

CBCS Scheme

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15CT43

Fourth Semester B.E. Degree Examination, Dec.2017/Jan.2018 Surveying – II

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. List the fundamental axes or lines of a Transit Theodolite. State the derived relationships among them. (08 Marks)
- b. List the permanent adjustments of Transit Theodolite. Explain spire test. (08 Marks)

OR

- 2 a. Explain the measurement of horizontal angle by repetition method. List the errors that are eliminated by this method. (08 Marks)
- b. Explain the objective, test and adjustment of plate level. (08 Marks)

Module-2

- 3 a. Explain with a sketch, step by step procedure of determining the R-L of top of the object say 'Q' by single plane method. (08 Marks)
- b. In order to ascertain the elevation of the top (Q) of the signal on a hill, observations were made from two instrument stations P and R at a horizontal distance of 100 meters 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 a bench mark of elevation 287.280 m were respectively 2.870 and 3.750 when the instrument was at P and R, the telescope being horizontal. Determine the elevation of foot of the signal, if the height of the signal above its base is 3 meters. (08 Marks)

OR

- 4 a. Explain how you would determine the elevation of top of the object (Q) by double plane method. (08 Marks)
- b. To find the elevation of top (Q) of a hill, a flag-staff of 2 mt height was erected and the observations were made from two stations P and R, 60 mt apart. The horizontal angle @ P between R and the top of the flagstaff was $60^{\circ}30'$ and that measured at R between top of flagstaff and P was $68^{\circ}18'$. The angle of elevation to the top of flag staff was measured to be $10^{\circ}12'$ at P. The angle of elevation to the top of the flagstaff was measured to be $10^{\circ}48'$ at R staff readings on BM when the instrument was at P = 1.965 m and that with the instrument at R = 2.055 mt. Calculate the elevation of top of the hill if that of BM was 435.065 mt. (08 Marks)

Module-3

- 5 a. What are the different methods of designating a curve? Derive a relationship between radius and degree of a curve. (08 Marks)
- b. A Tacheometer was 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 reading
P	$+8^{\circ}36'$	2.350	2.105
Q	$+6^{\circ}6'$	2.055	1.895

The instrument is fitted with anallactic lens and the constant is 100. Compute the length of PQ and R-L of Q, that of P being 321.50 meters. (08 Marks)

OR

- 6 a. Define the following terms:
 (i) Point of curve (ii) Midordinate (iii) Length of long chord (08 Marks)
 (iv) Tangent distance
- b. Two tangents intersect at a chainage 1000 mt, the deflection angle being 28° . Calculate all the data necessary to set out a simple circular curve of 250 mt radius by Rankine's method of deflection angles and tabulate the results. Take Peg interval as 20 mt. (08 Marks)

Module-4

- 7 a. Two straights with a total deflection angle of 72° are to be connected by a compound curve of two branches of equal length. The radius of the first branch is 300 mt and that of second is 400 mt. The chainage of intersection point is 1500 mt. Calculate the chainages of tangent points and also at point of compound curvature. (08 Marks)
- b. Two parallel Railway lines are to be connected by a suitable curve of radii $R_1 = R_2 = R$. If the Lines are 10 mt apart and the maximum distance between the tangent points measured parallel to the straight is 50 mt. Find R. Find radius R_2 if $R_1 = 50$ mt. (08 Marks)

OR

- 8 a. Two straights AB and BC are intersected by a line D_1D_2 . The angles BD_1D_2 and BD_2D_1 are $40^\circ 30'$ and $36^\circ 24'$ respectively. The radius of the first arc is 600 mt and that of the second is 800 mt. If the chainage of intersections point B is 8248.1 mt, find the chainages of tangent points and that of Point of Compound Curvature (PCC). (08 Marks)
- b. Two parallel Railway lines are to be connected by a Reverse curve, each section having the same radius. If the lines are 12 mt and the maximum distance between tangent points measured parallel to the straight is 45 mt, find the maximum allowable radius. If however, both the Radii are to be different, calculate the radius of the second branch if that of the first branch is 60 mt. Also calculate lengths of both the branches. (08 Marks)

Module-5

- 9 a. The following perpendicular offsets were taken at 10 mt, intervals from a survey line 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, the irregular boundary line and the first and last offset by the application of, (i) Average ordinate rule (ii) Trapezoidal rule (iii) Simpson's rule. (08 Marks)
- b. A Railway embankment is 10 mt wide with side slopes $1\frac{1}{2}$ to 1. Assuming the ground to be level in a direction transverse to the centre line, calculate the volume contained in a length of 120 mt, the centre height at 20 mt interval being in meters.
 2.2, 3.7, 3.8, 4.0, 3.8, 2.8, 2.5 (08 Marks)

OR

- 10 a. The following readings were obtained when an area was measured by a planimeter, the tracing arm being set to the natural scale. The initial and final readings were 2.268 and 4.582. The zero of the disc passed the fixed index mark once in the clockwise direction. The anchor point was inside the figure with the value of the constant C of the instrument = 26.430 (i) Calculate the area of the figure. (ii) If the area of the figure drawn to a scale of 1 inch = 64 feet, find the area of the figure. (08 Marks)
- b. A Railway embankment 400 mt long is 12 mt wide at the formation level and has a side slope 2 to 1. The ground levels at every 100 mt 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 207.000 mt and the embankment has a rising gradient of 1 in 100. The ground is level across the centre line. Calculate the volume of the earthwork. (08 Marks)