Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH/CE(O)/SEM-3/CE-303/2012-13

2012

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 × 1 = 10

i) The principle of surveying is to work from

a) the centre to the boundary

b) the whole to the part

c) the part to the whole

d) all of these.

ii) A 30 m chain is divided into

a) 100 links b) 150 links

c) 200 links d) 300 links.

iii) The fore bearing of a line is $310^\circ 30'$. The back bearing of the line is

a) $130^\circ 00'$ b) $130^\circ 10'$

c) $130^\circ 30'$ d) $131^\circ 10'$.

iv) The working principle of the optical square is based on

a) feflection b) refraction

c) double reflection d) double fefraction.

v) For ranging a line, the number of ranging rods required is

a) at least two b) at least three

c) at least four d) none of these.

vi) The staff reading taken on a point of known elevation is termed as

a) FS reading b) BS reading

c) IS reading d) RS reading.

vii) The vertical distance between two adjacent contour lines is known as

a) contour gradient b) vertical equivalent

c) contour interval d) horizontal equivalent.

viii) The sum of interior angles of a closed traverse is

a) $(2n - 4) \times 90^\circ$ b) $(2n + 4) \times 90^\circ$

c) $(n - 4) \times 90^\circ$ d) $(n + 4) \times 90^\circ$.

ix) The U-fork and plumb bob are required for

a) centring b) levelling

c) orientation d) none of these.

x) The datum adopted for India is the

a) MSL at Dadras b) MSL at Bombay

c) MSL at Karachi d) none of these.

xi) What will be the correction for curvature for a distance of 1000 m ?

a) 0·0673 m b) 0·0785 m

c) 78·50 m d) 6·73 m.

xii) The vertical distance through which excavated earth is lifted is called

a) lead b) lift

c) haulage d) all of these.

GROUP – B

(Short Answer Type Questions)

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

2. A series of offsets were taken from a base line to a curved boundary line at intervals of 10 m in the following order :

   0, 2·68, 3·64, 3·7, 4·6, 3·62, 4·84, 5·74.

   Compute the area between the base line, the curved boundary line and the end offsets using Simpson's rule and Trapezoidal rule.

3. A line was measured by a 20 m chain which was accurate before starting the day's work. After chaining 900 m, the chain was found to be 6 cm too long. After chaining a total distance of 1575 m, the chain was found to be 14 cm too long. Find the true distance of the line.

4. A traverse ABCDA in the form of a square is taken in clock-wise order. If the bearing of AB is $120^\circ\ 30'$, find the bearing of the other sides.

5. How the local attraction is detected ? How are the observed bearing corrected for local attraction ?

6. What are the different methods of contouring ? Describe any one of them.

7. A chain line *ABC* crosses a river, *B* & *C* being the near and distanct banks respectively. A line, *BD* of length 100 m is set out at right angles to the chain line at *B*. If the bearings of *BD* and *DC* are $287^\circ\ 15'$ and $62^\circ\ 15'$, find the width of the river.

GROUP – C

(Long Answer Type Questions)

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

(Assume value of data if additionally required)

8. a) Explain the difference between *B. S* & *F.S.* reading. 4

   b) The following consecutive readings were taken with a dumpy level along a chain line at a common interval of 15 m. The first reading was at a chainage of 165 m where the R.L. is 98·085. The instrument was shifted after the fourth and ninth readings.

   3·150 m, 2·245 m, 1·125 m, 0·860 m, 3·125 m, 2·760 m, 1·835 m, 1·470 m, 1·965 m, 1·225 m, 2·390 m, 3·035 m.

   Find the R.L. of all the points. 11

9. a) A steel tape was exactly 30 m long at 20°C when supported throughout its length under a pull of 10 kg. A line was measured with a tape under a pull of 15 kg and found to be 800 m. The mean temperature during measurement was 28°C. Assuming the tape to be supported at every 30 m, compute the true length of the line.

   Given : Cross-section area of steel = 0·04 cm^2.

   Mass density of the steel = 0·0077 kg / cm^3

   Coefficient of thermal expansion = 0·0000117 per °C

   Modulus of elasticity = 21 × 10^5 kg/cm^2. 7

b) In chaining a line, you come across a tall building. Describe how you would continue the line with the chain only. 4

c) With neat sketches briefly explain the random line method of ranging. 4

10. a) The following fore and back bearings were observed in running a compass traverse :

Line	Fore Bearing	Back Bearing
AB	44° 30′	266° 30′
BC	124° 30′	303° 15′
CD	181° 00′	1° 00′
DA	289° 30′	108° 45′

Correct for local attraction. Also calculate the interior angles of the traverse. 10

b) Describe the methods of setting out a right angle with a tape at a point on the chain line. 5

11. Write short notes on any *five* from the following : 5 × 3

a) Fly leveling

b) Meridian

c) Optical square

d) Sensitiveness of a bubble tube

e) Well conditioned triangle

f) Isogonic and agonic lines

g) Orientation of the plane table

h) Simpson's rule

i) Base line and check line

j) Collimation line.

12. a) Compute the total vlume, if the sections are 30 m apart, from the following notes : 10

Section	Bottom Width	Embankment Height	Side Slope
1	5 m	0·5 m	1 : 1
2	6 m	1·0 m	1 : 1
3	7 m	1·5 m	1 : 1

b) Briefly explain direct and indirect methods of contouring. 5

13. a) Derive an expression for the correction for earth's curvature and atmospheric refraction in levelling. 7

b) A level is set up at a station *A*. The reading on the staff when held at *B*, 360 m away from *A* is 2·150 m. What will be the correct reading ? 8