

ID: 7313

Ahmad Faraz Khan.

Paper: Advanced Engineering Survey.

Q.No: 1: What is Transition curve?.....

..... equation and diagram.

Ans: Transition Curve:-

A curve of varying radius is called transition curve between tangent and a 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 of :-

There are three types of transition curve.

- (i) Cubic Parabola. (Railway)
- (ii) Clothoid or spiral. (Railway)
- lemniscate (Highway).

Superelevation:-

It is the amount by which the outer edge of a curve or ~~the~~ the inner edge of a road or railway is banked above the inner edge. When a vehicle passes to a curved path, the following forces act on it.

- (i) Weight of vehicle.
- (ii) Centrifugal force both acting the center of gravity of vehicle.

The effect of centrifugal

force is the to push the vehicle of the track. Now to counteract the action, the plane of the road surface is made perpendicular to resultant of centrifugal force and weight of vehicle. In other words the outer bank of road is raised above the inner one. This raising of outer bank over the inner one is known as super elevation.

Mathematically :-

W = Weight of Vehicle.

P = Centrifugal force.

V = Speed of vehicle (cm/sec)

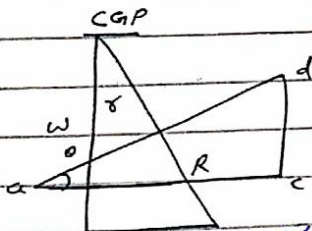
g = Acceleration due to gravity.

R = Radius of curve.

h = Super elevation in m.

b = width of road in m

G = Distance between center of 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:

$$P = \frac{WV^2}{gR}$$

$$\Rightarrow \frac{P}{W} = \frac{v^2}{gR}$$

If θ is the inclination of road surface, the inclination of resultant to vertical is above θ so we have

$$\tan \theta = \frac{de}{ae} = \frac{P}{W} = \frac{bv^2}{gR}$$

On Roads:

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

On Railways:

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

Radius:-

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

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

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

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

Speed of vehicle:-

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

$$v^2 = b \tan \theta gR$$

$$v = \sqrt{b \tan \theta gR}$$


for roads:

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

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

$$V = \sqrt{\frac{b \tan \theta gR}{G}}$$

for railways.



Q No 2: What is the difference
. and trilateration.

Triangulation:-

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

Principles of triangulation.

In triangulations 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 station.

To minimize accumulation of errors in lengths, subsidiary base of suitable intervals are provided.

Trilateration:-

is the method of surveying in which the lengths of the sides of a triangle are measured and formed this formation

angles are computed.

This method does not involve the measurements of angles.

Principles of triliteration:-

It is a method of control survey in which a network of triangles is used as in triangulation.

All the three sides of each triangle are measured in the field with the distance measuring instrument.

Horizontal angles are measured in the field.

Triliteration is adjusted after the computation of the angles and then coordinates of the stations are determined.

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

Q No 3A:- What is hydrographic
..... Survey?

Ans: Hydrographic Survey:-

Hydrographic Survey or bathymetric surveying is the survey of physical feature present under water. It is science of measuring all factors beneath water that affect all the marine activities like dredging, Marine construction off shore drilling etc.

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

Why do we do Hydrographic Surveying:-

In order to get following information we do Hydrographic Surveying.

- 1) Depth of bed can be determined.
- 2) Shore lines can be determined.
- 3) Locating sewer fault by measuring direct current.
- 4) Locating mean sea level.
- 5) Tide measurement.
- 6) River and stream discharge measurement.
- 7) Massive structure like bridges dams harbours are planned.

While Conducting Hydrographic Surveying

Following are the factors which should be done while doing and conducting Hydrographic Surveying.

- a) Survey Equipment.
- b) Preparation of a Hydrographic Survey specification. (To include or review of existing data).
- c) Issue to a designated unit.
- d) Programme planning of that unit.
- e) Assessment of the task within that unit.
- f) Reconnaissance requirement.
- g) Resource allocation.
- h) Detailed survey planning.
- i) Plan of compilation and checking of data.

Q:Q:- What is sounding and
sounding?

Ans: Sounding:-

The measurement of depth 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 most important for any water body to improve its navigable properties, to know about sitting and scoring etc.

In Hydrographic surveying sounding is the measurement of depth below the water surface.

In short the main purpose and objective of sounding to measure and finding the depth below the water surface.

Equipments:-

Sounding boat.
Sounding rods and poles.
Lead lines
Sounding Machine
Sathometer.

Q4.1: What is aerial photogrammetry and why we do it.

Ans: Aerial Photogrammetry:-

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

Reasons for Use of Aerial photogrammetry:-

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

It is used because it provides computer generated 3D and 2D models. These models are topographical in nature. They represent the dimensions and physical feature of the area of land and in stuning accuracy these model can be related and zoomed.

Along with survey many of the uses of Aerial photogrammetry in different fields:

Q4:B:- Shortly explain the process of aerial photography:

Ans:- Procedure of Aerial photography:-

- 1) Establishing control points.
- 2) Flight planning and photography.
- 3) Photo interpretation and stereoscopy.
- 4) Parallax and measurement of Parallax.
- 5) Construction of map and cartography.

1) Establishing control Points:-

Control points are points established on ground with known relative positions. There should be 3-4 points in a photograph.

2) Flight Planning and Photography:-

Flight planning and photography is actually known the height to be main while taking photo area to be covered in each photograph. Number of photographs, no. of strips and time interval between exposures.