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Third Semester B.E. Degree Examination, June/July 2019 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. Explain fundamental principles of surveying. (06 Marks)
- b. Differentiate between (i) Plan and map (ii) Accuracy and Precision. (06 Marks)
- c. A survey line BAC crosses a river, A and C being on the neat and distant banks respectively. Standing at D, a point 100 meters measured perpendicular to AB from A, the bearing of C and B are 230° respectively, AB being 50 meters. Find the width of the river. (08 Marks)

OR

- 2 a. Define surveying. Briefly explain the classification of surveying (08 Marks)
- b. Explain the methods of chaining on sloping ground. (04 Marks)
- c. A steel tape 30 meters long standardizing at 60°F with a pull of 10 kg and was used in measuring a baseline. Find the correction per tape length if the temperature at the time of measurement was 85°F and pull exerted was 16 kg. Weight of 1 centimeter cube of steel is 7.86 grams and total weight of tape is 0.8 kg. $E = 2.1 \times 10^6 \text{ kg/cm}^2$ and co-efficient of expansion of tape per $1^\circ\text{F} = 6.2 \times 10^{-6}$. (08 Marks)

Module-2

- 3 a. Differentiate between (i) Fore bearing and back bearing (ii) Magnetic bearing and True bearing (iii) Magnetic declination and magnetic dip. (06 Marks)
- b. Explain the uses of theodolite. (06 Marks)
- c. Determine the included angles in a closed traverse ABCDA conducted in a clockwise direction, given the following bearing observed with a prismatic compass.

| Line | AB | BC | CD | DA |
|--------------|------------|------------|-------------|-------------|
| Fore bearing | 40° | 70° | 210° | 280° |

Apply check.

(08 Marks)

OR

- 4 a. What are the different methods of measuring horizontal angle using theodolite? Explain any one in detail. (10 Marks)
- b. Following bearing were observed with a prismatic compass.

| Line | AB | BC | CD | DE | EA |
|--------------|----------------|----------------|----------------|----------------|----------------|
| Fore bearing | $74^\circ 0'$ | $91^\circ 0'$ | $166^\circ 0'$ | $177^\circ 0'$ | $289^\circ 0'$ |
| Back bearing | $254^\circ 0'$ | $271^\circ 0'$ | $343^\circ 0'$ | $0^\circ 0'$ | $109^\circ 0'$ |

Where do you suspect the local attraction? Find the correct bearings.

(10 Marks)

Module-3

- 5 a. Derive distance and elevation formulae for stadia tachometry, when staff held normal to the line of sight, for both an angle of elevation and an angle of depression. (08 Marks)

- b. The following data is available for a closed traverse ABCDA. Determine closing error and adjust the traverse using transit rule. Take co-ordinates of A(200, 100), compute coordinates of all the stations.

| Line | AB | BC | CD | DA |
|------------|---------|----------|---------|-------|
| Length (m) | 250 | 123 | 256 | 108 |
| Bearing | 86° 42' | 178° 06' | 270° 0' | 2° 0' |

(12 Marks)

OR

- 6 a. What are the different methods of balancing the traverse? Explain them. (08 Marks)
 b. A tachometer is set up at an intermediate point on a traverse course PQ and following observations are made on a vertically held staff.

| Staff Station | Vertical angle | Staff intercept | Axial hair readings. |
|---------------|----------------|-----------------|----------------------|
| P | + 8° 36' | 2.350 | 2.105 |
| Q | + 6° 06' | 2.055 | 1.895 |

The instrument is fitted with annalistic lens and the constant is 100. Compute the length of PQ and reduced level of Q, that of P being 321.50 meters. (12 Marks)

Module-4

- 7 a. Explain temporary adjustments of a dumpy level. (06 Marks)
 b. Define the following terms: (i) Bench mark (ii) Back sight (iii) Reduced level (iv) Datum. (04 Marks)
 c. The following staff readings were observed successively with a level, the instrument have been moved forward after the second, fourth and eighth readings.
 0.875, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.875, 2.030, 3.765.
 The first reading was taken with the staff held upon a bench mark of elevation 132.135m. Enter the readings in a page of level book and reduce the levels. Apply the usual check. (10 Marks)

OR

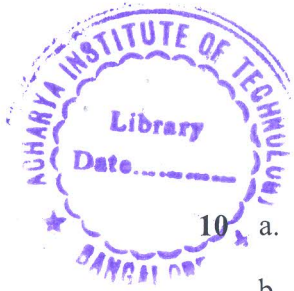
- 8 a. Compare rise and fall method of reducing levels with the height of collimation method. (06 Marks)
 b. The following consecutive readings were taken with a level and 5 meter leveling staff on a continuously sloping ground at common interval of 20 meters.
 0.585, 1.830, 1.925, 2.825, 3.730, 4.685, 0.825, 2.005, 3.110, 4.485.
 The reduced level of first point was 218.125m. Rule out a page of level book and enter the above readings. Calculate the reduced level of points by rise and fall method and also gradient of the line joining first and last point. (14 Marks)

Module-5

- 9 a. What are the different methods of contouring? Discuss the merits and demerits of each. (08 Marks)
 b. The following give the values in meters of the offsets taken from a chain line to an irregular boundary calculate the area included between the chain line and irregular boundary and first and last offsets by (i) Simpson rule (ii) Trapezoidal rule.

| | | | | | | | | | |
|---------------|------|------|------|------|------|------|------|------|------|
| Distance in m | 0 | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 |
| Off sets in m | 10.6 | 15.4 | 20.2 | 18.7 | 16.4 | 20.8 | 22.4 | 19.3 | 17.6 |

(12 Marks)



OR

- a. What are the different characteristics of contour lines? Explain with neat sketches. (06 Marks)
- b. Discuss the different methods of determining areas. (04 Marks)
- Calculate the volume of earth work by prismoidal rule in a road embankment with following data:

| Chainage along centre line | 0 | 100 | 200 | 300 | 400 |
|----------------------------|---------|---------|---------|---------|---------|
| Ground level | 201.700 | 202.900 | 202.400 | 204.700 | 205.900 |

Formation level at chainage 0 is 203.300m, top width is 12.0 meters, side slope is 2 to 1 and longitudinal gradient is 1 in 100. The ground is level across the centre line. (10 Marks)
