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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 120m away. The focal length of the object glass is 20cm and the distance from the object glass to the trunnion axis is 15cm. 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

Contd.

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

(b) Two straight lines  $AB$  and  $BC$  are intersected by a line  $D_1D_2$ . The angles  $BD_1D_2$  and  $BD_2D_1$  are  $40^\circ 30'$  and  $36^\circ 24'$  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  $8248.1m$ , find the chainage of the tangent points and the point of compound curvature. 10

3. (a) From a satellite station  $S$ ,  $5.8m$  from the main triangulation station  $A$ , the following directions were observed.

$A$	$0^\circ$	$0'$	$0''$
$B$	$132^\circ$	$18'$	$30''$
$C$	$232^\circ$	$24'$	$6''$
$D$	$296^\circ$	$6'$	$11''$

The lengths  $AB$ ,  $AC$  and  $AD$  were computed to be  $3452.6m$ ,  $4123.4m$  and  $3175.4m$  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 are 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  $60^{\circ}30'$ . 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 20m (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	$+8^{\circ}38'$	2.350	2.105
Q	$+6^{\circ}8'$	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 321.50m.

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