

* Name :-

Muhammad yaseen

o I.D :-

7544

o Section :-

"B"

o Dept :-

Civil

o Submitted to :-

Engr. Abdul farhan

o Subject :-

Advance Engineering Survey

1

Ans no. 01:-

Transition Curve :-

A curve of varying radius is called transition curve. It is also called spiral curve. It is used in both highway and railway b/w tangent and circular curve in order to have smooth transition from tangent to the curve and from curve to the tangent.

OR

Transition curve is a curve of varying radius introduced between a straight and a circular curve or between two branches of a compound curve or reverse curve.

Super elevation and Proves:-

When vehicle moves from tangent on to the curve force acting on it are.

- Weight of vehicle.
- Gravity of vehicle.

Let

w = weight of vehicle

P = Centrifugal force

v = Speed of vehicle m/s.

g = Acceleration due to gravity

R = Radius of the curve

n = Super elevation

b = Width of the road.

For equilibrium the resultant R of the P and w must be equal and opposite to the reaction perpendicular to the road or railway surface.

$$P = \frac{m^2}{R}$$

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

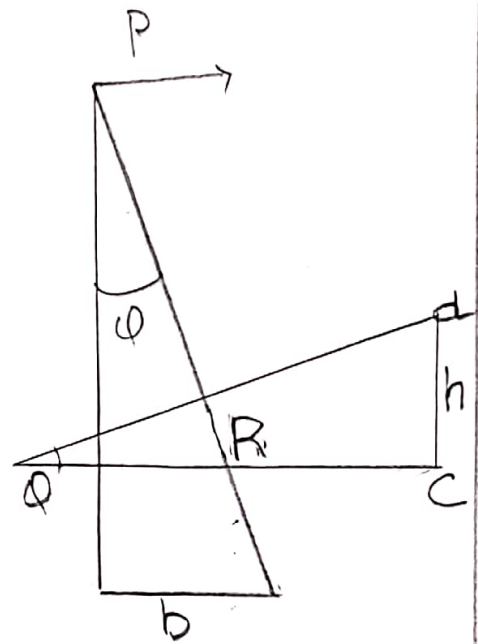
$$W = mg$$

3

$$P/W = \frac{V^2}{gR}$$

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

$$\tan \theta = h/b = P/W = \frac{V^2}{gR}$$



$$h = b \tan \theta$$

$$h = b \frac{V^2}{gR} \longrightarrow \text{highway}$$

$$h = b \frac{GV^2}{gR} \longrightarrow \text{Railway}$$

Where G = distance between centre of rail.

Super elevation is gradually applied along a transition curve. Full super elevation is attained in junction of the transition curve with the circular curve.

Ans No 02:-

4

Differentiate b/w triangulation and trilateration:-

Triangulation

- ① All angles are measured in triangulation
- ② Distance of base lines is measured
- ③ Some check base lines are also measured to control scale error.
- ④ Inter-visibility b/w station is essential
- ⑤ There are more internal checks in comparison with trilateration in

Trilateration

- ① All sides are measured in trilateration.
- ② Azimuth of the initial line is measured
- ③ Some check angles are measured to control azimuth error.
- ④ For small area it is possible to measure distance without inter-visibility.
- ⑤ There are less internal checks in comparison with

The same geometric figure

⑥ The side lengths are computed on the basis of measured angle applying sine law

triangulation in the same geometric figure.

⑥ The angles are computed on the basis of measured side lengths applying cosine law.

Principles of Triangulation:-

① In triangulation all the three angles of each triangle are measured in the field along with one baseline.

② The side of the first triangle whose length is predetermined is called the base line and vertices of the individual triangles are known as triangulation stations and the whole figure is called the triangulation system or triangulation figures.

③ To minimize accumulation of errors in lengths subsidiary bases at suitable intervals are provided.

④ Again, if the coordinates of any vertex of the triangle and azimuth of any side are also known, then coordinate of the remaining vertices may be computed.

⑤ The triangulation stations at which astronomical observation for azimuth are made are called Laplace station.

Principles of trilateration:-

- ① Trilateration is a highly accurate and precise method of establishing and expanding horizontal control.
- ② Method of control survey in which a network of triangles is used as in triangulation system.
- ③ All three sides of each triangle are measured in the field with the distance measuring instrument (EDMs, tapes, other apparatus).
- ④ Horizontal angles are not measured in the field.

⑤ Angle in a trilateration system are computed indirectly from the length of the sides of triangle by cosine formula.

Ans no:- 03 (b)

Sounding :-

The process of determining depth below the water surface is called sounding.

Sounding is analogous to levelling on land. The reduced level of any point on the bottom of a water body is obtained by subtracting the sounding from the mean sea level.

Purpose of Sounding:-

- ① Preparation of accurate charts for navigation.
- ② Determination of the quantities of the materials to be filled.
- ③ Obtaining information for design of breakwaters, sea wall etc.

- ④ The sounding points should be selected keeping in mind that all the important irregularities are recorded.
- ⑤ The soundings are thus made along a series of straight lines at right angles to the shoreline.
- ⑥ The spacing between the sounding lines and between the sounding points depends upon the nature of submarine surface as well as on the object of the survey.
- ⑦ Usually spacing between sounding line is kept 30m and spacing between sounding points is kept 7.5m to 15m.

Name of equipment used to determine

The sounding:-

The equipment used to determine the sounding are:-

- ① Shore signals and buoys
- ② Sounding equipment
 - ① Sounding boat
 - ② Sounding pole

- 9
- ③ Lead line.
 - ④ Weddell's sounding machine.
 - ⑤ Echo sounding machine/Fathometer

③ Angle measuring equipment:-

- ① Theodolite
 - ② Prismatic compass.
 - ③ Sextant.
-

10
7

Ans no 03 (a):-

Hydrographic Survey:-

It is the branch of surveying which deals with water bodies eg Lake river etc.

The usual fundamental principles of surveying and leveling are adopted

for acquiring data for determination

- ① water volume
- ② Rate of flow
- ③ To determine the shape of the area underlying the water surface etc.

It is the physical features present under water. It is science of measuring all factors beneath water that affect all the marine activities dredging, marine construction offshore drilling etc.

Hydrographic surveying is mainly conducted under authority concern.

It is mainly carried by means of sensor, sounding or electronic sensor system for shallow water.

Why we do hydrographic survey:-

A major purpose of hydrographic surveying is to obtain data necessary for preparation nautical charts, which show water depths, navigation channel, structure (such as piers), breakwater and so on and which are used by mariners. The main development/measurement performed in hydrographic surveying in water. Hydrographic surveying are main purpose tide measurement, river and stream discharge measurement and massive structure like bridge, dam etc.

Factor To be determined while conducting Hydrographic Survey:-

Following are factor while conducting hydrographic survey:-

- ① Survey Equipments.
 - ② Preparation of hydrographic survey specification (to review of existing Data).
 - ③ Issue to design units
 - ④ Programme planning of that units.
 - ⑤ Reconnaissance requirement.
 - ⑥ Detailed Survey planning.
 - ⑦ Plan for compilation and checking of Data.
-

Ans no :- 04 (a):-

Aerial photogrammetry:-

In terrestrial photo-grammetry photographs are taken from a fixed position on ground while in the aerial photogrammetry and aircraft camera setup is used to take photographs from air flying over the ground. In this article we will discuss about the aerial photography.

Why we do Aerial photogrammetry:-

Sometimes it is difficult to survey a large area of land on foot.

This is where UAVs come in they make the entire process of surveying land more affordable and efficient.

UAVs can fly either several hundreds of feet in the air or close to the ground, depending on the topography of the land being surveyed. Acquiring perspective from high up is beneficial since the imagery returned will display larger part of the land all at once.

However despite the efficiency of drones, surveyors must always allow for areas that present obstacles even to UAVs. These obstacles could be anything from trees to dense brush. In these cases the vehicles can fly closer to the ground, or the camera pointed at an angle to see what additional information can be gotten from the new perspective. UAV photogrammetry in land surveying has met a strong need in construction planning and management.

15
Ans no 04 (b):-

Procedure of Aerial photography:-

Establishing control points.

Flight planning and photography

Photo interpretation and stereoscopy.

Parallax and measurement of parallax

Construction of map and cartography.

Establishing control points:-

Control points are points established on ground with known relative position.

The photography captured is observed by setting these control points as boundaries, so point should be established in such a way that they should be easily identifiable on photography.

Flight planning & photography:-

Flight planning is nothing but

16

Knowing height to the maintained by flight while taking photos, area to be covered in each photography number of photography, nos of strips and time interval between exposures.

③ Photo Interpretation and Stereoscopy:-

Photo Interpretation is done by instrument called Stereoscopy which contains magnifiers so, one can observe the three dimensional mode of area through it and also ease of drawing for maps of photographed area. For accuracy, control, station, elevation, length of lines should be sufficiently available.

④ Parallax and Measurement of

Parallax:-

An aerial photograph can be studied to get the location of an object by its coordinates in the photograph.

Construction of maps and

17

Cartography:-

After collecting all photographs, its time to create or plot the map. There are several methods available to plot the details of map and one of the methods is stereoscopic method.
