

Code No: A109210104

R09**Set No. 2**

II B.Tech I Semester Examinations, MAY 2011

SURVEYING**Civil Engineering****Time: 3 hours****Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What are the common difficulties in setting out simple curves? Describe briefly the method employed in overcoming them?
 (b) Define the following terms:
 - i. Point of Curvature
 - ii. Point of Tangency
 - iii. Mid-ordinate
 - iv. Point of compound curvature. [15]
2. (a) Discuss the partitioning of a tract of land when the required area is to be cut off by a line through a given point.
 (b) Enumerate different methods of determination of volume of earthwork. Describe their merits and demerits. [7+8]
3. (a) What are the functionalities of GIS?
 (b) Write a detailed note on GPS. [7+8]
4. (a) A theodolite has a tacheometric multiplying constant of 100 and an additive constant of zero. The centre readings on a vertical staff held at point B was 2.292m when sighted from A. If the vertical angle was $+30^{\circ}$ and the horizontal distance AB 184.35m, calculate the other staff readings and show that the two intercept intervals are not equal. Using these values, calculate the level of B if the level of A is 37.950m and the height of instrument 1.35m?
 (b) Discuss the various methods of reading the staff using tacheometer? [15]
5. (a) What is a well conditioned triangle? Why is it necessary to use Well-conditioned triangles?
 (b) Describe various types of measuring chains? What are the advantages of a chain over a steel band? [7+8]
6. Draw a neat sketch of a vernier theodolite and explain the functions of the various parts? [15]
7. A base line was measured by a tape suspended in catenary under a pull of 145N, the mean temperature being 14°C the lengths of various segments of the tape and the difference in level of the two ends of a segment are given in table:

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Span	Length(m)	Difference in level(m)
1	28.988	+0.346
2	28.890	-0.214
3	28.838	+0.309
4	28.910	-0.106

If the tape was standardized on the flat under a pull of 95N at 18°C determine the correct length of the line taking cross sectional area of the tape = 3.85mm²
mass of the tape = 0.255kg/m
coefficient of linear expansion = 0.9 × 10⁻⁶ per °C
Young's modulus = 14.8 × 10⁴ MN/m²
mean height of the line above M.S.L. = 51.76m
radius of earth = 6370km. [15]

8. (a) Define the following terms:

- i. Vertical line
- ii. Level surface
- iii. Mean sealevel
- iv. Geoid.

(b) Reciprocal levels were taken with a dumpy level and following observations were recorded:

Instrument at	Staff readings at	
	A	B
A	1.225	1.375
B	0.850	0.500

R.L. of staion A is known to be 626.155. Calculate the R.L. of station B. Also calculate the error in line of collimation and state clearly whether it is inclined upwards or downwards. [7+8]

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R09**Set No. 4****II B.Tech I Semester Examinations, MAY 2011****SURVEYING****Civil Engineering****Time: 3 hours****Max Marks: 75**

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1. (a) Differentiate between direct levelling and indirect levelling.
 (b) Describe, in brief, the various methods of direct levelling. [7+8]
2. (a) What are different errors in tacheometric surveying? How would you minimize them?
 (b) Following observations were taken with a tacheometer fitted with an anallactic lens having value of constant to be 100:

Instrument Station	Staff station	R.B	Vertical angle	Staff Reading
O	P	N37°W	4°12'	0.910, 1.510, 2.110
O	Q	N23°E	5°42'	1.855, 2.705, 3.555

Calculate the horizontal distance between P and Q? [15]

3. (a) Define the terms latitude and departure? How would you determine them for a line?
 (b) Explain in brief the various temporary adjustments of a theodolite? [7+8]
4. (a) Find the hypotenusal allowance per chain of 30 m length if the angle of slope is 12° 30'.
 (b) Find the sag correction for a 30 m steel tape under a pull of 8 kg in three equal spans of 10 m each. Weight of 1 cubic cm of steel = 7.86 g. Area of cross section of the tape = 0.10 sq. cm. [5+10]
5. What are different types of EDM instruments? Give a brief description of each? [15]
6. (a) Discuss various types of mistakes in linear measurements: how would you avoid them?
 (b) What do you understand by the term well-conditioned triangle? Why is it necessary to have well-conditioned triangles in a chain survey? [7+8]
7. Two straights AB and BC meet in an inaccessible point B and are to be connected by a simple curve of 600m radius. Two points P and Q were selected on AB and BC respectively and the following data were obtained.

$$\angle APQ = 150^{\circ} \quad \angle CQP = 160^{\circ} \quad PQ = 150.0 \text{ m}$$

Make the necessary calculations for setting out the curve by the method of tangential angles given that the chainage of P=1600.00m. Take unit chord of 30m length?

[15]

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8. (a) Enumerate the characteristics of a mass diagram.
- (b) The following perpendicular offsets were taken at 10 m intervals from a survey line to an irregular boundary line.
2.95, 5.70, 4.00, 6.35, 8.25, 6.00k, 3.30, 4.85, 5.70.
Calculate the area included between the survey line, the irregular boundary line, and the first and last offsets by:
- i. Average-ordinate rule
 - ii. Trapezoidal rule, and
 - iii. simpson's rule.

[5+10]

FIRSTRANKER

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Answer any FIVE Questions
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1. Explain the following terms:

- (a) Base line
- (b) Check line
- (c) Tie line. [5+5+5]

2. (a) How would you determine the constants K and C of a tacheometer?
 (b) Two distances of 50m and 80m were accurately measured out and the intercepts on the staff between the outer stadia webs were 0.496 at the former distance and 0.796 at the latter. Calculate the tacheometric constants? [15]

3. The depth of a mineshaft was measured as 836.55m using a 1000m steel tape having a crosssection of 12mm^2 and mass 0.82kg/m . calculate the correct depth of the mine shaft if the tape was standardized at tension of 189N. Youngs modulus of the tape material is $21 \times 10^4 \text{N/mm}^2$ and the acceleration due to gravity is 9.806m/s^2 . [15]

4. (a) What are the uses of an electronic total station?
 (b) What are the objectives of Geodetic Surveying? [15]

5. (a) What are 'face left' and 'face right' observations? Why is it necessary to take both face observations?
 (b) Why both verniers are read in theodolite? [10+5]

6. Work out the difference in levels between points A and B if curvature and refraction effects are taken into consideration in the following case:

Level is set-up over A, and the staff held at B.

R.L. of A = 150.000

Height of instrument at A = 1.000

Reading of staff at B = 1.800

Distance AB = 500m. [15]

7. (a) Calculate the volume of earth work by Prismoidal formula in a road embankment with the following data:

Chainage along the center line(ft)	0	100	200	300	400
Ground levels	201.70	202.90	202.40	204.70	206.90

Formulation level at chainage 0 is 202.30; top width is 2.00 ft side slopes are 2 to 1. The longitudinal gradient of the embankment is 1 in 100 rising. The ground is assumed to be level all across the longitudinal section.

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- (b) If the transverse slope of the ground at chainage 200 is assumed to be 1 in 10, find the area of embankment section at this point. [7+8]
8. (a) Explain the method of setting out compound curve in the field?
- (b) Two straight lines AB and BC of a road curve meet at an angle of 110° . Find the radius of curve which will pass through a point P, 40m from the intersection point B, the angle ABP being 30° ? [15]

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R09**Set No. 3**

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1. (a) Explain the working of an Adjustable cross staff with a neat sketch.
 (b) A 30 m tape actually measures 29.985 m when it is supported at the two ends only, with the temperature at 30 °C and a tension of 70 N. the tape weight 12 N and has a cross-sectional area of 0.04 cm². If the field temperature is also 30 °C, what tension should be applied so that the tape measures exactly 30 m when supported at the two ends. [7+8]
2. (a) Describe various methods of contouring. Discuss the merits and demerits of each.
 (b) Describe with the help of sketches, the characteristics of contours. [7+8]
3. Define the following terms:
 - (a) Centering
 - (b) Line of collimation
 - (c) Horizontal axis
 - (d) Vertical axis
 - (e) Transiting. [3+3+3+3+3]
4. (a) A compound curve is to consist of an arc of 36chains followed by another one of 48chains radius and is to connect two straights which yield a deflection angle of 84°30'. At the intersection point the chainage, if continued along the first tangent would be 86+48 and starting point of the curve is selected at chainage 47+50. Calculate the chainage at the point of junction of the two branches and at the end of curve?
 (b) What are the different methods of designation of a curve? [15]
5. (a) Draw the sketch of a two level section, and derive an expression for the area of cross-section.
 (b) Draw a sidehill two-level section and derive an expression for the area of cross-section when there is:
 - i. Cutting at the centre-line
 - ii. Filling at the centre-line. [5+10]
6. (a) Give, in a tabular form, the difference between prismatic compass and surveyor's compass.

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- (b) The magnetic bearing of line as observed by the prismatic compass at a survey station is found to be 272° . If the local attraction at this station is known to be 5° E and the declination is 15° West, what is the true bearing of the line? [5+10]
7. (a) Discuss the method of Data recording and post processing in a Global Positioning systems?
(b) Discuss the functioning of CR333 and CR344 GPS controllers? [15]
8. Show the arrangement of the lenses in an ordinary anallactic telescope? In a telescope of this type the focal lengths of the objective and anallactic lenses are 24cm and 12cm respectively and the constant distance between this is 19.5cm for a multiplier of 100. Determine the error that would occur in horizontal distance D when the reading intercepts 2m, with an error of one hundredth of a mm in the 1.75mm interval between the subtense lines? [15]
