53 (CE 401) SURV–II

2017

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)* 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. 5

(b) Explain the factors necessary for setting out transition curve also write the expression for super-elevation of a highway. 5

(c) Explain the basic principles of triangulation survey and describe the various methods of determining the intervisibility between triangulation stations. 10

2. *(a)* What do you understand by geographical information system ? Write a note on components of GIS. 10

(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 R is $8248{\cdot}1m$, find the chainage of the tangent points and the point of compound curvature. 10

3. *(a)* From a satellite station S, $5{\cdot}8m$ from the main triangulation station A, the following directions were observed.

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 $3452{\cdot}6m$, $4123{\cdot}4m$ and $3175{\cdot}4m$ respectively. Determine the directions of AB, AC and AD. 10

(b) Define photogrammetry. Differentiate between a map and an aerial photograph. 5

(c) The scale of an aerial photograph is $1cm = 100m$. The photograph size is $20cm \times 20cm$. Determine the number of photographs required to cover an area $10km \times 10km$. If the longitudinal lap is 60% and the side lap is 30%. 5

4. (a) What is Remote Sensing ? What is the basic principles of remote sensing ? Differentiate between active and passive remote sensing. 10

(b) A series of offsets were taken from a chain line to a curved boundary line at intervals of $15m$ in the following order — 0, 2·65, 3·80, 3·75, 4·65, 3·60, 4·95, $5·85m$. Compute the area between the chain line, the curved boundary and the end offsets by *(a)* average ordinate rule *(b)* trapezoidal rule and *(c)* Simpson's rule. 10

5. (a) Two triangulation stations A and B are $60km$ 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 $200m$. 5

(b) What is the principle of two theodolite method ? Explain with a neat sketch the procedure of setting out the curve by two theodolite method. 10

(c) Write down the advantages and disadvantages of GIS and GPS. 5

6. (a) Two tangents intersect at chainage 59+60, the deflection angle being 60°30′. Calculate the necessary data for setting out a curve of 20 chains radius to connect the two tangents by offsets from chords method. Take peg interval equal to 100 links, length of the chain being equal to 20*m* (100 links). 10

(b) A tacheometer is set up at an intermediate point on a traverse course *PQ* and the following observations are made on a vertically held staff :

Staff station	Vertical angle	Staff intercept	Axial pair readings
P	+8°38′	2·350	2·105
Q	+6°8′	2·055	1·895

The instrument is fitted with an anallatic lens and the constant is 100. Compute the length of *PQ* and reduced level of *Q* that of *P* being 321·50*m*. 10