Code No: RT21015

R13

SET - 1

II B. Tech I Semester Regular/Supplementary Examinations, Dec - 2015
SURVEYING
(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Explain the different methods of chaining on sloping ground. What is hypotenusal allowance?

    b) Explain with the help of neat sketch, the graduations of a prismatic compass and s surveyor's compass.

    c) Distinguish between the Horizontal plane and level surface.

    d) Explain how you would take field observations with a theodolite so as to eliminate the Error due to eccentricity of verniers.

    e) Explain length of the simple curve.

    f) What is average ordinate rule? Derive expression for it.　　　(4M+4M+3M+4M+3M+4M)

PART-B

2. a) Derive rules to calculate reduced bearing from whole circle bearing for all the quadrants.

    b) The following bearing were observed with a compass:

AB	$74^0 0'$	BA	$254^0 0'$
BC	$91^0 0'$	CB	$271^0 0'$
CD	$166^0 0'$	DC	$343^0 0'$
DE	$177^0 0'$	ED	$0^0 0'$
EA	$189^0 0'$	AE	$9^0 0'$

    Where do you suspect the local attraction? Find the correct bearings.　　(6M+10M)

3. a) Explain the Principle of surveying (traversing) with the compass.

    b) Distinguish clearly between closed traverse and open traverse.　　　(8M+8M)

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4. a) Differentiate between 'Permanent' and temporary' adjustments of level.

   b) Discuss the effects of curvature and refraction in leveling. Find the correction due to each and the combined correction. Why are these effects ignored in ordinary leveling?

   (6M+10M)

5. The vertical angles to vanes fixed at 0.5m and 3.5m above the foot of the staff held vertically at a point were - 0^0 30' and + 1^0 12' respectively. Find the horizontal distance and the reduced level of the point, if the level of the instrument axis is 125.380meters above datum.   (16M)

6. A transition curve is required for a circular curve of 400m radius, the gauge being 1.5m between rail centre and maximum super-elevation restricted to 12cm. The transition to be designed for a velocity such that no lateral pressure is imposed on the rails and the rate of gain of the radial acceleration is 30cm/sec^3. Calculate the required length of transition curve and the design speed.   (16M)

7. A rectangular plot ABCD forms the plane of a pit excavated for road work. E is point intersection of the diagonals. Calculate the volume of the excavation in cubic meters from the following data:

Point	A	B	C	D	E
Original level	45.2	49.8	51.2	47.2	52.0
Final level	38.6	39.8	42.6	40.8	42.5

Length of AB = 50 m and BC = 80 m.   (16M)

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Code No: RT21015　　　　　　　　　(**R13**)　　　　　　　(SET - 2)

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PART-A

1.　a) Explain the principle on which chain survey is based.

　　b) What are the sources of errors in compass survey and what precautions will you take to
　　　 eliminate them?

　　c) Distinguish between the Line of collimation and line of sight.

　　d) Explain how you would take field observations with a theodolite so as to eliminate the error
　　　 due to non-adjustment of line of sight.

　　e) Explain external distance of the simple curve.

　　f) What is Mid-ordinate rule? Derive expression for it.　　　　　(4M+4M+3M+4M+3M+4M)

PART-B

2.　a) What are the different sources of errors in plane tabling? How are they eliminated?

　　b) What is two-point problem? How is it solved?　　　　　　　　　　　　　(6M+10M)

3.　Two points A and D are connected by a traverse survey ABCD and the following records are
　　obtained

　　AB = 219m; BC = 170.5m; CD = 245.75m

　　Angle ABC = $118^0 15^{'}$; Angle BCD = $180^0 40^{'}$.

　　Assuming that AB is in meridian, determine:

　　i) The latitude and departure of D relative to A.

　　ii) The length AD.

　　iii) The angle BAD.　　　　　　　　　　　　　　　　　　　　　　　　　　(16M)

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4. In leveling between two points A and B on opposite sides of a river, the level was set up near A and the staff readings on A and B were 2.642 and 3.228m respectively. The level was then moved and set up near B, the respective staff readings on A and B were 1.086 and 1.664. Find the true difference level of A and B. (16M)

5. An ordinary theodolite is to converted into an anallactic tacheometer with a multiplier of 100 by an insertion of a new glass stadia diaphragm and an additional convex lens. Focal length of object glass is 15cm, fixed at a distance of 10cm from the trunnion axis. A focusing slide carries the eye-piece. If a suitable lens of 10 cm focal length is available for the anallactic lens, Calculate the fixed distance at which this must be placed from the objective and the spacing of the stadia hairs on the diaphragm. (16M)

6. A compound railway curve ABC is to have the radius of arc AB 600meters and that BC 400 meters. The intersection point V of the straights is located, and the intersection angle is observed to be 35^0 6'. If the arc AB is to have a length of 200meters. Calculate the tangent distances VA and VC. (16M)

7. a) Calculate the volume of earth work by prismoidal formula in a road embankment with the following data:

Chainage along the centre line	0	100	200	300	400
Ground levels	201.70	202.90	202.40	204.70	206.90

   Formation level at chainage 0 is 202.30, top width is 0.6 m side slopes are 2 to 1. The longitudinal gradient of the embankment is 1 in 100 rising. The ground is assumed to be level all across the longitudinal section.

   b) If the transverse slope of the ground at chainage 200 is assumed to be 1 in 10, find the area of embankment section at this point. (10M+6M)

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Code No: RT21015   (**R13**)   (SET - 3)

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PART-A

1. a) What is a well conditional triangle? Why is it necessary to use well-conditioned triangles?

   b) What is local attraction? How is it detected and eliminated?

   c) Distinguish between the longitudinal section and cross-section.

   d) Explain how you would take field observations with a theodolite so as to eliminate the Error due to non-uniform graduations.

   e) Explain mid ordinate of the simple curve.

   f) What is trapezoidal rule? Derive expression for it.   (4M+4M+3M+4M+3M+4M)

PART-B

2. a) Compare the advantages and disadvantages of plane table surveying with those of chain surveying.

   b) State three-point problem plane tabling and describe its solution by trial method giving the rules which you will follow in estimating position of the point sought.   (8M+8M)

3. For the following traverse, find the length of DE so that A, E and F may be in the same straight line:

Line	Length in m.	R.B.
AB	200	S 84^0 30 E
BC	100	N $75^0$18 E
CD	80	N 18^0 45'E
DE	--	N$29^0$45'E
EF	150	N $64^0$10'E

                                                              (16M)

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4. The following staff readings were observed successively with level, the instrument having been moved forward after the second, fourth and eighth readings:

   0.875, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.875, 2.030, 3.765.

   The first reading was taken with the staff held upon a benchmark of elevation 132.135. Enter the readings in level book-form and reduce the levels. Apply the usual checks. Find also the difference in level between the first and the last points.   (16M)

5. The constant for an instrument is 1200 and the value of additive constant is 0.4 meters. Calculate the distance from the instrument to the staff when the micrometer readings are 6.262 and 6.258, the staff intercept is 2.5m and the line of sight is inclined at $+ 6^0$ 30', the staff being held vertically.   (16M)

6. Two straights of a proposed road deflect through an angle of 120^0. Originally, they were to be connected by a curve of 520meters radius. However, due to the revision of the scheme, the deflection angle is to be increased to 132^0. Calculate the suitable radius of the curve such that the original starting point of the curve (P.C.) does not change.   (16M)

7. The following notes refer to three level cross-sections at two sections 50 meters apart.

Station	Cross-section		
A	1.7/7.7	2.8/0	4.6/10.6
B	2.9/8.9	3.7/0	6.9/12.9

   The width of cutting at the formation level is 10m. Calculate the volume of cutting between the two stations.   (16M)

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R13

SET - 4

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(Civil Engineering)

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Max. Marks: 70

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2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART-A

1. a) Explain clearly the principle of chain surveying.

    b) Compare the advantages and disadvantages of plane table surveying with those of chain surveying.

    c) Distinguish between the Curvature and Refraction.

    d) Explain how you would take field observations with a theodolite so as to eliminate the Index error of vertical circle.

    e) Explain length of the long chord of the simple curve.

    f) What is Simpson's one-third rule? Derive expression for it.   (4M+4M+3M+4M+3M+4M)

PART-B

2. The following are the bearings taken on a closed campass traverse:

Line	F.B	B.B
AB	S 37^0 30' E	N37^0 30' W
BC	S 43^0 15' W	N 44^0 15' E
CD	N 73^0 00' W	S 72^0 15' E
DE	N 12^0 45' E	S 13^0 15' W
EA	N 60^0 00' E	S 59^0 00' W

    Compute the interior angles and correct them for observational errors. Assuming the observed bearing of the line AB to be correct, Adjust the bearing of the remaining sides.(16M)

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3. The following lengths and bearings were recorded in running a theodolite traverse in the counter clockwise direction, the length of CD and bearing of DE having been omitted.

Line	Length in m.	R.B.
AB	281.4	S 69^0 11' E
BC	129.4	N 21^0 49' E
CD	?	N 19^0 34' W
DE	144.5	?
EA	168.7	S 74^0 24' W

Determine the length of CD and the bearing of DE.   (16M)

4. The following consecutive readings were taken with a level and 3 metres levelling staff on continuously sloping ground at a common interval of 20 meters:
0.602, 1.234, 1.860, 2.574 , 0.238, 0.914, 1.936,   2.872, 0.568, 1.824, 2.722. The reduced level of the first point was 192.122. Rule out a page of a level field book and enter the above readings. Calculate the reduced levels of the points and also the gradient of the line joining the first and the last points.   (16M)

5. The stadia intercept read by means of a fixed hair instrument on a vertically held staff is 2.250 metres, the angle of elevation being 3^042'. The instrument constants are 100 and 0.4 m. What would be the total number of turns registered on a movable hair instrument at the same station for a 2.0 meters intercept on a staff held on the same point? The vertical angle in this case is 5^0 30'   and the constants 1000 and 0.4 m?   (16M)

6. a) What is meant by 'shift' of a curve. Derive an expression for the same.
   b) Explain the various methods of determining the length of a transition curve.   (8M+8M)

7. Derive an expression for trapezoidal for volume. Compare it with the prismoidal formula.

            (16M)

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