

Date: ___/___/___

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Subject Advance Surveying

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Q1:- Solution.

$$A = 180^\circ - 130^\circ = 50^\circ$$

$$B = 180^\circ - 140^\circ = 40^\circ$$

$$C = A + B = 90$$

$$I = 180^\circ - 90^\circ = 90^\circ$$

$$KT_1 = KN = R_1 \tan\left(\frac{A}{2}\right)$$

$$= 7952 \tan\left(\frac{50}{2}\right)$$

$$KT_1 = \boxed{3474.924}$$

$$MN = MT_2 = R_2 \tan\left(\frac{B}{2}\right) = 7852 \tan\left(\frac{40}{2}\right)$$

$$MT_2 = MN = \boxed{2748.703}$$

$$KM = MT_2 + KT_1$$

$$KM = 6223.627$$

Find BKM By Sine Rule

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

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

$$= \frac{6223.627 \sin(40)}{\sin(90)}$$

$$BK = 4000.47$$

$$BM = \frac{MK \sin \alpha}{\sin(I)}$$

$$= \frac{6223.627 \sin(50)}{\sin 90}$$

$$BM = 4767.574$$

$$T_2 = KT_1 + BK$$

$$T_2 = 3474.924 + 4000.47 = 7475.394$$

$$T_3 = MT_2 + BM$$

$$T_3 = 2748.303 + 4767.574$$

$$T_3 = 7516.277$$

$$L_2 = \frac{\pi R_2 \alpha}{180} = \frac{\pi 7852(30)}{180}$$

$$L_2 = 6590.363$$

$$L_3 = \frac{\pi (R_3) \beta}{180} = \frac{\pi 7452(40)}{180}$$

$$L_3 = 5202.477$$

$$L_2 = \text{chainage of Intersection} - T_2$$

$$7352 - 7475.394$$

$$\text{chainage of } T_1 = 123.394$$

$$\text{change of } T_1 + L_2$$

$$-123.394 - 6590.363$$

$$= 6466.969$$

~~PTD~~ change of compound curvature

N Plus L₂

$$6466.969 + 5202.477$$

$$\text{change of } T_2 = 11669.446 \text{ m.}$$

Q. No. _____

Transition Curves.

A Curve of varying radius is called a transition curve. It is also called as Spiral Curve or Easement Curve.

- It is used on both highway & railways between tangent and a circular curve in order to have a smooth transition from tangent to the curve and from curve to the tangent.

Super elevation:

Let

W = weight of the vehicle

P = centrifugal force

v = speed of the vehicle, m/s.

g = acceleration of the curve

h = super elevation

b = width of the road, m

For equilibrium the resultant R of the P & W must be equal & opposite to the reaction

Perpendicular to road of rail surface.

$$P = \frac{mv^2}{R} = \frac{mr^2}{gr} \quad W = mg.$$

$$\frac{P}{W} = \frac{v^2}{gr}$$

$$\tan \theta = \frac{h}{b} = \frac{dc}{ac} = \frac{P}{W}$$

$$\tan \theta = \frac{h}{b} = \frac{P}{W} = \frac{v^2}{gr}$$

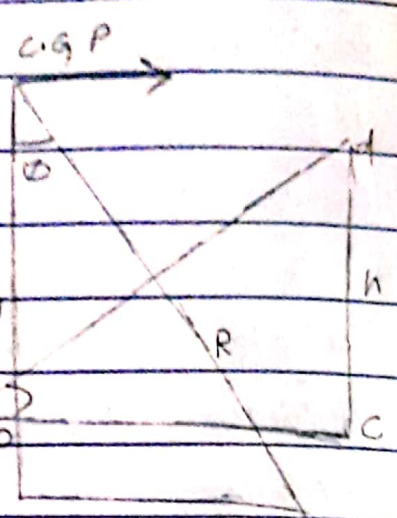
$$h = b \tan \theta$$

$$h = b \frac{v^2}{gr} \quad \text{--- on highway. } b$$

$$h = b \frac{cr^2}{gr} \quad \text{--- on railway}$$

Where $c =$ Distance b/w The Centre of the rail.

Super elevation is gradually applied along a transition Curve. Full Super elevation is attained at Junction of the transition Curve with the Circular Curve.



Q#3

what is the difference between triangulation & trilateration? Also explain the Principal of triangulation & trilateration.

Answer

Triangulation

1. All angles are measured in triangulation
2. Distance of baseline is measured.
3. Some check base line are also measured to control to scale error.
4. Intervisibility station is essential.
5. There are more internal check in comparison with trilateration in the same geometric figure.
6. The side lengths are computed on the basis of measured angle applying sine law.

Trilateration:-

1. All sides are measured in trilateration
2. Azimuth of the initial line is measured
3. Some check angle are measured to control azimuth error.
4. For small areas it is possible to

- measure distance without intervisibility
5. There are less internal checks in comparison with triangulation in the same geometric figure.
6. The angles are computed on the basis of measured side lengths applying cosine law.

Principals of triangulation:-

- If all the three angles and the length of one side of a triangle are known, then by trigonometry the length of the remaining sides of the triangle can be calculated.
- Again, if the coordinates of any vertex of the triangle and azimuth of any side are also known, then coordinates of the remaining vertices may be computed.

Principal of trilateration -

- Trilateration is a highly accurate and precise method of establishing and expanding horizontal control.
- Method of control survey in which a network of triangles is used as in triangulation system.
- All the three sides of each triangle are measured in the field with the distance measuring instruments (EDMs, tape)
- Horizontal angles are not measured in the field
- Angles in trilateration system are computed indirectly from the lengths of the sides of triangle by cosine formula.
- Few horizontal angles are also sometimes measured to provide a check on computed angles.

Q4

What is hydrographic survey? and why we do it. Factor?

Answer:-

Hydrographic Surveying.

- It is the branch of Surveying which deals with water bodies e.g. lake river etc.
- The Usual Fundamental Principal of Surveying and leveling are adopted for acquiring data for determination of.

(1) Water Volume.

(2) Rate of Flow.

(3) To determine the Shape of the area underlying the water etc.
why we do it.

(1) To determine the Quantities of Subaqueous excavation.

(2) Measure Areas Subjected to Scouring or Silting in harbours or docks.

(3) Locate rocks and other objects such as bouys, lights etc. to aid safe navigations.

- (4) To Prepare navigation charts exhibiting the depths available for navigations.
- (5) Control floods and to Plan water supply & storage for rivers
- (6) To develop water resources for Power, Irrigation and recreation.

what are the factor

(1) Prepare for survey before beginning make sure all the equipment is to good.

(2) Run star-stb line. Tidal line are very important especially when using single-beam system.

(3) Go the distance

(4) Process data right away.

The Primary Purpose of hydrographic surveying is the water depth. Harbour & Port Survey are Conducted to determine ideal.

Q4 What is Sounding & Purpose of Sounding Also name of equipment?

I The Process of determining depth below the water surface is called Sounding.

(2) Sounding is analogous to levelling on land.

(3) The reduce level of any point on the bottom of a water body is obtained by subtracting the Sounding from the mean sea level.
Purpose.

(1) Preparation of accurate charts for navigation.

(2) Determination of the quantities of the material to be filled.

(3) obtaining information for design of breakwaters sea wall etc.

Name of Equipments-

1. Sounding boat

2. Sounding Pole or rod.

3. Lead line.

4. Weddell's sounding machine

5. Echo sounding machine / Fathometer.

Q51-

(A)

Aerial Photography:-

Basically this can be defined as the way of taking photographs above the ground.

Why we do it?

Aerial Photography, technique of is used in Category, land-use Planning.

Archaeology, movie Production, environmental Studies, espionage, commercial advertising, conveyancing and other field.

(B) Procedure.

A Photogrammetric mapping process includes obtaining aerial photography, completing ground control network, constructing map from photos, checking the compiled map data for compliance with project specification. The ground control point to be measured by photogrammetry should be signalized before the flight.