QUESTION : 1 :

ANSWER :-

* ### TRANSITION CURVE :-

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

TYPES :-

There are three types of transition curves which are given below.

i Cubic Perabola   (railways)
ii Clothoid or spiral (railways)
iii lemniscale   (highways)

1 ### SUPER ELEVATION :-

"It is the amount by which the outer edge of a curve on a road or railways is banked vehicle passes to a curved path, the following forces act on it.

* weight of vehicle.
* Centrifugal force both acting through centre of gravity of vehicle.

The effect of centrifugal force is to push the vehicle off the track. Now to counter act 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 is known as super-elevation.

MATHEMATICALLY :-
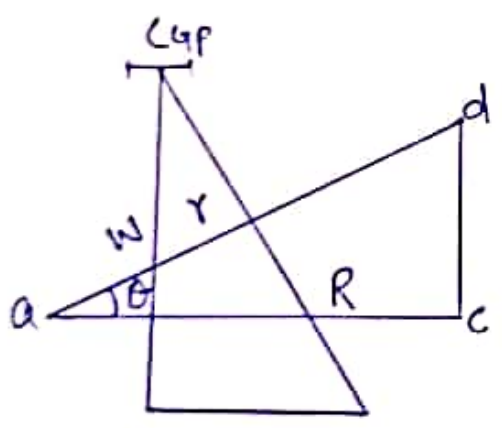
W = weight of vehicle
P = Centrifugal force
V = Speed of vehicle(m/s)
g = acceleration due to gravity.

R = radius of curve
h = Superelevation in m.
b = width of road in m.
G = Distance of rails between centre.

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 in the inclination of road surface, the inclination of resultant to vertical is also θ.

So we have,

$$Tan\theta = \frac{dc}{ac} = \frac{P}{W} = \frac{bv^2}{gR}$$

on Road,

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

on Railways:

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

RADIUS :-

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

$$R = \frac{v^2}{b\ tan\theta\ g} \qquad (For\ roads).$$

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

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

Speed of vehicle :-

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

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

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

"FOR ROADS"

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

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

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

"FOR RAILWAYS"

QUESTION : 2 :

ANSWER :-

* TRIANGULATION :-

" Triangulation is a process in surving in which tracing and measurement of a series or a network of triangles is used for determining distances and relative positions of point over an area.

PRINCIPLES OF TRIANGULATION :-

- In triangulations, all the three angles of each triangles 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 individuals, triangles are known as "triangulation stations".

DIFFERENCE BTW TRIangulation and trilletration :-

1 In triangulation, all the angles of the triangles are measured.

* while in triletration, all sides of triangles are measured.

2 In triangulation, base line is measured while in triletration azimuth of initial line is measured.

3 For triangulation, intervisibility between stations are essential while in triletration it is possible to measure distances without intervisibility.

4 There are more internal checks in triangulation as compared to that of triletration.

★ **TRILETRATION :-**

"The method of survying in which the lengths of the sides of a triangles are measured and from this information angles are computed.

This method does not involve the measurements of angles.

PRINCIPLES OF TRILETRATION :-

• It is a method of control survey in which a network of triangles is used

as in triangulation.

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

- Horizental angles are measure in the field.

- Triletration is adjusted after the compulation of the angles and then coordinates of the stations are determined.

- In triletration angles are computed indireclly from the length of the sides of triangles.

QUESTION : 3 :
PART : A :
ANSWER :-

★ HYDROGRAPHIC SURVEY :-

"Hydrographic surveying or bothymetric surveying is the survey of physical features present under water. It is science of measuring all factors beneth water that affect all the marine activities like dredging. Marine construction off shore drilling etc.

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

Why 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 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.

=> **<u>FACTORS TO BE DETERMINED WHILE CONDUCTING HYDROGRAPHIC SURVEY :-</u>**

Following are the factors which would be done while doing and conducting Hydrographic surveying.

* Survey equipment.
* Preparation of a hydrographic survey specification. (TO include a review of existing body).
* Issue to a designated unit.
* Programme planning of that unit.
* Assessment of the task with in that unit.
* Resource allocation.
* Detailed survey planing.
* Plans for complication and checking of data.

QUES : 3 :
PART : B :-
ANSWER :-

* 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 Horizental line establish by level. The object of making sounding in thus to determine the confoguration of the sub-aqueous source.

PURPOSE OF SOUNDING :-

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

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

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

EQUIPMENTS :-

1 Sounding boat.

2 Sounding rods and poles.

3 Lead lines.

4 Sounding Mechane.

5 Fathometer.

X———————————⊠———————————X

QUESTION : 4 :
PART : A :-

ANSWER :-

* ## ARIAL PHOTOGRAMMETRY :-

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

Reasons For Use Of Arial Photogrammetry :-

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

• It is used because it provides computer 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 accuracy. These model can be rotated and zoomed.

• Along with surveying may of the uses of aerial photogrammetry in different fields.

Scanned with CamScanner

QUES: 4:

PART: B :-

ANSWER :-

* PROCEDURE OF AERIAL PHOTOGRAPHY :-

    Following are the main steps of aerial photography.

⇒ Establishing control points.

⇒ Flight plaining and photography.

Photo interpretation and stereoscopy.

Parallax and measurement of parallax.

Construction of map and constography.

ESTABIISHING CONTROL POINT :-

    Control points are points established on ground with known relative positions the Photograph captured is observed by setting these control points as boundries. There should be minimum 3 to 4 points in a photograph.

* FLIGHT PLANING AND PHOTOGRAPHY :-

Flight planning is actually knowing the height to be maintained while taking photo, area to be covered in each photograph number of photograph, no of strips and time interval between exposures.

X————————————☒————————————X