53 (CE 401) SURV-II

2015

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)* The following notes refer to a line levelled tacheometrically with an anallactic tacheometer, the multiplying constants being 100 : 10

Inst. station	Height of axis	Staff station	Vertical angle	Hair readings	Remarks
P	1·5	B.M	-6°12'	0·963, 1·515, 2·067	R.L. of
P	1·5	Q	+7°5'	0·819, 1·341, 1·863	B.M.=460·65*m*
Q	1·6	R	+12°27'	1·860, 2·445, 3·030	Staff held vertically

Compute the reduced levels of *P, Q* and *R* and the horizontal distances *PQ* and *QR*.

Contd.

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

Chainage (m) :	0	15	30	45	60	70	80	100	120	140
Offsets (m)	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 6

(c) What is the principle of two-theodolite method of setting out circular curve ? Explain its procedure. 4

2. (a) Derive the formulae for the determination of horizontal distance and vertical distance in tangential tacheometry when both the angles are angles of depression. 6

(b) Write short notes on : 2×4=8

(i) Selection of site for Base line.

(ii) Satellite station.

(c) A pair of photographs was taken with an aerial camera from an altitude of 500*m* above MSL. The mean principle base measured is equal to 90*mm*. The difference in parallax between two points if the elevation of the lower point is 500*m* above the datum.

What will be the difference in elevation if the parallax difference is 15·5*mm* ? 6

3. (a) From the satellite station *S* 5·8*m* from the main triangulation station *A*. The following directions were observed :

A	00° 0' 0"
B	130° 18' 30"
C	232° 24' 6"
D	296° 6' 11"

The length AB, AC, AD were 3265·5*m* and 4022·2*m* and 3086·2*m* respectively. Determine the directions of AB, AC and AD. 10

(b) Calculate the volume of earth work by Prismoidal formula in a road embankment with the following data :

Chainage along the centre line	: 0	100	200	300	400
Ground levels	: 201·70	202·90	202·40	204·70	206·90

Formation level at chainage 0 is 202·30, top width is 2·00 *ft* side slopes are 2 to 1. The longitudinal gradient of the embankment is 1 in 100 rising. The ground is assumed to be level all across the longitudinal section. 10

4. (a) Explain how you will determine the volume of earth work from a contour plan. 6

(b) Write short notes on components of GIS and explain various types of data structures used in GIS. 4+6=10

(c) What are the applications of photogrammetry ? 4

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

(b) Explain with reference to aerial photographs, what is meant by end overlap and side overlap and why they are provided ?

How do you determine the number of photographs necessary to cover a given area is an aerial survey ? 4+6=10

(c) Write a note on application of remote sensing. 5

6. *(a)* What do you understand by electro-magnetic spectrum ? State the wave-length regions, along with their uses, for remote sensing applications. 10

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

7. *(a)* How do you determine the intervisibility of triangulation stations ? Two triangulation stations A and B are 40*km* apart and have elevations of 178*m* and 175*m* respectively. Find the minimum height of signal required at B so that the line of sight may not pass nearer the ground than 3*m*. The intervening ground may be assumed to have a uniform elevation of 150*m*. 4+6=10

(b) Write a note on electro-magnetic energy used for remote sensing. 5

(c) Write a note on various types of sensors used for remote sensing in India. 5
