Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH(CE-OLD)/SEM-3/CE-303/2011-12

2011
SURVEYING - I

Time Allotted : 3 Hours *Full Marks :* 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

   i) The forebearing of a line is 70°, its backbearing is

   a) 75° b) 250°

   c) 225° d) 105°

   ii) Quadrantal bearing can be reckoned from

   a) east line

   b) either from east or west

   c) either from north or south

   d) north line.

   iii) Accurate centering in plane table survey is necessary for

   a) small scale maps

   b) large scale maps

   c) filling in details

   d) solving triangle of error rapidly.

iv) If the R.L. of a B.M. is 100 m the back sight is 1.215 m and the fore sight is 1.870 m, the R.L. of the forward station is

a) 99.345 m b) 100.345 m

c) 100.655 m d) 101.870 m.

v) Compensating or accidental errors are proportional to

a) $L^{1/2}$ b) $L^{1/3}$

c) L d) 1/L.

vi) Which of the following scales is the largest one ?

a) 1 cm = 50 m b) 1 : 42000

c) RF = 1/300000 d) 1 cm = 50 km.

vii) Invar tape is made of an alloy of

a) copper and steel b) brass and nickel

c) brass and steel d) steel and nickel.

viii) Line of collimation is defined as the

a) line joining the intersection of cross-hair, optical centre of objective and its continuation

b) line joining the centre of eyepiece and optical centre of objective

c) line tangential to the longitudinal curve of the bubble tube at its mid-point

d) inclined line of sight.

ix) In the WCB system, a line is said to be free from local attraction if the difference between the FB and BB is

a) 0°

b) 90°

c) 180°.

x) The principle of surveying is to work from

a) the whole to the part

b) the part to the whole

c) the centre to the boundary

d) all of these.

xi) In plane survey the operation which must be carried out is

a) Resection

b) Intersection

c) Orientation.

xii) The operation of levelling any river is termed as

a) profile levelling

b) reciprocal levelling

c) compound levelling.

xiii) A temple is situated on the far side of a river and is inaccessible. It can be located by

a) radiation b) traversing

c) intersection d) resection.

xiv) The datum adopted in India is the mean sea level at

a) Kolkata b) Chennai

c) Mumbai d) Karachi.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. A 30 m long tape was standardized at e20°C and under a pull of 100 N. The tape was used to measure a distance *AB* when the temperature was 45° C and the pull was 150N. The tape was supported at the ends only. Find the corrections per tape length if the c/s of the tape was 4 mm^2 , the unit wt. of the tape material is 0.0786N/mm^3 and the coefficient of thermal expansion of the tape material is $11{\cdot}5 \times 10^{-6}$ E=2000000 kN/m^2.

3. a) Following are the lengths and bearings of a traverse ABCD.

Line	Length in m	Bearing
AB	248.0	30°
BC	320.0	140°
CD	180.0	210°

Calculate length and bearing of the line DA.

b) How is local attraction detected ?

4. A traverse is done by three stations *A*, *B* and *C* in clockwise order in the form of an equilateral triangle. If the bearing of *AB* is 80°30´, find the bearings of the other sides.

5. *A* and *B* are two points 150 m apart on the nearer bank of a river, which flows east and west. The bearings of the tree on the other bank of a river as observed from *A* and *B* are N 30°E and N 45° W. Find the width of the river.

6. Define Three Point Problem in Plane Table Survey. Explain the method of solving it by Mechanical method with neat sketch.

7. A series of off-sets from a base line to the boundary of a curved line are as follows 0, 2.37, 3.84, 4.52, 4.91, 3.74, 2.81, 1.34, 0 (all in metre). If the intervals of the offsets are 7.5 m, calculate the area between the base line and curved boundary by

   a) Simpon's rule

   b) Trapezoidal rule.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

8. a) Describe any one of the following instruments for setting out right angles :

   (i) Cross staff (ii) Optical square. 6

   b) The following records refer to an operation involving reciprocal levelling.

   Find :

   (i) The true RL of *B*

   (ii) The combined correction for curvature and refraction

   (iii) The collimation error, and

   (iv) Whether the line of collimation is inclined upward or downwards. 9

Instrument at	**Staff reading on A**	**Staff reading on B**	**Remarks**
A	1.155	2.595	Distance *AB*= 500 m
B	0.985	2.415	RL of *A* = 525.500

9. a) Calculate the area of a figure from the following readings by a planimeter with anchor point outside the figure.

Initial reading = 7.875, Final reading = 3.086, M = 10 sq cm.

The zero mark on the dial passed the fixed index mark twice in the clockwise direction. 7

b) What is closing error in a traverse ? Describe with a sketch how such an error is adjusted. 8

10. a) Explain the principle of equalizing back sight and fore sight distances in levelling. 5

b) Some observations are missing from the page of a field book shown below. Find the missing data from the available data. 10

Staff Station	Back sight	Intermediate sight	Fore sight	Height of Collimation	Reduced Level	Remarks
A					100.91	
B		1.085				
C		2.125				BM RL 100
D	1.315				101.26	
E			1.325	102.235		
F					101.61	

11. a) Write a short note on different methods of Compass Traverse. 7

b) The following bearings were observed in a Compass Traverse.

Line	FB	BB
AB	305°00′	125°30′
BC	75°30′	254°30′
CD	115°30′	297°00′
DE	165°30′	345°30′
EA	225°00′	44°00′

At which of these stations would local attraction be suspected ? Find the correct bearings of the lines. Find also the true bearings of the lines if magnetic declination is 4°30′ W. 8

12. Write down the characteristics of contours. Briefly discuss about the contouring methods. Name the methods of interpolation of contour.