

Code No: W0123/R07

Set No. 1

II B.Tech I Semester Supplementary Examinations, November 2012
SURVEYING
(Civil Engineering)

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Describe plane Table Radiation method with the help of a neat sketch. Under what circumstances this method is resorted to.
- (b) Discuss the advantages and disadvantages of plane table Surveying over other methods of Surveying. [8+8]
2. (a) What are the essential differences between chain Survey and compass Survey. Under what circumstances compass Survey is preferred to other types of Surveys.
- (b) Find which station is free from local attraction and work out the correct bearings.

<u>Line</u>	<u>F.B</u>	<u>B.B</u>
AB	191°45'	13°00'00"
BC	39°30'	222°00'30"
CD	22°15'	200°30'00"
DE	242°45'	60°45'00"
EA	330°15'	147°45'00"

[8+8]

3. The following observations were made during the testing of a dumpy level:

Instrument at	Staff reading on	
	A	B
A	1.702	2.244
B	2.146	3.044

Distance AB=150m Is the instrument in adjustment? To what reading should the line of collimation be adjusted when the instrument was at B? If the R.L of A=432.052, what should be the R.L. of B. [16]

4. What is Simpson's rule? Derive an expression for it. How does it compare with other rules. [16]
5. (a) Explain the adjustment for making the axis of the spirit level over T-frame of the vertical circle perpendicular to the vertical axis of the theodolite.
- (b) Explain the procedure of measuring a vertical angle. What do you understand by index error? How would you eliminate it? [10+6]
6. A tachometer was set up at a station A and the readings on a vertically held staff at B were 2.255, 2.605 and 2.955, the line of sight being at an inclination of

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+8°24'. Another observation on the vertically held staff at B.M. gave the readings 1.640, 1.920 and 2.200, the inclination of the line of sight being +1°6'. Calculate the horizontal distance between A and B, and the elevation of B if the R.L of B.M is 418.685 m. the constants of the instruments were 100 and 0.3. [16]

7. (a) Draw a neat sketch of a simple circular curve and represent different elements of it.
- (b) Establish the relation $\delta = \frac{1718.9C}{R}$ minutes
where δ = deflection angle of the chord; C = length of chord. R= Radius of the curve,
- (c) Calculate the perpendicular offsets at 20m intervals along the tangents to set out first five pegs of a simple circular curve of 250m radius. [4+4+8]
8. (a) Describe Geodetic Surveying ? When do you go for the Geodetic Survey.
- (b) Describe the spatial models available in Geographical Information System. [8+8]

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1. (a) a) Explain clearly the points of difference between the prismatic compass and Surveyor's compass.
 (b) What are the sources of errors in compass Surveying and what precautions are to be taken to eliminate them. [8+8]

2. (a) Explain
 - i) Whole circle and Reduced bearing and
 - ii) Fore and Back bearings of a Line.
- (b) The following bearings were taken in traversing with a compass. Locate the local attraction and determine corrected bearings.

<u>Line</u>	<u>F.B</u>	<u>B.B</u>
AB	$S45^030'E$	$N45^030'W$
BC	$S60^000'E$	$N60^040'W$
CD	$S5^030'E$	$N3^020'W$
DA	$N80^030'W$	$S82^000'E$

[8+8]

3. A level set up on extended line BA in a position 70m from A and 100m from B reads 1.684 m on a staff held at A and 2.122 on a staff held at B, the bubble having been carefully brought to the center of its run before each reading. The R.Ls of the tops of pegs A and B are 89.620 and 89.222m respectively. Find

- (a) the collimation error, and
- (b) the readings that would have been obtained had there been no collimation error. [16]

4. The areas enclosed by various contours on the upstream side of a dam are given below. Determination.

- (a) the capacity of the reservoir if the full reservoir level (FRL) is 125m.
- (b) the elevation of the water surface when the reservoir is half-full. Ignore the volume below R.L. 100m. [8+8]

Contour(m)	100	105	110	115	120	125
Area(ha)	3	8	10	15	20	25

5. (a) State what errors are eliminated by repetition method. How will you set out a horizontal angle by method of repetition?

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(b) Discuss the procedure of measuring horizontal angle with a theodolite? [8+8]

6. The following readings were taken on a vertical staff with a tachometer fitted with an analytic lens:

Staff station	Bearing	Vertical angle	Staff reading
A	$34^{\circ}20'$	$+11^{\circ}$	0.850 1.410 1.970
B	$202^{\circ}50'$	-4°	0.755 1.885 3.015

The value of k for the instrument is 100, calculate the difference of level between A and B and the distance AB. [16]

7. (a) What is meant by degree of curve. Derive its relationship with radius of curve.
 (b) If the tangents to a circular curve having 500m radius intersect at an angle of 120° and the chainage of point of intersection is 1520.5m, calculate the different elements of a simple circular curve. [6+10]
8. (a) Define geographic information system and describe the relationship between traditional analog map and Geographic Information System.
 (b) Suggest possible users of a GIS and how it might benefit them. [8+8]

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Set No. 3

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Answer any FIVE Questions
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1. (a) Describe different types of chains and tapes commonly used in Surveying stating the advantages of each.
(b) Describe in detail how you would range and chain a line between two points which are not intervisible because of an intervening hillock. [8+8]
2. (a) Explain the terms : Check Line, Base Line, Tie Line, and oblique offset.
(b) Find the maximum length of offset so that the displacement on paper from both sources of error does not exceed 0.2 mm given that the offset is measured with an accuracy of 1 in 25 and the scale is 1cm = 50m. [8+8]
3. (a) What do you understand by interpolation of contours? What is the assumption on which the methods of interpolation is based ? Name the different methods of interpolation.
(b) Explain any 3 methods of interpolation. [8+8]
4. A road embankment 40m wide at the formation level with side slopes .1 to 1 and with an average height of 15m is constructed with an average gradient of 1 in 40 from the contour of 150m to 590m. The ground has an average slope of 10 to 1 in the direction transverse to the centre line. Find the
(a) length of the road
(b) volume of embankment. [16]
5. (a) Define the following terms associated with the angle measurements with a Theodolite:
 - i. Vertical axis
 - ii. Trunnion axis
 - iii. Axis of plate level
 - iv. Centering.
(b) Can you use a theodolite as levelling instrument? If so, how? [12+4]
6. (a) Describe the conditions under which tacheometric surveying is advantageous. Explain how you will obtain in the field the constants of a tacheometer.
(b) Following observations were taken from two traverse stations by means of a tacheometer fitted with anallactical lens. The multiplying constant of the instrument is 100. compute the length and gradient of the line ST

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Inst. Station	Staff station	Ht of Inst.	Bearing	Vertical angle	Staff reading in units
P	S	1.31	226°30'	+10°12'	0.765, 1.595, 2.425
Q	T	1.42	84°45'	-12°30'	0.820, 1.840, 2.860

Co-ordinates of station P are 212.3 N and 186.8 W units. Co-ordinate of station Q are 102.8N and 96.4 W units. Assume P and Q to be at the same level. [6+10]

7. (a) Draw a neat sketch of a simple circular curve and represent different elements of it.
- (b) Establish the relation $\delta = \frac{1718.9C}{R}$ minutes
where δ = deflection angle of the chord; C = length of chord. R= Radius of the curve,
- (c) Calculate the perpendicular offsets at 20m intervals along the tangents to set out first five pegs of a simple circular curve of 250m radius. [4+4+8]
8. (a) Describe Geodetic Surveying ? When do you go for the Geodetic Survey.
- (b) Describe the spatial models available in Geographical Information System. [8+8]

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Set No. 4

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(Civil Engineering)

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Describe different types of chains and tapes commonly used in Surveying stating the advantages of each.
 (b) Describe in detail how you would range and chain a line between two points which are not intervisible because of an intervening hillock. [8+8]
2. (a) Explain the procedure of chaining. How will you record the measurements of Chain Survey. Enumerate the points to be kept in view while booking the field notes.
 (b) A Survey line BAC crosses a river, A and C being on the near and opposite banks respectively. A perpendicular AD 40m long is set out at A. If the bearings of AD and DC are $38^{\circ} 45'$ and $278^{\circ} 45'$ respectively and the chainage at A is 862m. find the chainage at C. [8+8]
3. A level set up on extended line BA in a position 70m from A and 100m from B reads 1.684 m on a staff held at A and 2.122 on a staff held at B, the bubble having been carefully brought to the center of its run before each reading. The R.Ls of the tops of pegs A and B are 89.620 and 89.222m respectively. Find
 (a) the collimation error, and
 (b) the readings that would have been obtained had there been no collimation error. [16]
4. A railway embankment, 500m long has a width at formation level of 9m with side slopes of 2 to 1. The ground levels at every 100m along the center line are given below. The embankment has a listing gradient of 1.2m per 100m and the formation level is 110.5 at zero chainage. Assuming the ground to be level across the centre line, compute the volume of earthwork. [16]

Distance(m)	0	100	200	300	400	500
Ground level(m)	107.8	106.3	110.5	111	110.7	112.2

5. What is Gale's traverse table? Discuss the procedure for recording the various entries in the table. [16]
6. A tacheometer is used to obtain the difference of levels between two points A and B. The instrument is set up at another station C, and the following observations were taken.

Staff	Vertical angle	Stadia readings
A	$-6^{\circ} 30'$	3.50, 2.815, 2.130
B	$-8^{\circ} 30'$	1.870, 0.990, 0.110

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If the R.L of A is 100.0000, determine the R.L of B. also determine the horizontal distance of A from C. Take $k=50.0$ and $C=0.50$ [16]

7. (a) Why are the curves provided. Explain different types of curves with neat sketches.
- (b) Two straights intersect at a chainage of 3500.5m with an angle of intersection of 156° . These two straights are to be connected by a simple circular curve of 200m radius. Calculate the data necessary by the method of offsets from the chords produced with a peg interval of 20m. Explain the procedure to set out the curve. [8+8]
8. Explain about the segments of Global Positioning system? [16]

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