53 (CE 401) SURV-II

2014

SURVEYING-II

Paper : CE 401

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* Explain how you would determine the constants of a tacheometer. 5

(b) It is desired to compute a flight mission for an area 8*km* wide and 16*km* long. The airplane has a speed of 192*km/h*. A camera with a focal length of 21*cm* is to be used. The approximate scale is 1 : 10,000, the average elevation of the ground is 366*m*, and the photographs are to be 23*cm* × 23*cm*. The forward lap is 60% and the side lap is 25%. 10

(c) An excavation is to be made for a reservoir 20*m* long 12*m* wide at the bottom, having the side of the excavation slope at 2 horizontal to 1 vertical. Calculate the volume of excavation if the depth is 4*m*. The ground surface is level before excavation. 5

2. (a) Determine the gradient from a point *A* to a point *B* from the following observations made with a tacheometer fitted with an anallactic lens. The constant of the instrument was 100 and the staff was held vertically. 10

Instrument station	Staff point	Bearing	Vertical angle	Staff readings
P	*A*	134°	+10°32′	1·360, 1·915, 2·470
	B	224°	+5°6′	1·065, 1·885, 2·705

(b) Define transition curve ? What are the conditions necessary for setting out transition curve ? 2+4

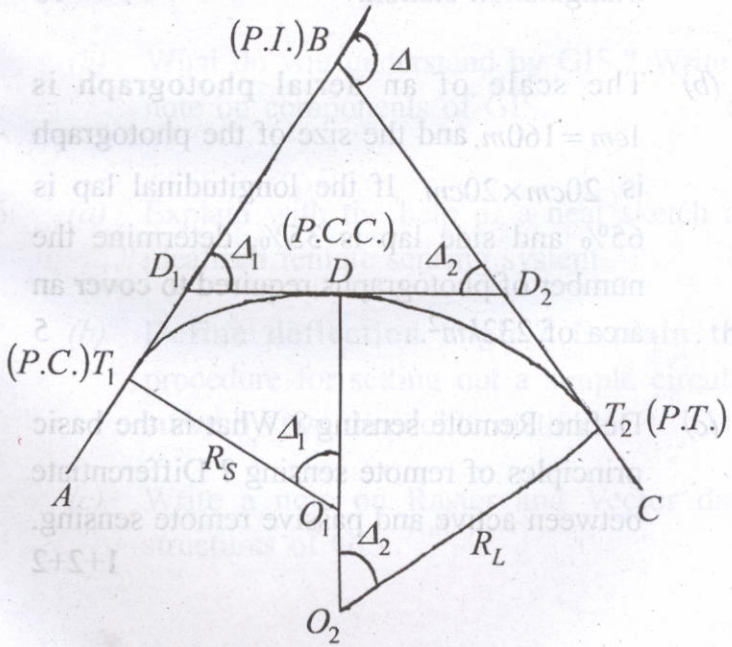
(c) Define the following : 2×2

(i) Reverse curve

(ii) Super-elevation.

3. *(a)* Define photogrammetry ? Differentiate between a map and an aerial photograph. 2+4

(b) Two straights AB and BC are intersected by a line D_1D_2. The angles BD_1D_2 and BD_2D_1 are $40°30'$ and $36°24'$ respectively. The radius of the first arc is $600m$ and that of the second arc is $800m$. If the chainage of intersection point B is $8248{\cdot}1m$, find the chainage of the tangent points and the point of compound curvature. 10



(c) A tacheometer reads 1·645 and 2·840 corresponding to the stadia wires, when sighted horizontally to a vertical staff 120*m* away. The focal length of the object glass is 20*cm* and the distance from the object glass to the trunnion axis is 15*cm*. Calculate the stadia interval. 4

4. (a) Define satellite station ? Explain the methods of determining the intervisibility between triangulation station. 10

(b) The scale of an aerial photograph is $1cm = 160m$, and the size of the photograph is $20cm \times 20cm$. If the longitudinal lap is 65% and side lap is 35%, determine the number of photographs required to cover an area of $232km^2$. 5

(c) Define Remote sensing ? What is the basic principles of remote sensing ? Differentiate between active and passive remote sensing. 1+2+2

5. *(a)* From a satellite station S, 6·2*m* from the main triangulation station *A*, the following directions were observed : 10

A	0°	0′	0″
B	132°	18′	30″
C	232°	24′	6″
D	296°	6′	11″

The lengths *AB*, *AC* and *AD* were computed to be 3265·5*m*, 4022·2*m* and 3086·4*m* respectively. Determine the directions of *AB*, *AC* and *AD*.

(b) What do you understand by GIS ? Write a note on components of GIS. 10

6. *(a)* Explain with the help of a neat sketch an idealized remote sensing system. 10

(b) Define deflection angle ? Explain the procedure for setting out a simple circular curve by two theodolite methods. 1+4

(c) Write a note on Raster and Vector data structures of GIS. 5

7. *(a)* The following perpendicular offsets were taken from a chain line to a hedge : 10

Chainage :	0	15	30	45	60	70	80	100	120	140
Offsets :	7·60	8·5	10·7	12·8	10·6	9·5	8·3	7·9	6·4	4·4

Calculate the area between the survey line, the hedge and the end offsets by

(a) Trapezoidal rule

(b) Simpson's rule.

(b) Two triangulation stations A and B are 60*kilometers* apart and have elevations 240m and 280m respectively. Find the minimum height of signal required at B so that the line of sight may not pass near the ground than 2m, the intervening ground may be assumed to have a uniform elevation of 200m. 6

(c) Differentiate between : 2×2

(i) Point of intersection and point of tangency

(ii) GIS and GPS.
