18CV35

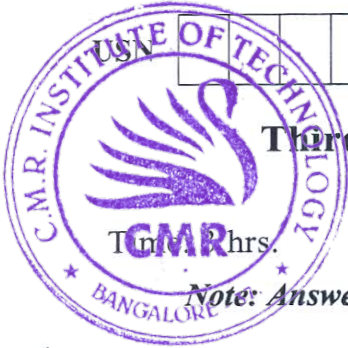### Third Semester B.E. Degree Examination, Jan./Feb. 2023
Basic Surveying

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1   a. Differentiate between plane surveying and geodetic surveying. **(04 Marks)**
    b. Explain the principles of surveying with neat sketches. **(06 Marks)**
    c. A 20m chain was found to be 10cm too long after chain a distance of 1500m. It was found to be 18cm too long at the end of days work, after chaining a total distance of 3000m. Find the true distance. If the chain was correct before the commencement of the work. **(10 Marks)**

OR

2   a. With a neat sketch, explain the concept of indirect ranging. **(06 Marks)**
    b. Explain with a neat sketch the principle, working and use of optical square. **(08 Marks)**
    c. Two stations P and Q on the main survey line were taken on the opposite sides of the pond. On the right of PQ, a line PR, 210m long was laid down and another line PS, 260m long laid down on the left of PQ. The points R, Q and S are on the same straight line. The measured lengths of RQ and QS are 85m and 75m respectively. Compute the length of PQ. **(06 Marks)**

Module-2

3   a. Distinguish between:
    i)   Whole circle bearing system and quadrantal bearing system.
    ii) Dip and Declination. (Sketches carry due weightage). **(06 Marks)**
    b. Compare between prismatic compass and surveyors compass. **(06 Marks)**
    c. The bearings of the sides of a closed traverse are as follows:

Side	Fore-bearing	Back bearing
AB	80° 40′	260° 40′
BC	121° 55′	301° 55′
CD	170° 50′	350° 50′
DE	230° 05′	50° 05′
EA	310° 50′	130° 50′

Compute the interior angles of the traverse using a sketch. **(08 Marks)**

OR

4   a. Explain the terms and their significance:
    i)   Independent and dependent co-ordinates.
    ii) Bowditch and transit rules. **(08 Marks)**
    b. An abstract from a traverse for a closed traverse is given below. Balance traverse using Bowditch's method:

Line	Length (m)	Latitude (m)	Departure (m)
AB	200	-173.20	+100.00
BC	130	-0.00	+130.00
CD	100	+86.60	+50.00
DE	250	+250.00	+0.00
EA	320	-154.90	-250.00

(06 Marks)

c. The table below gives the lengths and bearings of the lines of a traverse ABCDEA, the length and bearing of EA having been omitted. Calculate the length and bearing of line EA.

Line	Length (m)	Fore Bearing
AB	204	87° 30′
BC	226	20° 20′
CD	187	280° 00′
DE	192	210° 30′
EA	?	?

(06 Marks)

Module-3

5 a. Explain the following terms: i) Bench mark ii) Turning point iii) Fore sight. Note: Sketches carry due weightage. (06 Marks)

b. Give step by step procedure for temporary adjustments of a dumpy level. (06 Marks)

c. The following consecutive readings were taken with a dumpy level and a 4m leveling staff on a continuously sloping ground at 30m intervals.
0.680, 1.455, 1.855, 2.330, 2.885, 3.380, 1.055, 1.860, 2.265, 3.540, 0.835, 0.945, 1.530 and 2.250. The RL of the starting point was 80.750m. Rule out a page of level book. Carryout reduction by height of collimation method. Apply checks and also determine the gradient. (08 Marks)

OR

6 a. Explain the effects of curvature of the earth and refraction on the accuracy of leveling. (06 Marks)

b. Explain the process of 'Reciprocal Levelling' with a sketch and state its advantages. (08 Marks)

c. In leveling between two points A and B on opposite sides of a river, the level was set up near A and the staff readings on A and B were 2.640 and 3.220 respectively. The level was then moved and set-up near B, the respective staff readings on A and B were 1.080 and 1.660. Find the true difference in level of A and B. (06 Marks)

Module-4

7 a. List and describe briefly the use of various accessories of a plane table. (08 Marks)

b. What are the advantages and disadvantages of plane table surveying? (08 Marks)

c. Describe the method of orienting the plane table by back sighting. (04 Marks)

OR

8 a. Explain radiation and intersection method of plane table surveying. (08 Marks)

b. What is three point problem? With neat sketches, explain Bessel's graphical method to solve three-point problem. (08 Marks)

c. State the errors in plane tabling. (04 Marks)

Module-5

9 a. State Simpson's rule. Derive an expression for it. (08 Marks)

b. The following offsets were taken from a chain line to a hedge:

Distance, m	0	20	40	60	80	120	160	220	280
Offset, m	9.4	10.8	13.6	11.2	9.6	8.4	7.5	6.3	4.6

Calculate the area using Simpson's rule. (08 Marks)

c. List the uses of contours. (04 Marks)

OR

10 a. Describe the various characteristics of contours with sketches wherever necessary. (08 Marks)

b. Explain the following: i) Contour interval ii) Grade contour (08 Marks)

c. A railway embankment is 16m wide with side slopes 2 to 1. Assume the ground to be level in direction traverse to the centre line. Calculate the volume contained in a length of 100m, the centre height at 20m intervals being in m: 2.0, 4.5, 4.0, 6.5, 2.5 and 1.5. Use trapezoidal rule. (04 Marks)