

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2005.

Third Semester

Civil Engineering

CE 234 --- SURVEYING --- I

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A --- (10 × 2 = 20 marks)

1. Define 'Surveying' and list its various classifications.
2. Sketch the conventional signs to represent the following : Wall with gate, Railway single line, pond, wire fencing.
3. Differentiate between fore bearing and back bearing of a line. The forebearing of a line PQ is $N 28^\circ W$. What is its backbearing?
4. When is a 'Three-Point Problem' resorted to in plane table surveying?
5. Differentiate between 'Back sight' and 'Fore sight' in running a fly level.
6. Define 'Contour and contour interval'.
7. What are the two methods of measuring the horizontal angle using a theodolite? When each method is advantageously used?
8. What is 'Close traverse'? Give any one method of checking a close traverse from the observed readings.
9. Why curves are necessary in the alignment of a highway/railway? List the various types of curves.
10. What is 'Sight distance' in highways? Which factors affect it?

PART B — (5 × 16 = 80 marks)

11. (i) Discuss briefly the various surveys undertaken at different stages of a new highway project and the objective of each of them. (6)

(ii) Two straight stretches of a road meet at an angle of 130° . Calculate the necessary data for setting out a circular curve of 15 chains radius between the stretches by the following methods. The length of one chain is 20 m.

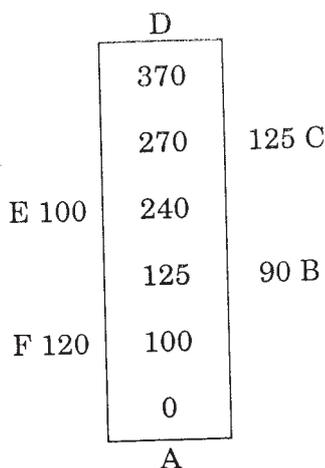
Perpendicular offsets method.

(5 + 5)

Radial offsets method.

12. (a) (i) What is meant by 'well-conditions triangle' and what is its advantages? (4)

(ii) Data pertaining to a cross staff survey are given below. Plot the boundary ABCDEFA of the field and calculate the enclosed area. All distances are in metres. (6 + 6)



Or

(b) (i) What is meant by 'ranging' a survey line? Under what situation 'reciprocal ranging' is resorted to and how it is achieved? (1 + 1 + 4)

(ii) Two stations P and Q , on the main survey line, are on the opposite sides of a pond. On the right of PQ , a line PR 210 m long is laid down and another line PS , 260 m long is laid down on the left of PQ . The points R , Q and S are collinear. The measured lengths of RQ and QS are 85 m and 75 m respectively. Find the length of PQ . (10)

13. (a) (i) Tabulate the differences between a prismatic compass and a surveyor's compass. (6)
- (ii) The readings recorded in a closed traverse $ABCDEA$ in an area under the influence of local attraction are given below. Find the corrected bearings. Hence find the interior angle at station B . (8 + 2)

Line	Forebearing	Backbearing
AB	$43^{\circ} 14'$	$223^{\circ} 25'$
BC	$101^{\circ} 40'$	$283^{\circ} 35'$
CD	$195^{\circ} 05'$	$14^{\circ} 15'$
DE	$255^{\circ} 10'$	$75^{\circ} 10'$
EA	$328^{\circ} 20'$	$147^{\circ} 04'$

Or

- (b) (i) Enumerate the different methods of plane table surveying. Explain any one method with suitable sketches. (2 + 4)
- (ii) In a closed traverse $ABCDE$, the bearing of the line AB is $19^{\circ} 10'$. The interior angles of the traverse are : $\hat{A} = 88^{\circ} 20'$; $\hat{B} = 109^{\circ} 10'$; $\hat{C} = 118^{\circ} 15'$; $\hat{D} = 151^{\circ} 00'$; $\hat{E} = 73^{\circ} 15'$. Find the bearings of all the sides of the traverse. (10)
14. (a) (i) Explain the characteristic features of contours. What are the uses of contour mapping? (4 + 2)
- (ii) The following staff readings were taken in a leveling operation. Enter the readings in a level book form and identify the reduced level of each station by the plane of collimation method. Take R.L. of station A as 92.650 m. Apply the check. (4 + 4 + 2)

Staff Reading	Remarks
1.175	B.S. to A
1.205	I.S. to B
1.290	I.S. to C
1.390	F.S. to D
0.985	B.S. to D
1.005	I.S. to E
-0.700	I.S. to F
0.990	I.S. to G
1.115	F.S. to H

Or

A

- (b) (i) An observer on the deck of a ship just sees a light house. The observer's eye is 7.5 m above the sea level while the top of the light house is 45 m above the sea level. Find the distance of the light house from the observer. (6)
- (ii) A series of offsets in metres were taken from a chain line to an irregular boundary line at intervals of 15 m in the following order :
0; 2.65; 3.8; 3.7; 4.65; 3.6; 4.95; 5.85.
- Compute the area between the chain line, the irregular boundary and the end offsets by
(1) Trapezoidal rule (2) Simpsons' rule. (4 + 6)
15. (a) (i) What is meant by 'closing error' in a theodolite traverse? Explain any one method of distributing this error. (2 + 4)
- (ii) Using the data of a closed traverse given below, calculate the lengths of the lines *BC* and *CD*. (10)

Line	Length (m)	Bearing
<i>AB</i>	344	14° 31'
<i>BC</i>	?	319° 42'
<i>CD</i>	?	347° 15'
<i>DE</i>	300	5° 16'
<i>EA</i>	1958	168° 12'

Or

- (b) (i) What are the two methods of measuring the horizontal angle using a theodolite and under what situation each one is preferred? Outline the principle in each method. (2 + 2 + 4)
- (ii) Write a detailed note on 'Gale's Traverse Table'. (8)