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53 (CE 401) SURV-II

2016

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) What is photogrammetry? Differentiate between a map and an aerial photograph. 6
- (b) Explain with the help of a neat sketch an idealized remote sensing system. 10
- (c) Differentiate between : 2×2
 - (i) Point of intersection and point of tangency
 - (ii) GIS and GPS.

Contd.

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

Chainage : 0 15 30 45 60 70 80 100

Offsets : 7.60 8.5 10.7 12.8 10.6 9.5 8.3 7.9

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

(i) Trapezoidal rule

(ii) Simpson's rule 10

- (b) Explain *any two* methods of determining the intervisibility between triangulation stations. 10

3. (a) From a satellite station S, 5.8m from the main triangulation station A, the following directions were observed. 10

A $0^{\circ}0'0''$

B $132^{\circ}18'30''$

C $232^{\circ}24'6''$

D $296^{\circ}6'11''$

the length AB, AC and AD were computed to be 3265.5m, 4022.2m and 3086.4m respectively. Determine the directions of AB, AC and AD.

(b) The area of a figure was measured by a planimeter with the anchor point outside the Figure and the tracing arm set to the natural scale ($M=100\text{cm}^2$). The initial reading was 8.628 and final reading was 1.238. The zero mark of the disc passed the index mark once in clockwise direction. Calculate the area of the figure. 5

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

4.iii (a) Write a note on the application of GIS and GPS in the field of surveying. Also give its advantages and disadvantages. 10

(b) 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

- (c) Define super-elevation. Why transition curve is provided in highways? 5
5. (a) What is the principle of two-theodolite method for setting out circular curve? Explain its procedure. 5
- (b) Derive the formulae for determining the horizontal and vertical distance in tangential tacheometry when both angles are angles of depression. 5
- (c) What is electromagnetic spectrum? State the wavelength regions, along with their uses, for remote sensing applications. 10
6. (a) The following notes refer to a line levelled tacheometrically with an anallactic tacheometer, the multiplying constants being 100 :

Inst. Station	Height of axis	Staff station	Vertical angle	Hair readings	Remarks
P	1.5	B.M.	$-6^{\circ}12'$	0.963, 1.515, 2.067	RL of BM = 460.65m
P	1.5	Q	$+7^{\circ}5'$	0.819, 1.341, 1.863	Staff held vertically
Q	1.6	R	$+12^{\circ}27'$	1.860, 2.445, 3.030	

Compute the reduced levels of P, Q and R and the horizontal distances PQ and QB. 10

(b) Two tangents intersect at chainage 59+60, the deflection angle being $50^{\circ}30'$. Calculate the necessary data for setting out a curve of 15 chains radius to connect the two tangents if it is intended to set out the curve by offsets from chords. Take peg interval equal to 100 links, length of the chain being equal to 20m (100 links). 10

7. (a) Compare the various triangulation figures mentioning their suitability. How does triangulation differ from traversing? 10

(b) What is meant by a satellite station? Why is it required? How are the observed angles to and from a satellite station reduced to their true value? 10