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

PAPER ID : 0023 Roll No. ☐☐☐☐☐☐☐☐☐☐

B. Tech.

(SEM. III) ODD SEMESTER THEORY EXAMINATION 2012–13

SURVEYING—I

Time : 2 Hours   Total Marks : 50

Note :– Attempt **all** questions.

1. Attempt any **four** parts of the following :   (3×4=12)

   (a) Discuss the difference between plane and geodetic surveying along with importance of surveying in civil engineering.

   (b) Explain and describe the fundamental principles of surveying and discuss the different sources and kinds of errors in surveying

   (c) Distinguish clearly between cumulative and compensating errors with suitable examples.

   (d) Write short notes on the following :

       (i)   Fore Bearing and Back Bearing,

       (ii) True and Magnetic meridian,

       (iii) Working of Total Station.

   (e) A survey line *ABC* crosses a river, *B* and *C* being on the near and distant banks respectively. The line *BM* of length 75 m is set out at right angles to the survey line at *B*. If the bearings of *BM* and *MC* are 288° 15' and 63° 15' respectively. Find the width of the river.

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

   (a) Write short notes on the following : Datum and Bench mark, Combined correction for curvature and refraction, Uses of contours.

   (b) Staff reading on the floor of a factory is 1.32 m and on a beam at the roof of truss when the bottom of the staff touching the beam is 3.705 m., R.L. of the beam is 475.00 m. What is the reduced level of the floor ?

   (c) A theodolite was set up at a point P and a staff was kept at a station Q. The distance PQ was 3010 m. If the angle of elevation to a vane 3.5 m above the foot of the staff was 7°59'. Determine the reduced level of the station Q. The elevation of the instrument axis was 120.80 m. Apply correction due curvature and refraction.

3. Attempt any **two** parts of the following :   (7×2=14)

   (a) Write short notes on the following : Ideal transition curve, Super elevation, Vertical curve, Two theodolite method of setting out curve.

   (b) The chainage of the intersection point of two straights is 1080 m and the angle of intersection is 120°. If the radius of a circular curve is 575 m and peg interval is 30 m, find :

   (i)   Tangent length

   (ii)   Chainage at the beginning and end of the curve

   (iii) Length of the long chord

   (iv)   Length of the sub-chords and chords

   (v)   Number of normal chords.

(c) A transition curve is required for a circular curve of 410 m radius, the gauge being 1.5 m between rail centers and maximum super-elevation restricted to 12 cm. The transition is to be designed for a velocity such that no lateral pressure is imposed on the rails and the rate of radial acceleration is 30 cm/sec^3. Calculate the required length of transition curve and the design speed.

4. Attempt any **four** parts of the following :   **(3×4=12)**

(a) Discuss the procedure, type and uses of traversing.

(b) What is triangulation and how is it different from traversing ? What is meant by the strength of triangulation figure ?

(c) Determine the value of *(D–C)/D* for the triangulation figures (*D* and *C* is related with strength of triangulation figure) if all the stations have been occupied and all the lines have been observed in both directions :

   (i) A braced quadrilateral

   (ii) A four sided central point figure without diagonals.

(d) There are two stations *P* and *Q* at elevations of 195 m and 990 m, respectively. The distance of *Q* from *P* is 104 km. If the elevation of a peak *M* at a distance of 37 km from *P* is 302 m, determine whether *Q* is visible from *P* or not. If not what would be the height of scaffolding required at *Q* so that *Q* becomes visible from *P* ?

(e) What is orientation in Plane Table surveying ? Distinguish between Resection and Intersection methods as applied to Plane table surveying.

(f) Write short notes on the following : Adjustment of closed traverse, Latitude and Departure, Satellite station.

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