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10CV/CT44

Fourth Semester B.E. Degree Examination, June/July 2017
Surveying – II

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer any FIVE full questions, selecting atleast TWO questions from each part.
2. Assume missing data, if any, suitably.

PART – A

- 1 a. Explain the method of measurement of horizontal angle by reiteration method. Mention the advantages. (10 Marks)
- b. Explain with neat sketches, the methods of prolonging a straight line using a theodolite, when the instrument is in adjustment and when not in adjustment. (10 Marks)
- 2 a. With a neat sketch, mention the fundamental lines of a transit and explain the relationship between them. (10 Marks)
- b. Explain two peg method of testing and adjusting line of collimation of a dumpy level. (10 Marks)
- 3 a. Explain the method of determining the distance and elevation of an object when the base of the object is inaccessible and instrument stations are in the same vertical plane as that of the object. Derive the equation. (10 Marks)
- b. To determine the elevation of the top of an electric pole, the following observations were made.

| Instrument Station | Reading on B.M | Angle of elevation | Remarks |
|--------------------|----------------|--------------------|-------------------|
| A | 1.377 m | 11° 53' | RL of BM = 30.15m |
| B | 1.263 m | 8° 5' | Distance AB = 30m |

Station A and B and the top of the pole are in the same vertical plane. Find the elevation of the top of the pole. (10 Marks)

- 4 a. Derive the tacheometric equation for horizontal line of sight and hence obtain the tacheometric equation for inclined line of sight. (10 Marks)
- b. An old temple is on a small hill adjoining a road. With a view of determining the distance of the temple and the height of the tower of the temple above its plinth, observations were taken from the centre of the road upon a vertically held staff.
 - (i) On the plinth of the entrance door of the temple.
 - (ii) On the top of the tower.

The tacheometer is fitted with anallactic lens the constant of the instrument being 100.

| Instrument Station | Height of Instrument | Staff Station | Vertical angle | Staff reading |
|--------------------|----------------------|---------------|----------------|---------------------|
| Centre of Road | 1.560 m | Plinth | +14° 14' | 1.530, 2.100, 2.670 |
| | | Top of tower | +17° 28' | 1.260, 1.900, 2.540 |

Calculate :

- (i) Distance of plinth from the road.
- (ii) R.L. of plinth, given R.L. of road as 850.740 m
- (iii) Height of tower.

(10 Marks)

PART – B

- 5 a. What is meant by degree of curve? Establish the relationship between degree of a curve and its radius. (08 Marks)
- b. Derive the expression for setting out simple curve by Rankine's deflection angle method. Explain the procedure. (12 Marks)
- 6 a. Two straights AB and BC intersect at B with a deflection angle of 75° and chainage of 3415m. The straights are to be connected by a compound curve with first arc of 600m and that of second arc of 400m radius. If the chainage of point of curve is 2992.05 m, find the central angles of two arcs and tangent distance of compound curve corresponding to small arc. (10 Marks)
- b. Two parallel railway lines are to be connected by a reverse curve. If the lines are 10m apart and the maximum distance between the tangent points measured parallel to the straight is 50m, find
- (i) the radius 'R', if $R_1 = R_2 = R$.
- (ii) the radius 'R₂', if $R_1 = 50$ m. (10 Marks)
- 7 a. List the functions and requirements of a transition curve. (06 Marks)
- b. Why vertical curves are provided on highways? List the different types of vertical curves with sketches. (06 Marks)
- c. A parabolic vertical curve is to be set out to connect two uniform grades of +0.9% and - 1.1%. If the rate of change of grade is - 0.25% per 100m, calculate the reduced levels of pegs on the curve if the R.L. of the point of intersection is 215.35m. The chainage of the point of intersection is 2540.00m. (08 Marks)
- 8 a. What is zero circle of a planimeter? Explain any one method of determining the area of zero circle. (08 Marks)
- b. The following perpendicular offsets were taken at 10m intervals from a survey line to an irregular boundary. 3.82, 4.37, 6.82, 5.26, 7.59, 8.90, 9.52, 8.42, and 6.43m. Calculate the area in square metre enclosed between the survey line, the irregular boundary line and the first and last offsets by
- (i) Average ordinate rule
- (ii) Trapezoidal rule
- (iii) Simpson's rule. (12 Marks)
