

# CBCS SCHEME

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15CT43

## Fourth Semester B.E. Degree Examination, June/July 2019 Surveying – II

Time: 3 hrs.

Max. Marks: 80

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

### Module-1

- 1 a. Differentiate the following terms :
- Transiting and swinging of telescope
  - Clamp screw and tangent screw
  - Face right and face left observation
  - Plate bubble and altitude bubble. (08 Marks)
- b. With neat sketch and tabular column, explain the measurement of Horizontal angle by repetition method. List the errors that are eliminated by this method. (08 Marks)

**OR**

- 2 a. List the permanent adjustments of transit theodolite. Explain spire test. (08 Marks)
- b. Explain the procedures for extending a straight line using a transit when it is in adjustment and not adjustment. (08 Marks)

### Module-2

- 3 a. Explain the method of determining the distance and elevation of an object using trigonometrical leveling, when the base is inaccessible and the instrument stations are in the same plane as that of the elevated object. Derive the required equation. (10 Marks)
- b. What is total station? List out advantages of total stations over the conventional surveying instruments. (06 Marks)

**OR**

- 4 a. Derive the expression for the horizontal distance, vertical distance and the elevation of an elevated object by double plane method, when base is inaccessible. (08 Marks)
- b. The top (Q) of a Chimney was sighted from two stations P and R at every different levels, the stations P and R being in the line with the top of the Chimney. The angle of elevation from P to the top of the Chimney was  $38^{\circ}21'$  and that from 'R' to the top of the chimney was  $21^{\circ}18'$  the angle of the elevation from 'R' to a vane 2m above the foot of the staff held at P was  $15^{\circ}11'$ . The height of instruments at R and P were 1.87m and 1.64m respectively. The Horizontal distance between P and R was 127m and reduced level of R was 112.78m. Find the RL of the top the chimney and horizontal distance from 'P' to the Chimney. (08 Marks)

### Module-3

- 5 a. With usual notation, derive the distance and elevation formulae for staff vertical and line of sight inclined upwards in fixed hair method of tacheometric surveying. (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.

- b. Determine gradient from a point 'A' to a point 'B' from the following observations made with a tacheometer fitted with an anallactic lens, the constant of the instrument was 100m and the staff held vertically.

Instrument station	Staff point	Bearing	Vertical angle	Staff reading
P	A	134°	+10°32'	1.360, 1.915, 2.470
	B	224°	+5°6'	1.065, 1.885, 2.705

(08 Marks)

**OR**

- 6 a. With neat sketches, explain different types of curves. (06 Marks)
- b. Two tangents intersect at a Chainage of 1000m, the deflection angle being 28°. Calculate all the data necessary to set out a simple circular curve of 250m radius by Rankin's deflection angle method and tabulate the results.  
Take peg intervals = 20m, least, count of theodolite = 20 seconds. (10 Marks)

**Module-4**

- 7 a. With neat sketch, explain the various elements of a compound curve. Derive the relations for calculating the chainages of tangent points. (08 Marks)
- b. Two straight lines having a total deflection angle of 76° to be connected by a compound curve. The radius of first arc is 500m and that of second arc is 800m. If the chainage of point of intersection is 7540m. Find the Chainage of tangent points and point of compound curvature. Deflection angle for the first arc is 35°. (08 Marks)

**OR**

- 8 a. Define : (i) Transition curve (ii) Super elevation (iii) Bernoulli's Lemniscates curve. (06 Marks)
- b. With neat sketches, explain the types of vertical curves. (04 Marks)
- c. A road bend which deflects 76° is to be designed for a maximum speed of 80kmph. If the maximum centrifugal ratio is  $\frac{1}{4}$  and maximum rate of change of radial acceleration is  $0.3\text{m/sec}^3$  calculate :  
i) Radius of circular arc ii) Length of transition curve iii) Total length of composite curve. (06 Marks)

**Module-5**

- 9 a. Discuss the methods determining Area and volumes. (06 Marks)
- b. The following perpendicular offsets were taken from a chain line to a edge.

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 edge and offsets by

- i) Trapezoidal rule ii) Simpson's rule. (10 Marks)

**OR**

- 10 a. What is "zero circles" planimeter? Explain any one method of using planimeter to find area. (06 Marks)
- b. A railway embankment 400m long is 12m wide at the formation level, and has side slope of 2 to 1. The ground levels at every 100m along the centre line are as under

Distance	0	100	200	300	400
RL	204.8	206.2	207.5	207.2	208.3

The formation level at zero chainage is 207.00m 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)