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Question Paper Code: 31016

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2015.

Third Semester

Civil Engineering

01UCE306 – SURVEYING - I

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Define ranging.
2. What do you mean by planimeter?
3. Describe the isoclinic lines.
4. Discuss the three point method of resection.
5. What are the difficulties generally faced in leveling?
6. List out the error in the leveling.
7. Why the contour interval is important?
8. Enumerate the instruments used to find the inclination of the contour gradient.
9. How the temporary adjustment of a Theodolite is carried out?
10. What are the purposes of Tacheometric surveying?

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Explain the obstacles in chaining with neat sketches. (10)
(ii) A survey line BAC crosses a river, A and C being near and opposite banks respectively. A perpendicular AD, 40 m long is set out at A. If the bearings of AD and DC are $38^{\circ} 45'$ and $278^{\circ} 45'$ respectively, find the width of the river. (6)

Or

- (b) (i) Explain the principle of chain survey. When does it become inconvenient? (10)
- (ii) A survey line CDE crosses a river, D being on the near bank, and E on the opposite bank. A perpendicular DF = 150 m is ranged at D on the left. From F bearings of E and C are observed to be $25^{\circ} 00'$ and $115^{\circ} 00'$ respectively. If the chainage of C is 1250 m and that of D is 1620 m find the chainage of E. (6)

12. (a) (i) The following are the bearings of the lines of a closed traverse ABCD. Calculate the interior angles of the traverse. (6)

Line	Fore Bearing	Line	Fore Bearing
AB	N $45^{\circ} 10'$ E	CD	S $9^{\circ} 50'$ W
BC	S $60^{\circ} 40'$ E	DA	N $80^{\circ} 40'$ W

- (ii) The following bearings were taken in traversing with a compass in a place where local attraction was suspected. (10)

Line	Fore Bearing	Back Bearing
AB	S $45^{\circ} 30'$ E	N $45^{\circ} 30'$ W
BC	S $60^{\circ} 00'$ E	N $60^{\circ} 40'$ W
CD	S $5^{\circ} 30'$ E	N $3^{\circ} 20'$ W
DA	N $4^{\circ} 30'$ W	S $56^{\circ} 00'$ E

Or

- (b) (i) What is meant by a closing error in a closed traverse? How it is rectified by graphically? (6)
- (ii) The following bearings observed in traversing with a compass in a place where local attraction was suspected: At what stations affected by local attraction? Find the corrected bearings of the lines. (10)

Line	Fore Bearing	Back Bearing
AB	$80^{\circ} 30'$	$260^{\circ} 30'$
BC	$351^{\circ} 15'$	$173^{\circ} 0'$
CD	$32^{\circ} 15'$	$208^{\circ} 0'$
DE	$106^{\circ} 15'$	$287^{\circ} 45'$
EF	$99^{\circ} 00'$	$280^{\circ} 0''$
FG	$209^{\circ} 30'$	$29^{\circ} 30'$

13. (a) (i) Compare the line of collimation method and rise and fall method to find the RL. (6)

- (ii) The following consecutive readings were taken with a dumpy level and a 4 m leveling staff on a continuously sloping ground at 30 m intervals: 0.680, 1.455, 1.855, 2.330, 2.885, 3.380, 1.055, 1.860, 2.265, 3.540, 0.835, 0.945, 1.530 and 2.250. The RL of the starting point was 100 m. (a.) Find the RL by height of collimation method. Calculate the gradient of the line joining the first and last point. (10)

Or

- (b) (i) Reciprocal levels were taken with a dump level and following observations were recorded.

Instrument near station	Staff reading at station	
	A	B
A	1.225	1.375
B	0.850	0.500

RL of station A is known to be 525. Calculate the RL of the station B. Also calculate the error in the line of collimation and state clearly whether it is inclined upwards or down words. (6)

- (ii) The following is the page of a level field book. Fill in the missing readings and calculate the reduced levels of the points. Apply the usual checks. (10)

Stn.	B.S	I.S	F.S	Rise	Fall	RL	Remarks
1	2.150					450.000	B.M.1
2	1.645		?	0.500			
3		2.345			?		
4	?		1.965	?			
5	2.050		1.825		0.400		
6		?		?		451.73	B.M.2, Staff held against ceiling
7	-1.690		?	0.120			
8	?		2.100		?		
9			?	?		499.100	B.M.3
	8.445						

14. (a) (i) Describe the characteristics of contour. (6)

- (ii) From the topographical map, the areas enclosed within the contour lines and along the face of a proposed dam, are as given below: calculate the volume of water in the reservoir formed, when the water level is at an elevation of 40 m, using : (a) trapezoidal formula, (b) Prismoidal formula. (10)

Sl.No	Contour	Area (m ²)	Sl.No	Contour	Area (m ²)
1	100	30,285	6	75	14,150
2	95	27,750	7	70	10,895
3	90	22,350	8	65	7,985
4	85	20,895	9	60	4,350
5	80	18,450	10	55 (Bottom)	1,050

Or

- (b) (i) In a proposed hydro electric project a storage reservoir was required to store the capacity of 4.5 million cubic meter between lowest draw down and top water level . The areas contained within the stated contours and upstream faces of the dam were as follows: (10)

Contour	100	95	90	85	80	75	70	65	60
Area in hectares	32	30	28	25	21	18	15	12	5

(ii) What is the difference between direct and indirect methods of contouring? (3)

(iii) What do you understand by interpolation of contours? (3)

15. (a) (i) Describe in detail, how tachometric surveys are conducted in the field. (6)

(ii) Determine the gradient from a point A to point B from the following observations made with a fixed hair tacheometer fitted with an analytic lens, the constant of the instruments being 100. (10)

	Bearing	Reading of stadia hairs	Reading of axial hairs	Vertical angles
To A	345°	0.750, 2.120	1.435	+ 15°
To B	75°	0.625, 3.050	1.835	+ 10°

Or

- (b) (i) Write short notes on 1.tangential tacheometry 2, Tacheometry tables 3.Subtense bar. (6)

(ii) The following readings were taken with a tacheometer fitted with an analytic lens and having a constant of 100. Calculate the horizontal distance between P and Q. (10)

Inst.station	Staff station	R.B	Vertical Angle	Staff Readings		
O	P	N37° W	4° 12′	0.910	1.510	2.110
O	Q	N23° E	5° 42′	1.855	2.705	3.555