R13

Code No: 113AM

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B.Tech II Year I Semester Examinations, November - 2015**
**SURVEYING**
**(Common to CE, CEE, AGE)**

**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 is the main principle of surveying? [2M]
b) Distinguish between prismatic compass and surveyor's compass. [3M]
c) Define line of collimation and change point in levelling. [2M]
d) What is the object of preparing a contour map? [3M]
e) State the trapezoidal rule. [2M]
f) The following perpendicular offsets were taken at 10 m intervals from a chain line to an irregular boundary line: 3.10, 4.20, 5.35, 6.45, 7.15, 8.25, 7.95 and 5.20. Find the area by Simpson's rule. [3M]
g) What do the terms 'telescope normal' and 'telescope inverted' mean? [2M]
h) What is the principle of electronic theodolite? [3M]
i) What are the multiplying constant and additive constant of a tacheometer? [2M]
j) List out the applications of Geographical Information System. [3M]

**PART-B** **(50 Marks)**

2.a) What is orientation? Discuss any one method of orientation with a neat sketch.
b) A chain line PQ intersects a pond. Two points A and B are taken on the chain line on opposite sides of the pond. A line AC, 250 m long, is set out on the left of AB and another line AD, 300 m long, is set out on the right of AB. Points C, B and D are in the same straight line. CB and BD are 100 and 150 m long respectively. Calculate the length of AB. [5+5]

**OR**

3. The following are the fore and back bearings of the sides of a closed traverse:

| Side | FB | BB |
|---|---|---|
| AB | $150^0\ 15'$ | $330^0\ 15'$ |
| BC | $20^0\ 30'$ | $200^0\ 30'$ |
| CD | $295^0\ 45'$ | $115^0\ 45'$ |
| DE | $218^0\ 00'$ | $38^0\ 00'$ |
| EA | $120^0\ 30'$ | $300^0\ 30'$ |

Calculate the interior angles of the traverse. [10]

4. The following consecutive readings were taken with a level and a 4-m levelling staff on a continuously sloping ground at common intervals of 30 m:
0.855 (on A), 1.545, 2.335, 3.115, 3.825, 0.455, 1.380, 2.055, 2.855, 3.455, 0.585, 1.015, 1.850, 2.755, 3.845 (on B). The RL of A was 380.500. Determine the gradient of AB. [10]

OR

5. Discuss the characteristics of contour lines with neat sketches. [10]

6. The following offsets are taken from a survey line to a curved boundary line:

| Distance (m) | 0 | 5 | 10 | 15 | 20 | 30 | 40 | 60 | 80 |
|---|---|---|---|---|---|---|---|---|---|
| Offset (m) | 2.50 | 3.80 | 4.60 | 5.20 | 6.10 | 4.70 | 5.80 | 3.90 | 2.20 |

Find the area between the survey line, the curved boundary line, and the first and the last offsets by Trapezoidal rule and Simpson`s rule. [10]

**OR**

7. An embankment of width 10 m and side slopes 1.5:1 is required to be made on a ground which is level in a direction transverse to the centre line. The central heights at 40 m intervals are as follows: 0.90, 1.25, 2.15, 2.50, 1.85, 1.35 and 0.85 m. Calculate the volume of earth work by Trapezoidal and Prismoidal methods. [10]

8.a) Describe the process of measuring the horizontal angle.
b) Briefly explain about the temporary adjustments of a theodolite. [5+5]

**OR**

9. Find the reduced level of the top of a church tower from the following data: [10]

| Inst. stn | Reading on BM (m) | Vertical angle | RL of BM (m) | Distance AB in (m) | Remarks |
|---|---|---|---|---|---|
| A | 1.698 | $10^0$ 12′ | 363.075 | 30 | A and B are in line with the top of the tower |
| B | 1.382 | $8^0$ 20′ | | | |

10.a) Briefly explain about the methods of tacheometry.
b) Determine the values of stadia constants from the following observations: [5+5]

| Instrument station | Staff reading on | Distance (m) | Stadia Readings (m) | |
|---|---|---|---|---|
| | | | Lower | Upper |
| O | A | 150 | 1.255 | 2.750 |
| | B | 200 | 1.000 | 3.000 |
| | C | 250 | 0.750 | 3.255 |

**OR**

11.a) Discuss the uses of Global Positioning System (GPS) in Civil Engineering.
b) A simple circular curve is to have a radius of 573m. The tangents intersect at chainage 1060 m and the angle of intersection is $120^0$. Find
i) Tangent Length ii) Length of curve iii) Length of long chord. [5+5]

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