B.E. (Civil Engineering) IV Semester (C.B.S.) Examination

Paper - IV

SURVEYING - I

Time : Three Hours] [Maximum Marks : 80

Note : 1. All questions carry marks as indicated.
2. Solve Question no. 1 Or Question no. 2.
3. Solve Question no. 3 Or Question no. 4.
4. Solve Question no. 5 Or Question no. 6.
5. Solve Question no. 7 Or Question no. 8.
6. Solve Question no. 9 Or Question no. 10.
7. Solve Question no. 11 Or Question no. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.

1. a) What is ranging? What are the methods of ranging a survey line? 6

b) The following are bearings taken on a closed traverse:

Line	F.B.	B.B.
AB	195°30'	17°0'
BC	73°30'	250°30'
CD	36°15'	214°30'
DE	266°45'	84°45'
EA	234°15'	57°0'

Compute the interior angles and correct them for observational errors. Also determine the corrected magnetic bearings. 7

Or

2. a) Differentiate between prismatic compass and surveyor's compass. 6

   b) The area of the plan of an old survey plotted to a scale of 10 m to 1 cm now measures as 90.5 cm^2 as found by planimeter. The plan is found to have shrunk so that a line originally 10 cm long now measure 9.5 cm only. A note on the plan also states that the 20 m chain used was 9 cm too short. Find the true area of the survey. 7

3. a) What are the temporary adjustments of dumpy level? How it is done? 7

   b) The following consecutive staff readings were observed with 4 m levelling staff at a common interval of 30 m.

0.525 m on A, 0.936, 1.953, 2.846, 3.644, 3.938, 0.962, 2.534, 3.844, 0.956, 1.579 and 3.016 m on B.

The elevation of point A is 120 m. Make up a level book and apply usual checks. Determine the gradient of line AB. 7

Or

4. a) Explain with neat sketches the characteristics of contours. 7

   b) The following details refer to reciprocal levels taken with a level:

Instrument at	Staff reading on		Remarks
	A	B	
A	1.405	2.775	Distance between A and B = 1150 m
B	0.650	1.795	R.L. of B = 200.000 m

Determine

i) True difference of level between A and B,
ii) The reduced level of A and
iii) The error in collimation adjustment of the level. 7

5. a) Derive the equation to determine R.L. of top of the elevated object as base of the object inaccessible and instrument stations are in the same vertical plane as that of the elevated object and also instrument axes at the same level in case of trigonometric levelling. 6

b) A dumpy level was setup at C exactly midway between two pegs A and B 100 m apart. The reading on the staff when held on the pegs A and B were 2.250 and 2.025 respectively. The instrument was then moved and set up at a point D on the line BA produced and 20 m from A. The respective staff reading on A and B were 1.875 and 1.670. Calculate the staff readings on A and B to give a horizontal line of sight. 7

Or

6. a) Enlist the fundamental lines of level and describe relationship between them. 6

b) A vane 4 m above the foot of a staff was sighted at a point 2000 m away from the instrument. The observed angle of elevation was 2°30'. The RL of Instrument station was 250.50 m and the height of instrument axis 1.5 m. Find the RL of the staff station. 7

7. a) Describe the temporary adjustment of theodolite. 6

b) The following lengths and bearings were recorded in running a theodolite traverse in the counter clockwise direction, the length CD and bearing of DE having been omitted.

Line	Length (m)	R.B.
AB	281.4	S 69°11' E
BC	129.4	N 21°49' E
CD	?	N 19°34' W
DE	144.5	?
EA	168.7	S 74°24' W

Determine the length of CD and the bearing of DE. 8

Or

8. a) What do you understand by Gales traverse table? 7

b) Describe the reiteration method of measurement of horizontal angle by theodolite. 7

9. a) What are the advantages and disadvantages of plane table survey? 6

b) A railway embankment is 10 m wide with side slopes 1.5 to 1. Assuming the ground to be level in a direction transverse to the centre line, calculate the volume contained in a length of 120 m by trapezoidal rule and prismoidal rule. The centre heights at 20 m intervals are 2.2 m, 3.7 m, 3.8 m, 4.0 m, 3.8 m, 2.8 m, 2.5 m. 7

Or

10. a) Enlist the methods of plane table survey and explain any one. 7

b) Explain Trapezoidal and Simpson's rule for area calculation. 6

11. a) Describe the equipments used for soundings. 6

b) Write a short note on optical theodolite. 7

Or

12. a) Explain briefly the methods of locating soundings. 6

b) Explain the procedure of transferring the levels underground. 7