

Name:- Wajeehuddin

ID :- 7921

Section :- "A"

Subject:- Advance
Engineering Survey

Date :- 24. june. 2020

Question (1)

Answer:-

Transition Curve:-

A curve of varying radius is called transition curve between tangent and circular curve. It is also known as spiral curve. It can be inserted in between the two branches of a compound or reverse curve.

Types:-

(2)

There are three common types of transition curve which are given below.

(i) Cubick Parabola
(railways)

(ii) clothoid or spiral
(railways)

(iii) Lemniscate
(highways)

Superelevation :-

It is the amount by which the outer edge of a curve on a road or railway is banked

above the inner edge. when a vehicle frames to a curved path, the following forces act on it.

(i) Weight on it

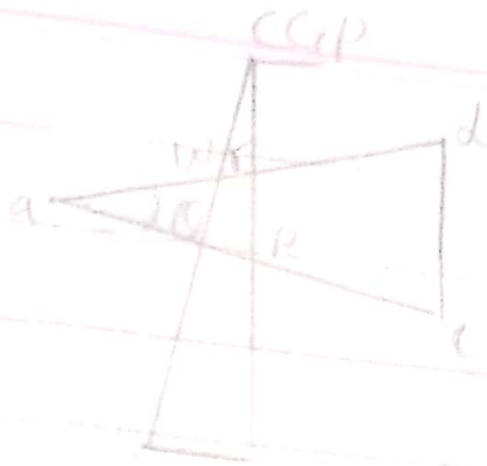
(ii) Centrifugal forces both acting through centre of gravity of vehicle.

The effect of centrifugal force is to push the vehicle off the track. Now it counteract the action, The plane of the

road surface is made perpendicular to resultant of centrifugal force and weight of the vehicle. In other words the outer bank of road is raised above the inner one. This raising of outer over inner one.

This raising of outer bank over inner one is known as Superelevation.

Mathematically :-



$W =$ weight of vehicle

$P =$ centrifugal force

$v =$ Speed of vehicle (m/sec)

$g =$ acceleration due to gravity

$R =$ radius of curve

$h =$ Super elevation in m

$b =$ width of road in m

$G =$ Distance between centre and rails

For Equilibrium:-

The resultant of weight and centrifugal force must be equal and opposite to the reaction perpendicular to road.

As we know that,

$$p = \frac{WV^2}{gR}$$
$$= \frac{p}{W} = \frac{v^2}{gR}$$

If θ is the inclination of road surface,

The inclination of resultant to vehicle is also θ .

So we have,

$$\tan \theta = \frac{dc}{ac} = \frac{p}{W} = \frac{bv^2}{gR}$$

Roads :-

$$b \tan \theta = \frac{v^2}{R}$$

Railways:-

$$b \tan \theta = \frac{Gv^2}{gR}$$

Radius :-

$$b \tan \theta = \frac{v^2}{gR}$$

$$R = \frac{v^2}{b \tan \theta g} \quad (\text{for roads})$$

$$b \tan \theta = \frac{Gv^2}{R}$$

$$R = \frac{Gv^2}{b \tan \theta} \quad (\text{for railways})$$

Speed of vehicle:-

$$b \tan \theta = \frac{v^2}{R}$$

$$v^2 = b \tan \theta \ g R$$

$$v = \sqrt{b \tan \theta \ g R}$$

(For roads)

$$b \tan \theta = \frac{G v^2}{g R}$$

$$v^2 = \frac{b \tan \theta \ g R}{G}$$

$$v = \sqrt{\frac{b \tan \theta \ g R}{G}}$$

(for railways)



Question (2)

Answer:-

Triangulation:-

Triangulation is a process in surveying in which tracing and measurement of a series of triangles or a network of triangles is used for determining distance and relative positions of points over an area.

Principal of triangulation:-

- * In triangulation, all the three angles of each triangle are in the field along with one base line.
- * The side of the first triangle whose length is predetermined is called "base line" and vertices of the individual triangles are known as triangulation stations.

To minimize accumulation

of errors in length. Subsidiary bases at suitable intervals are provided.

b) Trilateration:-

The method of surveying is used in which two lengths of the sides of a triangle are measured and from the information angle are computed.

This method does not involve the measurement of angles.

Principal of titration:-

it is the method of control survey in which a network of triangles is used in triangulation.

* All the three sides of each triangles are measured in the field. with distance measuring instruments

* Horizontal is adjusted after the computation of the angles the

Coordinates of the stations. are determined

horizontal angles are measured in the field

In trilateration angles are computed indirectly from the lengths of the sides of triangles.

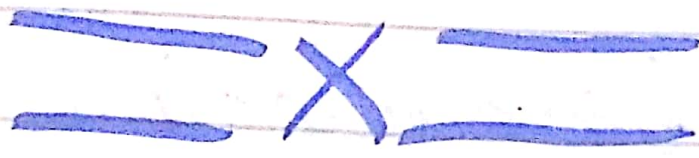
(11)

Difference Between Triangulation and Trilateration :-

- (1) In triangulation, all the angles of triangles are measured.
- (2) In triangulation, base line is measured, while in trilateration azimuth of initial line is measured.
- (3) For triangulation intervisibility between stations are essential while in trilateration, it is possible

to measure distances without intervisibility.

v) There are more internal checks in triangulation as compared to that of trilateration.



(1)

Question (3) (part - (a))

Answer:-

Hydrographic Survey:-

Hydrographic surveying are bathymetric surveying is the surveying of physical features present under water. It is the science of measuring all factors beneath water that effect all the marine activities like dredging, Marine construction, offshore drilling etc.

Hydrographic survey is mainly conducted under authority concern. It is mainly carried by means of sensor, sounding or electric sensor system for shallow water.

Why we do hydrographic surveying :-

In order to get the following information we do hydrographic surveying.

Depth of bay can be determined.

shore lines can be

(18)
determined.

(3) Locating Sewer fall
by measuring direct
current.

(4) Locating mean sea level

(5) Tide measurement.

(6) River and stream
discharge measurement.

(7) Massive structures like
bridges, dams, harbors
are planned.

Factors To be Determined While conducting Hydrographic Survey:-

Following are the factors which would be done while doing and conducting hydrographic survey.

- (a) Survey Equipment
- (b) preparation of a hydrographic survey specification.
(To include a review of existing data).
- (c) Issue to a designated unit.

programme planning of that unit.

- (e) assessment of the task with in that unit.
- (f) Reconnaissance requirement.
- (g) Resource allocation
- (h) Detailed survey planning.
- (i) plans for compilation and checking of data.

Sounding :-

The measurement of dept below the water surface is called sounding. This corresponds to the ordinary spirit leveling in land

surveying where depth are measured below horizontal line establish by level. The object of making sounding is thus to determine the configuration of the sub aqueous source.

Purpose of Sounding:-

Sounding is the most important for any any water body to improve its negligable properties to know about sitting and scouring etc.

=> In hydrographics surveying soundings is the measurement of depth below the water surface.

=> In short the main purpose and objective of sounding is to measure and find the depth below the water surface.

=> Equipment :-

- (i) Sounding Boat.
- (ii) Sounding rods and poles.
- (iii) lead lines.
- (iv) Sounding machine.
- (v) Fathometer.

23

Question (4) (Part-a)

Ans:-

Aerial Photogrametry :-

Aerial photogrametry is a process in which an aircraft with camera is used to take photograph from certain height in the air. A minimum 3 to 4 controls points needed in one photograph.

Reason For Use of

aerial photogrametry:-

Following are some of the reasons for uses of aerial photogrammetry.

It is used because it provided generated 2D and 3D models.

These models are topographical in nature. They represent the dimensions and physical features of the area of land and in stunning accurately. These models can be related and zoomed.

Along with surveying

28

may the use of
aerial photogrammetry
in different fields.

Part (b) Q#4

Answer:-

Freedom Of Aerial Photogrametry:-

Following are the main steps of aerial photogrametry.

=> Establishing Control Prints
=> Flight planning and photography.

=> photointerpretation and stereoscopy.

=> parallax and measurement of parallax.

=> Construction of map

Castography.

Establishing Control points:-

Control points are points established on ground with known relative positions. The photograph captured is described by setting the control points as boundaries. There should be minimum 3 to 4 points (initial points) in a photograph.

Flight Planning and photograph:-

Flight planning is actually

known the height to be maintained while taking photo, area be covered in each photograph. Number of photograph, no strips and time interval between exposures.

