

CBCS SCHEME

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17CV34



Third Semester B.E. Degree Examination, Feb./Mar. 2022 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 the basic principles of surveying. (06 Marks)
- b. Distinguish between precision and accuracy. (04 Marks)
- c. A 30mt chain was tested before commencement of the day's work and found to be correct. After measuring 3000mt, the chain was found to be 5cm too long. At the end of day's work after measuring 5400mt, the chain was found to be 10cm too long. What was the true distance chained? (10 Marks)

OR

- 2 a. List the different types of chains and tapes used in chain surveying. (06 Marks)
- b. Explain Indirect method of Ranging with a neat sketch. (06 Marks)
- c. Two stations P and Q, on the main survey line were taken on the opposite sides of a pond. On the right of PQ, a line PR, 210mt long was laid down and another line PS, 260mt long was 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 85mt and 75mt respectively. What is the length of PQ? (08 Marks)

Module-2

- 3 a. Define the following terms with reference to theodolite:
 - i) Transiting
 - ii) Centring
 - iii) Faceleft observation
 - iv) Horizontal axis
 - v) The line of collimation
 - vi) Vertical axis. (06 Marks)
- b. Differentiate between:
 - i) True meridian and magnetic meridians
 - ii) Dip and declination
 - iii) Isogonic and Agonic line. (06 Marks)
- c. Explain the method of repetitions for the measurement of horizontal angle using transit theodolite, with a neat tabular column. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. $42+8=50$, will be treated as malpractice.

OR

- 4 a. What are the fundamental lines of a transit theodolite? Establish the fixed relationships among them. (08 Marks)
- b. The following are the Bearings of a closed traverse ABCDA. At what stations do you suspect local attraction? Find the connected bearings of two sides. If magnetic declination at the place is $2^{\circ}20'W$, compute the true bearings at the lines.

| Line | Fore Bearing | Back Bearing |
|------|------------------|------------------|
| AB | $124^{\circ}30'$ | $304^{\circ}30'$ |
| BC | $68^{\circ}15'$ | $246^{\circ}0'$ |
| CD | $310^{\circ}30'$ | $135^{\circ}15'$ |
| DA | $200^{\circ}15'$ | $17^{\circ}45'$ |

(12 Marks)

Module-3

- 5 a. Discuss Transit and Bowditch method of balancing traverse. (08 Marks)
- b. The table below gives the lengths and bearings of the lines of a traverse ABCDE, the length and bearing of line EA having been omitted. Calculate the length and bearing of line EA.

| Line | Length (m) | Bearing |
|------|------------|-----------------|
| AB | 204.0 | $87^{\circ}30'$ |
| BC | 226.0 | $20^{\circ}20'$ |
| CD | 187.0 | $280^{\circ}0'$ |
| DE | 192.0 | $210^{\circ}3'$ |
| EA | ? | ? |

(12 Marks)

OR

- 6 a. Derive distance and elevation formulae for stadia tacheometry, when the staff held normal to line of sight and both for angle of elevation and angle of depression. (08 Marks)
- b. A tachometer is setup at an intermediate point on a traverse course PQ and the following observations are made on a vertically held staff:

| Staff station | Vertical angle | Staff intercept | Axial hair readings |
|---------------|-----------------|-----------------|---------------------|
| P | $+8^{\circ}36'$ | 2.350 | 2.105 |
| Q | $+6^{\circ}6'$ | 2.050 | 1.895 |

The instrument is fitted with an anallatic lens and the constant is 100. Compute the length of PQ and RL of Q that of P being 321.500 mt. (12 Marks)

Module-4

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- 7 a. Define the following terms:
i) Benchmark ii) MSL iii) Back sight iv) Reduced level v) Fore sight
vi) Parallax. (06 Marks)
- b. Explain the temporary adjustments of Dumpy level. (06 Marks)
- c. The following staff readings were observed successively with a level, the instrument having been moved after 3rd, 6th and 8th readings. Enter the readings and calculate the R.L of all the points by rise and fall method, if the first reading was taken with a staff held on BM of RL 100.000mt.
2.225, 1.625, 0.985, 2.095, 2.795, 1.265, 0.605, 1.980, 1.045 and 2.685m (08 Marks)

OR

- 8 a. Explain the temporary adjustments of a dumpy level. (08 Marks)
- b. In order to ascertain the elevation of top (Q) of the signal on a hill, observations were made from two instrument stations P and R at a horizontal distance 100m apart, the stations P and R being in line with Q. The angles of elevation of Q at P and R were $28^{\circ}42'$ and $18^{\circ}6'$ respectively. The staff readings upon BM at elevations 287.280m were respectively 2.870m and 3.750m when the instrument was at P and at R, the telescope being horizontal. Determine the elevation of foot of the signal if the height of the signal above its base is 3m. (12 Marks)

Module-5

- 9 a. Explain the characteristics of contours. (08 Marks)
- b. The following perpendicular offsets were taken at 10m intervals from a surveyline to an irregular boundary line.
3.25, 5.60, 4.20, 6.65, 8.75, 6.20, 3.25, 4.20, 5.65 calculate the area enclosed between the survey line, boundary line and the first and last offsets, by the applications of i) average ordinate rule ii) Trapezoidal rule iii) Simpson's rule. (12 Marks)

OR

- 10 a. List the methods of determining areas and volumes. (08 Marks)
- b. A Railway embankment is 10m wide with side slopes $1\frac{1}{2} : 1$. Assuming the ground to be level in a direction transverse to the centerline, calculate the volume contained in a length of 120m. The centre heights at 20m intervals being in meters.
2.2, 3.7, 3.8, 4.0, 3.8, 2.8, 2.5 (12 Marks)
