



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

*(An Autonomous Institution affiliated to VTU, Belgaum)*

**Third Semester, B.E. - Civil Engineering**

**Semester End Examination; Dec - 2016/Jan - 2017**

**Basic Surveying**

*Time: 3 hrs*

*Max. Marks: 100*

**Note:** Answer *FIVE* full questions, selecting at least *ONE* full question from each unit.

**UNIT - I**

- 1 a. Enumerate the classification of survey based on the instruments used. 6
- b. What is Topo map? Explain about the survey of India topographical maps and their numbering. 8
- c. What is a scale? Explain about the choice of scale of a map. 6
- 2 a. Enumerate the conditions to be fulfilled by survey lines or survey stations. 6
- b. The distance between two stations was measured with a 20 m chain and found to be 1500 m. The same distance was measured with a 30 m chain and found to be 1476 m. If the 20 m chain was 5 cm too short, what was the error in the 30 m chain? 6
- c. In passing an obstacle in the form of a pond, stations A and D, on the main line were taken on the opposite sides of the pond. On the left of AD line AB, 200 m long was laid down and a second line AC, 250 m long was ranged on the right of AD, the points B, D and C being in the same straight line. BD and DC were then chained and found to be 125 m and 150 m respectively. Find the length of AD. 8

**UNIT - II**

- 3 a. Differentiate between prismatic and surveyors compass. 6
- b. The following bearing were observed with a compass, calculate the interior angles,

|      |         |
|------|---------|
| line | FB      |
| AB   | 60°30'  |
| BC   | 122°00' |
| CD   | 46°00'  |
| DE   | 205°30' |
| EA   | 300°00' |

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- c. The following bearings were observed in running a closed traverse,

| Line | FB      | BB      |
|------|---------|---------|
| AB   | 75°05'  | 254°20' |
| BC   | 115°20' | 296°35' |
| CD   | 165°35' | 345°35' |
| DE   | 224°50' | 44°05'  |
| EA   | 304°50' | 125°05' |

At what stations do you suspect local attraction? Determine the corrected bearings.

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- 4 a. Define Traversing. List the checks in closed and open traverse. 6
- b. Define : 6  
Latitude, Departure and closing error.

- c. Calculate the length and bearing of the line EA,

| Line | Length(m) | Bearing |   |
|------|-----------|---------|---|
| AB   | 204       | 87°30'  |   |
| BC   | 226       | 20°20'  | 8 |
| CD   | 187       | 280°0'  |   |
| DE   | 192       | 210°3'  |   |
| EA   | ?         | ?       |   |

- 5 a. List the advantages of internal focusing Telescope. 6
- b. Explain about the effect of curvature and refraction on leveling. 8
- c. An observer standing on the deck of a ship just sees a light house. The top of the light house is 42 m above the sea level and the height of the observer’s eye is 6 m above sea level. Find the distance of the observer from the light house. 6

- 6 a. Enumerate the errors in leveling. 6
- b. With note on Level tube. 6
- c. The following staff readings were observed successively with level, the instrument having been moved forward after the second, fourth and eighth readings : 8  
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 on a BM of 132.135. Enter the readings in a level book format and reduce the levels. Apply the usual checks.

**UNIT - IV**

- 7 a. Define contour Interval. List the factors affecting the contour interval. 6
- b. Enumerate the advantages and limitations of plane table surveying. 6
- c. Briefly explain the uses of the following instruments : 8  
i) Planimeter    ii) Ceylon Ghat Tracer    iii) Seztant    iv) EDM.
- 8 a. List the characteristics of contours. 6
- b. List the different methods of plane table survey. Explain any one method. 8
- c. List the uses of contours. 6

**UNIT - V**

- 9 a. Enumerate the applications of theodolite. 6
- b. List the fundamental lines of a Theodolite and their desired relationship. 6
- c. Explain the Repetition method of measuring the horizontal angle and list the errors eliminated by this method. 8

- 10 a. List the general methods of calculating area. 6
- b. The following perpendicular offsets were taken from a chain line to a hedge. Calculate the area between the survey line and hedge line by trapezoidal and Prismoidal rule. 6

|             |      |      |      |      |      |     |     |     |     |     |
|-------------|------|------|------|------|------|-----|-----|-----|-----|-----|
| Ch (m)      | 0    | 15   | 30   | 45   | 60   | 70  | 80  | 100 | 120 | 140 |
| Offsets (.) | 7.60 | 8.50 | 10.7 | 12.8 | 10.6 | 9.5 | 8.3 | 7.9 | 6.4 | 4.4 |

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

|          |       |       |       |       |       |
|----------|-------|-------|-------|-------|-------|
| Distance | 0     | 100   | 200   | 300   | 400   |
| RL       | 204.8 | 206.2 | 207.5 | 207.2 | 208.3 |

The formation level at zero chainage is 207 and embankment has a rising gradient of 1 in 100. Calculate the volume of earth work.

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