

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

PAPER ID : 0023

Roll No.

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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.