Code No: 123AM **R15**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, March - 2017
SURVEYING
(Common to CE, CEE)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

Part - A

(25 Marks)

1.a)	What are the objectives of plane and geodetic surveying?	[2]
b)	What are different classifications of surveying?	[3]
c)	Differentiate between Level line and Horizontal line.	[2]
d)	What is reciprocal levelling? Give the use and advantages of it.	[3]
e)	What do you mean by prismoid?	[2]
f)	What are the merits of computation of area using Simpson's rule?	[3]
g)	What are the various types of theodolite?	[2]
h)	What is Trigonometrical leveling? How is it carried out?	[3]
i)	What is the principle of stadia tacheometry?	[2]
j)	Differentiate between simple and compound curves	[3]

Part - B

(50 Marks)

2.a) Explain the principle and working of Electronic Distance Measurements (EDM).

b) The area of the plan of an old survey plotted to a scale of 10 m to 1 cm now measures as 90.5 cm^2 as found by a planimeter. The plan is found to have shrunk so that a line originally 10 cm long now measures 9.5 cm only. A note on the plan also states that the 20 m chain used was 9 cm too short. Find the true area of the survey. [5+5]

OR

3.a) Differentiate between
i) Surveyor's compass and Prismatic compass ii) Declination and Dip
iii) Fore bearing and Back bearing iv) Meridian and Bearing.

b) The bearings of the lines of a traverse are given below. Correct the bearings for local attraction, if any, find the included angles. [5+5]

Line	Fore bearing	Back bearing
AB	$S36^0$ 15′E	$N36^0$ 15′W
BC	$S44^0$ 30′W	$N45^0$ 30′E
CD	$N71^0$ 45′W	$S71^0$ 00′E
DE	$N14^0$ 00′E	$S14^0$ 30′W
EA	$N61^0$ 15′E	$S61^0$ 00′W

4.a) What are the various methods of levelling? Describe them briefly.

b) A gradient of 1 in 400 falling from elevation 67.45 m was set out by driving pegs at 100m intervals with the top of pegs on the required gradient. After a time it was suspected that some of the pegs had been disturbed and the following observations were taken for checking their elevations. List the errors in the levels of the pegs, if any. [5+5]

Station	B.S.	I.S.	F.S.	R.L.	Remarks
1	1.76			64.13	B.M.
2	2.64		0.720		
3	1.96		1.420		
4		0.93			Peg 1
5		1.20			Peg 2
6		1.50			Peg 3
7		1.76			Peg 4
8		2.03			Peg 5
9		2.30			Peg 6
10	0.69		2.59		Peg 7
11		0.95			Peg 8
12		1.23			Peg 9
13		1.52			Peg10
14	0.61		1.21		
15			1.72		B.M.

OR

5.a) Describe the various characteristics and uses of contour lines.

b) Explain direct and indirect methods of contouring. What are the methods of interpolating contours and how is the interpolation done? [5+5]

6.a) State various methods of computation of areas and Derive the formula for Simpson's rule. What are its limitations?

b) The latitudes and departures of the lines of a closed traverse are given below. Calculate the area of the traverse. [5+5]

Line	Northing	Southing	Easting	Westing
AB		157.2	154.8	
BC	210.5		52.5	
CD	175.4			98.3
DA		228.7		109.0

OR

7.a) Draw the sketch of a two level section and derive an expression for the area of cross-section.

b) The centre line of a proposed road of formation width 12 m. is to fall at a slope of 1 in 100 from chainage 50m to chainage 150m. The existing ground levels on the centre line at chainage 50m, 100m and 150m are 71.62m, 72.34m, and 69.31m respectively and the ground slopes at 1 in 3 perpendicular to the proposed centre line. If the centre line formation level at chainage 50m is 71.22m and side slopes are to be 1 in 1 in cutting and 1 in 2 in filling, find the volumes of cut and fill between chainages 50m and 150m. [5+5]

8.a) How is a closed traverse checked in the field? What do you mean by "Balancing a traverse"?

b) The following data was obtained during a theodolite traversing:

Line	Length (m)	Included angle
AB	186	∟A = $118^0 20'$
BC	164	∟B = $82^0 10'$
CD	303	∟C = $137^0 00'$
DE	162	∟D = $73^0 44'$
EA	240	∟E = $128^0 36'$

Balance the traverse and also find the independent coordinates of the various stations if the bearing of the line AB is $30^0 25'$. [5+5]

OR

9.a) What are the Principles of Electronic Theodolite?

b) A straight tunnel is to be run between two points A and B whose independent coordinates are:

Station	Northing	Easting
A	0	0
B	3014	256
C	1764	1398

It is desired to sink a shaft at D, the mid-point of AB. It is not possible to measure along AB directly. Therefore, D is to be fixed from C, another point whose independent coordinates are known. Calculate the

i) Independent coordinates of D

ii) Length and bearing of CD.

iii) Angle ACD, given the W.C.B. of AC is $38^0 35'$. [5+5]

10.a) What are the elements of a simple circular curve? What are unit and sub chords?

b) What is degree of a curve and give its relationship with the radius of the curve.

c) Derive an expression for Rankine's deflection angle and explain the setting out a simple curve by Rankine's deflection angle method. [4+3+3]

OR

11.a) Derive distance equation for staff vertical condition and explain the role of anallactic lens in stadia tacheometry.

b) The following set of readings refers to observations in a tacheometric survey from station B on stations A, C, and D in clock-wise direction.

Staff station	Vertical angle	Horizontal circle reading	Stadia hair readings
A		$301^0 10'$	
C	$-5^0 12'$	$152^0 56'$	1.044,2.283,3.522
D	$+2^0 30'$	$205^0 06'$	0.645,2.376,4.110

The line BA has a bearing of 58°46' and the instrument constants are 100 and 0. Find the slope of the line CD and its bearing. [5+5]

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