



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Third Semester, B.E. - Civil Engineering

Semester End Examination; March / April - 2022

Basic Surveying

Time: 3 hrs

Max. Marks: 100

Course Outcomes

The Students will be able to:

CO1: Apply the knowledge of basic surveying and mathematics for measurements of distance and angles using conventional surveying equipments.

CO2: Conduct traversing to plot the area and locate the objects on the drawing using chain, tape, compass.

CO3: Prepare the contour plans to estimate area and volume and to determine distance & elevation by tachometric surveying.

CO4: Interpretation of the data of leveling, theodolite surveying to measure the elevation and distances.

Note: I) PART - A is compulsory. Two marks for each question.

II) PART - B: Answer any **Two** sub questions (from a, b, c) for Maximum of **18 marks** from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
I : PART - A		10			
I a.	Differentiate between plane surveying and geodetic surveying.	2	L1	CO1	PO1
b.	What is meant by balancing of Traverse? Mention its methods.	2	L1	CO2	PO1
c.	Define Mean Sea level and Line of Collimation.	2	L1	CO2	PO1
d.	Mention the characteristics of Contour line.	2	L1	CO1	PO1
e.	List the horizontal Axis and Face left observation.	2	L1	CO2	PO1
II : PART - B		90			
UNIT - I		18			
1 a.	What is ranging? Explain reciprocal method of ranging with neat sketch.	9	L2	CO1	PO1
b.	A line was measured by a 20 m chain which was accurate before starting the day's work. After chaining 900 m, the chain was found to be 6 cms too long. After chaining a total distance of 1575 m, the chain was found to be 14cms too long. Find the true distance of the line.	9	L2	CO1	PO1
c.	Define surveying and explain the principles of surveying with neat sketches.	9	L2	CO1	PO1
UNIT - II		18			
2 a.	Explain the following:				
	i) Dip and Declination	9	L2	CO1	PO1
	ii) True Meridian and Magnetic Meridian				
	iii) Fore bearing and Back bearing				
b.	Differentiate between prismatic compass and surveyors compass.	9	L2	CO2	PO2,3

- c. The following data FB and BB were observed in traversing with a compass in a place where local attraction was suspected. Compute the correct bearings of the lines.

Line	FB	BB
AB	38° 30'	219° 15'
BC	100° 45'	278° 30'
CD	25° 45'	207° 30'
DE	325° 15'	145° 15'
EA	190° 30'	10° 15'

9 CO2 PO2

UNIT - III**18**

- 3 a. Define the following terms:

- i) Parallax ii) Back sight iii) Bench mark
iv) Height of instrument v) Datum

9 L2 CO2 PO1

- b. Explain the temporary adjustment of Dumpy level.

9 L2 CO2 PO1

- c. The following staff readings were observed successively with a level, the instrument having been moved after third, sixth, eighth readings: 2.228, 1.606, 0.988, 2.090, 2.864, 1.262, 0.602, 1.982, 1.044, 2.684 meters. Enter the above readings in a page of a level book and calculate the R.L. points by Rise and Fall method, if the first reading was taken with a staff held on a BM of 432.384 m.

9 L2 CO2PO1,2

UNIT - IV**18**

- 4 a. Define contour and explain the characteristics of contour.

9 L2 CO2 PO1

- b. Explain the following:

- i) Methods for determining volumes
ii) List the uses of contours

9 L2 CO2 PO1

- c. A railway embankment 400 m long is 12 m wide at the formation level and has a side slope of 2:1. The ground levels at every 100 m along the centre line are as follows:

Distance (m)	0	100	200	300	400
R.L.	204.8	206.2	207.5	207.2	208.3

9 L2 CO2PO1,2

The formation level at zero chainage is 207.0 m and the embankment has a rising gradient of 1 in 100. Calculate the volume of earth work by,

- i) Trapezoidal rule
ii) Prismoidal rule

UNIT - V

18

- 5 a. Define the following:
- i) Axis of level tube
 - ii) Vertical axis
 - iii) Face left and Face right observation 9 L2 CO2 PO2
 - iv) Transiting
 - v) Swinging of telescope
 - vi) Centring
- b. Derive distance and elevation formula for stadia tacheometry, when the staff held normal to the line of sight and both for an angle of elevation 9 L2 CO2 PO2 and angle of depression.
- c. The Elevation of point '*P*' is to be determined by observations from two adjacent stations of a tacheometer. The staff was held vertically upon the point, and the instrument is fitted within an anallatic lens, the constant instrument being 100. Compute the elevation of the point '*P*' from the following data, taking both observations as equally trustworthy. Also calculate the distance of *A* and *B* from '*P*'. 9 L2 CO2PO1,2

Ins. station	Height of axis	Staff point	Vertical angle	Staff readings	Elevation of station
<i>A</i>	1.42	<i>P</i>	+2° 24'	1.230, 2.055, 2.880	77.75 m
<i>B</i>	1.4	<i>P</i>	−3° 36'	0.785, 1.800, 2.815	97.135 m

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