 42.5''$$

$$\Delta_3 = \Delta_2 + G_3 = 0' 13' 34.5''$$

$$\Delta_4 = \Delta_3 + G_4 = 0' 18' 26.5''$$

$$\Delta_5 = \Delta_4 + G_5 = 0' 23' 18.5''$$

$$\Delta_6 = \Delta_5 + G_6 = 0' 28' 10.5''$$

$$\Delta_7 = \Delta_6 + G_7 = 0' 33' 2.5''$$

$$\Delta_8 = \Delta_7 + G_8 = 0' 37' 54.5''$$

$$\Delta_9 = \Delta_8 + G_9 = 0' 42' 46.5''$$

$$\Delta_{10} = \Delta_9 + G_{10} = 0' 47' 38.5''$$

and so on...

π

π

π

π

Q No 3)

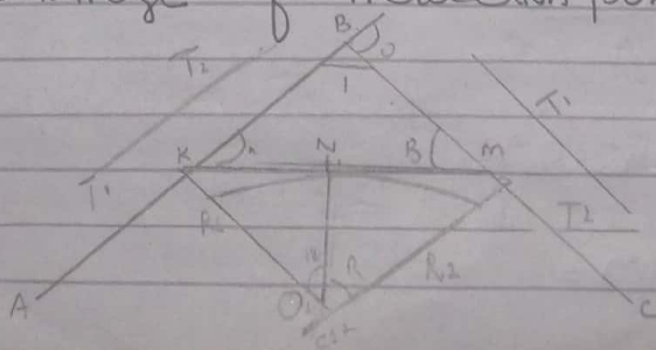
Two tangents AB & BC are intersected by a line KM. The angles AKM & KMC are 130° & 140° respectively. The radius of 1st arc is (LD-300) m & of 2nd arc is (LD-200) m. Find the chainage of tangent points and the point of compound curve given that the chainage of intersection point is (LD-400) m.

Taxonomy Domain

Program Learning Objectives

C-3

2



Ans Sol:

$$d = 180^\circ - 130^\circ = \boxed{50^\circ}$$

$$B = 180^\circ - 140^\circ = \boxed{40^\circ}$$

$$C = d + B + 50 + 40 = \boxed{190^\circ}$$

$$J = 180^\circ - 90^\circ = \boxed{90^\circ}$$

$$d = \boxed{50^\circ} \quad , \quad \boxed{B = 40^\circ}$$

$$KT_1 = KN = R_s \tan(d/2)$$

$$= 6974 (\tan 50/2)$$

$$= 6974 (\tan 25)$$

$$\boxed{KN = 3252.01}$$

$$MN = TTT_2 = (7074) (\tan(d/2))$$

$$= (7074) (\tan 40/2)$$

$$= 7074 (\tan 20)$$

$$\boxed{MN = 2574.71}$$

* To find KM =

$$KM = KN + MN$$

$$3252 + 2574.7$$

$$\boxed{KM = 5826.721}$$

* By Sin Rule to find BK & BM:-

$$\frac{BK}{\sin B} = \frac{MK}{\sin C}$$

$$BK = \frac{KMS \sin B}{\sin C}$$

$$BK = \frac{5826.76 \sin 40^\circ}{\sin 90^\circ}$$

$$BK = \frac{3745.36}{1}$$

$$(BK = 3745.36)$$

To find BM =

$$\frac{BM}{\sin u} = \frac{MK}{\sin j}$$

$$BM = \frac{MK \sin d}{\sin i}$$

$$BM = \frac{5826.76 (\sin 5^\circ)}{\sin 9^\circ}$$

$$BM = \frac{4463.55}{1}$$

(BM = 4463.55)

$$T_1 = 3252 + 3745.36 = 6997.36$$

$$T_2 = 2574.7 + 4463.55$$

$$T_L = 7038.25$$

To find:-

$$L_c = \frac{\pi R L_c}{180} = \frac{3.14 \times 707 \times 50}{180}$$

$$L_c = 6170$$

$$L_s = \frac{3.14 \times 6974 \times 40}{180}$$

$$L_s = 4866.30$$

- ① Chainage of intersection point = 6874
 - ② Minus $T_L = 7038.25$
 - ③ Chainage of $T_2 = 1642$
 - ④ Plus $L = 6170$
- change of compound curve (N) = 600°

Plus 1s = 4866.30

⑦ Change of $T_2 = 10872.1$

π ——— π ——— π ——— π ———