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10CV/CT44

Fourth Semester B.E. Degree Examination, June/July 2015
Surveying – II

Time: 3 hrs.   Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting*
atleast TWO questions from each part.
2. Draw neat sketches.
3. Missing data, if any, may be suitably assumed.

PART – A

1 a. Explain the following terms with reference to theodolite :
   i) transiting   ii) swinging   iii) line of collimation
   iv) horizontal axis   v) faceleft observation.   **(10 Marks)**
   b. With a neat sketch and tabular column, explain the measurement of horizontal
   angles by repetition method. List the errors that are eliminated by this method.
                                                                            (10 Marks)

2 a. What are the permanent adjustments of a theodolite? Explain the spire test.   **(10 Marks)**
   b. The following observations were made during the testing of a dumpy level

Instrument	Staff Reading on	
@	A	B
A	1.702	2.244
B	2.146	3.044

   Distance AB = 1500 meters.
   Is the instrument in adjustment? To what reading should the line of collimation be adjusted
   when the instrument were at B? If RL of A = 432.052 m, what should be the RL of B?
                                                                            (10 Marks)

3 a. What is a total station? List out the advantages of total station.   **(04 Marks)**
   b. Derive the expressions for the horizontal distance, vertical distance and the elevation of an
   object by double plane method, when the base is inaccessible   **(08 Marks)**
   c. 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 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° 42′
   and 18°6′ respectively. The staff readings upon the benchmark of elevation 287.280 meters
   were respectively 2.870 and 3.750 m when the instrument was at P and R, the telescope
   being horizontal. Determine the elevation of the foot of the signal if the height of the signal
   above its base is 3 meters.   **(08 Marks)**

4 a. Derive the expressions for distance and elevation when the staff is held vertical and the line
   of sight is inclined.   **(10 Marks)**
   b. Determine the gradient from a point A to a point B from the following observations made
   with a tacheometer fitted with an anallactic lens. The constant at the instrument was 100 and
   the staff was held vertically.

Instrument station	Staff point	Bearing	Vertical angle	Staff readings
P	A	134°	+10° 32′	1.360, 1.915, 2.490
	B	224°	+5° 6′	1.065, 1.885, 2.705

                                                                            (10 Marks)

PART – B

5 a. What are the different methods of settingout a simple circular curve? **(04 Marks)**

   b. Calculate the ordinates at 10 meters distances for a circular curve having a long chord of 80 meters and a versed sine of 4 meter. **(06 Marks)**

   c. Two Tangents intersect at a chainage of 1000 meters, 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 and tabulate the results. Peg interval = 20 mt; Least count of theodolite = 20 second. **(10 Marks)**

6 a. Draw a neat labeled sketch of compound curve and giving the elements of a compound curve. Explain the method of settingout compound curve. **(10 Marks)**

   b. A compound curve consisting of two simple circular curves of radii 350 m and 500 m is to be laidout between two straights T_1I and T_2I. PQ is the common tangent, at point of compound curvature, D. The angles IPQ and IQP are respectively 55° ad 25°. Sketch and calculate the tangent lengths T_1I and IT_2. **(10 Marks)**

7 a. What is phase of a signal? Derive the expression for phase correction when the bright portion is bisected. **(10 Marks)**

   b. From on eccentric stations 'S', 12.25 meters to the west of the main station B, the following angles were measured $\underline{|BSC} = 76°\ 25'\ 32''$ and $\underline{|CSA} = 54°\ 32'\ 20''$. The stations S and C are to the opposite sides of the line AB. Calculate the correct angle ABC if the lengths AB and BC are 5286.5 mt and 4932.2 m respectively. **(10 Marks)**

8 a. A series of offsets were taken from a chain line to a curved boundary line at intervals of 15 meters in the following order :

       0, 2.65,   3.80,   3.75,   4.65,   3.60,   4.95,   5.85 m

   Calculate the area between the chain line, the curved boundary line and the end offset by :
   i) Average ordinate rule
   ii) Trapezoidal rule
   iii) Simpson's rule. **(10 Marks)**

   b. A railway embankment is 10 mt wide with side slopes 1½ 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 meters, the centre heights at 20 m intervals being in meters

       2.2,   3.7,   3.8,   4.0,   3.8,   2.8,   2.5. **(10 Marks)**

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