Printed Pages : 3 ECE303

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0023 Roll No. | | | | | | | | | | |

B.Tech.

(SEMESTER-III) THEORY EXAMINATION, 2012-13

# SURVEYING – I

*Time : 2 Hours ]* *[ Total Marks : 50*

***Note :*** The question paper contains three sections – A, B and C with weightage of 10, 16 & 24 respectively. Follow the instructions as given in each section.

## Section – A

1. Attempt **all** parts of this question. Give your answer in brief : **1 × 10 = 10**
   (a) Define surveying. What are principles of surveying ? Explain them briefly.
   (b) Briefly describe the process of chaining.
   (c) Differentiate between chainage and offset.
   (d) Why it is desirable to plot maps with true bearings rather than with magnetic bearings ?
   (e) Sketch the fundamental lines of Theodolite. State the direct relationship between them.
   (f) How is closing error of a traverse adjusted graphically ?
   (g) Describe the two-peg method of permanent adjustment of a Dumpy level.
   (h) Explain how a subtense bar is used to determine horizontal distances.
   (i) Define a contour. State the various characteristics of contour lines.
   (j) What are essential requirements of a transition curve ?

## Section – B

2. Attempt any **four** parts. All parts carry equal marks : **4 × 4 = 16**
   (a) Discuss briefly the different types of errors in surveying.
   (b) An offset is laid 4° out from its true direction in the field. Find the resulting displacement of plotted point on the plain for following cases, if the offset measured was 8.0 m and scale of plotting was 6 m to 1 cm :
      (i) On direction parallel to chain line
      (ii) In direction perpendicular to the chain line

(c) Differentiate between following :

(i) Bearing & azimuth

(ii) Magnetic & true meridian

(d) What is meant by face left and face right of a theodolite ? How would you change face ? What instrumental errors are eliminated by face left and face right observations ?

(e) In a quadrilateral ABCD, the coordinates of points (in metres) are as follows :

| Point | East | North |
|---|---|---|
| A | 0 | 0 |
| B | 0 | –893.8 |
| C | 634.8 | 728.8 |
| D | 1068.4 | 699.3 |

Find the area of figure.

(f) Discuss in detail the methods of direct and indirect contouring.

## Section – C

3. Attempt any **three** parts. **All** parts carry equal marks. **8 × 3 = 24**

(a) A road 8 m wide is to deflect through an angle of 60° with the centre line radius of 300 m, the chainage of intersection point being 3605.0 m. A transition curve is to be used at each end of circular curve of such a length that rate of gain of radial acceleration is 0.5 $m/s^3$, when speed is 50 km/h. Find out

(i) Length of transition curve

(ii) Superelevation

(iii) Chainage of all junction points

(iv) Offsets at X = L/4, L/2, $\frac{3L}{4}$ & L

(b) Find upto which vertical angle, in stadia work, a sloping distance may be assumed to be horizontal so that the error may not exceed 1 in 300 ? The instrument is fitted with an anallatic lens and staff is held vertical.

(c) A closed traverse has following lengths and bearings :

| Line | Length (m) | Bearing |
|---|---|---|
| AB | 200.0 | Roughly East |
| BC | 98.0 | 178° |
| CD | Not-obtained | 270° |
| DA | 86.4 | 1° |

The length CD could not be measured due to some obstructions to chaining. The bearing of AB could not be taken, as station A is badly affected by local attraction. Find the exact bearing of the side AB & calculate length CD.

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(d) The following bearings were taken while conducting a close traverse with a compass in a place where local attraction was suspected :

| Line | F.B. | B.B. |
|---|---|---|
| AB | 80°45' | 260°00' |
| BC | 130°30' | 311°35' |
| CD | 240°15' | 60°15' |
| DA | 290°30' | 110°10' |

At what stations do you suspect local attraction ? Find the corrected bearings for local attraction and for declination of 1° 30' n.

(e) The distance measured between two paints on a sloping ground is 450 m. Find correction to be applied and horizontal distance if :

(i) The angle of slope is 10°

(ii) The slope is 1 in 5.

(iii) The difference in elevation between two points is 45 m.

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