CE 303   **Roll**

B.Tech.
(SEM III) THEORY EXAMINATION 2015-16
SURVEYING

Time: 2 Hours   Total Marks: 50

Note: Attempt all questions.

1. Attempt any **four** parts of the following: (3.5x4=14)

   a) Discuss the difference between plane and geodetic surveying.
   b) Explain the 'Whole to Part' principle of surveying.
   c) Explain the difference between a plan and map.
   d) The distance between two stations was measured with a 20 m chain and found to be 1500 metres. The same was measured with a 30 m chain and found to be 1476 metres. If the 20 m chain was 5 cm too short, what was the error in 30 metre chain?
   e) Find the magnetic declination at a place if the magnetic bearing of the sun at noon is (a) 18^{40} (b) $35^{00}20'$.
   f) Write short notes on any three of the following: Temporary adjustments of a theodolite, Fore Bearing and Back Bearing, True and Magnetic meridian

2. Attempt any **two** parts of the following: (6x2=12)

   a) Discuss the effects of curvature and refraction in leveling. Find the correction due to each of them and the combined correction.
   b) The following consecutive readings were taken with an Auto level along a straight line at a regular interval of 20 m. The first reading was at a BM (RL 132.135 m). The instrument was shifted after the second, fourth and eight readings:
   0.875, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.875, 2.030, and 3.765 m. Draw up a level book page and reduce the levels by the Rise and Fall method. Apply all possible checks and find the difference in level between the first and the last point.
   c) Discuss the field methods of determination of tacheometric constants and derive an expression for the horizontal distance of a vertical staff from a tacheometer when the line of sight is inclined.

3. Attempt any **two** parts of the following: (6x2=12)

   a) The chainage of the intersection point of two straights is 1060 m and the external deflection angle is 60^0. If the radius of a circular curve is 570 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

b) A transition curve is required for a circular curve of 200 m radius, the gauge being 1.5 m between rail centers and maximum super-elevation restricted to 15 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^2/sec. Calculate the required length of transition curve and the design speed.

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

4. Attempt any **two** parts of the following: (6x2=12)

a) What is triangulation? How is it different from traversing and trilateration? Determine the value of $(D-C)/D$ [*D and C is related with strength of triangulation figure*] for (i) a braced quadrilateral (ii) a four sided central point figure without diagonals, if all the stations have been occupied and all the lines have been observed in both directions.

b) In a triangulation survey, the altitudes of two stations *A* and *B*, 100 km apart, are respectively 420 m and 700 m. The elevation of a peak *P* situated at 70 km from *A* has an elevation of 478 m. Ascertain if *A* and *B* are intervisible, and if necessary, find by how much *B* should be raised so that the line of sight nowhere be less than 3 m above the surface of ground. Take earth's mean radius as 6400 km and the mean coefficient of refraction as 0.07.

c) Write short notes on any **four** of the following

(i) Open traverse and Closed traverse

(ii) Latitude and Departure

(iii) Dependent and Independent coordinates

(iv) Balancing of traverse

(v) Radiation and Intersection

(vi) Three point problem