CBCS Scheme

Third Semester B.E. Degree Examination, Dec.2017/Jan.2018
Basic Surveying

Time: 3 hrs. Max. Marks: 80

Note: *Answer FIVE full questions, choosing one full question from each module.*

Module-1

1 a. Define surveying. Explain briefly principles of surveying. **(07 Marks)**

b. What is 'Ranging'? Explain indirect or reciprocal ranging with neat sketch. **(06 Marks)**

c. A steel tape 20 m long standardized at 55°F with a pull of 10 kg was used for measuring a baseline. Find the correction per tape length, if the temperature at the time of measurement was 80°F and pull exerted was 16 kg. Weight of 1 cubic cm of steel is 7.86 gms. Weight of tape = 0.8 kg and $E = 2.109 \times 10^6$ kg/cm^2 coefficient of expansion of tape per 1°F = 6.2×10^{-6}. **(03 Marks)**

OR

2 a. Differentiate between plane and geodetic surveying. **(06 Marks)**

b. In passing an obstacle in form of a pond, stations A and D, on the main line were taken an opposite sides of the pond. On the left of AD, a line AB 200 m long was laid down and a second line AC 250 m long was ranged on AD, the points B, D and C being in the same straight line. BD and DC were then chained and found to be 125 m and 150 m respectively. Find length of AD. **(06 Marks)**

c. Distinguish between accuracy and precision in surveying. **(04 Marks)**

Module-2

3 a. What are the temporary adjustments to be carried out for theodolite? **(08 Marks)**

b. Following bearings were observed with a compass. Calculate the interior angles. **(05 Marks)**

Line	Fore Bearing
AB	60°30'
BC	122°0'
CD	46°0'
DE	205°30'
EA	300°0'

c. Define the terms: (i) True bearing. (ii) Magnetic bearing. (iii) Magnetic declination. **(03 Marks)**

OR

4 a. Explain step by step procedure of measuring horizontal angle by Repetition method. **(08 Marks)**

b. The following are the bearings of closed traverse ABCDA. At what station do you suspect the local attraction? Find the corrected bearings of the sides. If magnitude of magnetic declination at the place is 2°20' W, compute the true bearings of the lines. **(08 Marks)**

Line	Fore bearing	Back bearing
AB	124°30'	304°30'
BC	68°15'	246°0'
CD	310°30'	135°15'
DA	200°15'	17°45'

Module-3

5 a. Discuss transit method and Bawditch method. **(06 Marks)**

b. The following data is available for a closed traverse ABCDEA. Check for angular error and correct it if necessary. Determine closing error and adjust the traverse using "Transit rule". Taking coordinates of station 'A' as (400, 400), compute coordinates of all stations.

(10 Marks)

Line	Length (m)	Bearing
AB	130	92°
BC	158	174°
CD	145	220°
DE	308	279°
EA	337	48°

OR

6 a. The elevation of point 'P' is to be determined by observations from two adjacent stations of a tacheometric survey. The staff was held vertically upon the point, and the instrument is fitted within an anallactic lens, the constant of the instrument being 100. Compute the elevation of the point 'P' from the following data, taking both observations as equally trustworthy. Also calculate the distance of A and B from 'P'. **(10 Marks)**

Inst. station	Height of axis	Staff point	Vertical angle	Staff readings	Elevation of station
A	1.42	P	$+2^0 24'$	1.230, 2.055, 2.880	77.750 m
B	1.40	P	$-3^0 36'$	0.785, 1.800, 2.815	97.135 m

b. Derive distance and elevation formulae for stadia tacheometry, when the staff held normal to line of sight and both for an angle of elevation and angle of depression. **(06 Marks)**

Module-4

7 a. Define the following terms:
   (i) Bench mark   (ii) Parallax   (iii) Line of collimation   (iv) Back sight
   (v) MSL   (vi) Reduced level **(06 Marks)**

b. The following staff readings were observed successively with a level, the instrument having been moved after third, sixth and eighth readings. Enter the readings and calculate RL of points by Rise and Fall method if first readings was taken with a staff held on BM = 432.384 m
2.228 m, 1.606, 0.988, 2.090, 2.864, 1.262, 0.602, 1.982, 1.044, 2.684 m. **(10 Marks)**

OR

8 a. What is sensitiveness of bubble tube? Explain any one method of determining sensitivity. **(06 Marks)**

b. In order to determine the elevation of top 'Q' of a signal on a hill, observations were made from two stations 'P' and 'R'. The stations P, R and Q were on the same plane. If angles of elevation of the top 'Q' of signal measured at 'P' and 'R' were 25°35' and 15°05' respectively. Determine the elevation of the foot of the signal if height of signal above its base was 4 m. The staff readings upon the B.M (RL 105.42) were respectively 2.755 and 3.855 m when the instrument was at 'P' and at 'R'. The distance between 'P' and 'R' was 120 m. **(10 Marks)**

Module-5

9 a. What are the characteristics of contours? **(08 Marks)**

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)	7.6	8.5	10.7	12.8	10.6	9.5	8.3	7.9	6.4	4.4

Calculate the area between survey line, the hedge and end offsets by,
   (i)   Trapezoidal rule.
   (ii) Simpson's rule. **(08 Marks)**

OR

10 a. Discuss the methods for determining areas and volumes. **(06 Marks)**

b. A railway embankment 400 m long is 12 m wide at the formation level and has side slope of 2 to 1. The ground levels at every 100 m along the centre line are as under –

Distance	0	100	200	300	400
R.L	204.8	206.2	207.5	207.2	208.3

The formation level at zero chainage is 207.00 and the embankment has a rising gradient of 1 in 100. The ground is level across the centre line. Calculate the volume of earth work. **(10 Marks)**

* * * * *