Paper Code: CE-303	**Roll No.**										

B.TECH
THIRD SEMESTER EXAMINATION, 2016-17
SURVEYING

[Time: 2 Hours] [Max. Marks: 50]

Note: Attempt all questions. All questions carry equal marks.

1. Attempt any two parts of the following: - **(7x2=14)**

(a) Write short notes on: Temporary adjustments of a theodolite, Fore Bearing and Back Bearing, True and Magnetic meridian, Principle of EDM, Working of Total Station.

(b) Discuss the difference between plane and geodetic surveying and explain the 'Whole to Part' principle of surveying.

(c) 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 $288^0\ 15'$ and 63^0 15' respectively, find the width of the river.

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

(a) 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.

(b) 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 $7^059'$, determine the reduced level of the station *Q*. The elevation of the instrument axis was 120.80 m. Apply correction due curvature and refraction.

(c) 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.

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

(a) The chainage of the intersection point of two straights is 1070 m and the angle of intersection is 120^0. 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

(b) 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^2/sec. Calculate the required length of transition curve and the design speed.

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

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

(a) Discuss about the choice of proper contour interval and describe the characteristics of contours.

(b) What is triangulation? How is it different from traversing and trilateration? Determine the value of (*D*-*C*)/*D* [*D and C are 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.

(c) In a triangulation survey, the altitudes of two stations *A* and *B*, 110 km apart, are respectively 440 m and 725 m. The elevation of a peak *P* situated at 65 km from *A* has an elevation of 410 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.