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

PAPER ID : 0023   **Roll No.** [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

B.Tech.

(SEM. III) THEORY EXAMINATION 2011-12

SURVEYING—I

Time : 2 Hours   *Total Marks : 50*

Note :—Attempt **all** the questions.

1. Attempt any **four** parts of the following :   **(3.5×4=14)**

    (a) Explain in brief the two basic principles of surveying.

    (b) A 30 *m* long steel tape is supported at the ends. Find the normal tension for the tape with following details : cross section of the tape = *4 mm²*, unit weight of the tape material = *78600 N/m³*, $E = 2 \times 10^{11}$ *N/m²*. The pull at which the tape is standardized is *100 N*.

    (c) Explain the different types of variations in declination.

    (d) Explain the temporary adjustment of a theodolite.

    (e) Describe basic features of a total station.

    (f) The magnetic bearing of Sun at noon was measured with a compass and found to be *3° 30 '*. If the magnetic bearing of line AB was also measured and found to be *56° 30'*, find the true bearing of this line.

2. Attempt any **two** parts of the following : (6×2=12)

(a) To determine the elevation of a point P, a tachometer was set up at a station A and the observations were made to a staff held vertically at P. As a check, the instrument was set up at another point B and observations were taken to a staff held at P. The RL of the BM was *235.455*. The instrument constants were *100* and *0.3*. Determine the RL of P from the following data recorded.

Instrument At	Staff At	Vertical Angle	Hair readings	Reading at BM
A	P	3° 45'	2.235, 2.795, 3.355	1.75
B	P	2° 30'	0.945, 1.490, 2.035	2.25

(b) Explain curvature and refraction correction in levelling. The eye of an observer is *7.5 m* above sea level and he was able to see a lighthouse *50 m* high just above the horizon. Find the distance between the observer and the lighthouse.

(c) Explain the indirect methods of contouring. What are the advantages and disadvantages of these methods ?

3. Attempt any **two** parts of the following : (6×2=12)

(a) What are the different shapes of transition curves used in highways and railways ? Derive an expression for an ideal transition curve.

(b) The apex distance of a *3°* circular curve is *82.45 m*. Determine the deflection angle, tangent length and length of long chord.

(c) Describe how would you set a curve by method of offsets from long chord with the help of chain and tape ?

4. Attempt any **two** parts of the following :   (6×2=12)

   (a) A traverse survey was conducted and the data obtained is given in following table. Find the magnitude and direction of the closing error if any.

Line	AB	BC	CD	DA
Length (m)	156.5	178.2	234.8	202.6
Bearing	78° 40'	152° 32'	251° 18'	356°15'

   (b) Two triangulation stations A and B are *50 km* apart.The elevation of A is *202.5 m* and that of B is *232.2 m*. The intervening ground at 15 m from A may be assumed to have a uniform elevation of *175 m*. Determine the height of the signal at B if the line of sight is required to pass *3 m* above the ground.

   (c) What do you mean by orientation of plane table ? Explain the methods of orientation.