**21CV32**

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### Third Semester B.E. Degree Examination, June/July 2024
## Geodetic Engineering

Time: 3 hrs.                                                                 Max. Marks: 100

**Note:** *Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

1  a. Define Surveying. Discuss the classification of Surveying. **(04 Marks)**
   b. Distinguish between :
      i)   True meridian and Magnetic Meridian.
      ii)  Whole circle bearing and Quadrantal bearing.
      iii) Fore bearing and Back bearing.
      iv)  Dip and Declination. **(08 Marks)**
   c. The following bearings were observed with a compass. Calculate the interior angles.

| Line | AB | BC | CD | DA |
|------|------|------|------|------|
| Fore bearing | N 45° 30′ E | S 60° 0′ E | S 10° 30′ N | N 75° 45′ W |

**(08 Marks)**

#### OR

2  a. Define Local Attraction and explain the procedure of Detection and Elimination methods. **(04 Marks)**
   b. Describe briefly Radiation and Intersection method of plant tabeling. **(08 Marks)**
   c. The following bearings were observed in running a closed traverse.

| Line | AB | BC | CD | DE | EA |
|------|------|------|------|------|------|
| FB | 75° 5′ | 115° 20′ | 165° 35′ | 224° 50′ | 304° 50′ |
| BB | 254° 20′ | 296° 35′ | 345° 35′ | 44° 05′ | 125° 05′ |

At what stations do you suspect local attraction? Determine the correct magnetic bearings. If declination was 5° 10′ E, what are the true bearings? **(08 Marks)**

### Module-2

3  a. Define i) Back sight   ii) Fore sight   iii) Intermediate sight   iv) Change point. **(04 Marks)**
   b. Explain the procedure with sketch reciprocal levelling. **(08 Marks)**
   c. Following readings were taken with a level and a 4m levelling staff on a continuously sloping ground
      1.680 , 2.470 , 3.550 , 0.680 , 1.200 , 2.050 , 3.800 , 1.200 , 1.600 , 1.850 , 3.600 , 1.800 , 2.500 , 3.500.
      Rule out a page of level book and find out RL of each point by Rise and Fall method. Taking the BM RL as 100.00m. Apply usual checks. **(08 Marks)**

#### OR

4  a. Discuss the methods of determining areas and volume. **(05 Marks)**
   b. Explain the temporary adjustments and dumpy level. **(05 Marks)**

c. Calculate the volume of earthwork for a road having the following data :

| Chainage (m) | Depth of cutting (m) | Transverse slope |
|---|---|---|
| 0 | 1.50 | 1 in 8 |
| 40 | 2.50 | 1 in 4 |
| 80 | 1.80 | 1 in 10 |

If formation width = 10m and side slopes 1 : 1. **(10 Marks)**

## Module-3

5  a. Explain the procedure of measuring horizontal angles by Repetition and Reiteration method. **(05 Marks)**
   b. Briefly explain the Double plane method of finding the RL of an point. **(05 Marks)**
   c. To determine the elevation of the top of aerial pole, the following observations were made :

| Instrument station | Reading on BM | Angle of Elevation | Remarks |
|---|---|---|---|
| A | 1.377 | 11° 53′ | RL of BM = 30.150m |
| B | 1.263 | 8° 5′ | |

Stations A & B & top of aerial pole are in the same vertical plane. Find the RL of top of aerial pole. If distance between A & B is 30.00m. **(10 Marks)**

## OR

6  a. Explain the following terms :
   i)   Transiting                ii)  Changing face
   iii) Swinging                 iv)  Line of collimation. **(04 Marks)**
   b. Derive the expression for distance and elevation for stadia tacheometry, when the staff held vertical to the line of sight , for both angle of elevation and angle of depression. **(06 Marks)**
   c. The following observations were observed with a tacheometer fitted with anallactic lens and multiplyer constant being 100.

| Inst. Station | Staff Station | Height of axis | Vertical angle | Hair readings |
|---|---|---|---|---|
| P | BM | 1.5 | - 6° 12′ | 0.963, 1.515, 2.067 |
| P | Q | 1.5 | 7° 5′ | 0.819, 1.341, 1.863 |
| Q | R | 1.6 | 12° 23′ | 1.860, 2.445, 3.030 |

RL of BM is 460.500m, staff held vertically. Compute the RL of P, Q & R and the horizontal distances PQ & QR. **(10 Marks)**

## Module-4

7  a. Explain the following along with a neat sketch :
   i)   Forward tangent           ii)  Point of curve
   iii) Deflection angle          iv)  Long chord. **(04 Marks)**
   b. What is the relation between degree and radius of a curve? **(06 Marks)**
   c. Calculate the necessary data for setting out a curve by Rankine's method and prepare a curve table.     Chainage of PI = 1192m , Deflection angle = 50° 30′ , Radius of curve = 300m , Peg interval = 20m , Theodolite least count 20″. **(10 Marks)**

## OR

8  a. What are the requirements of a transition curve? **(04 Marks)**
   b. With a neat sketch, explain the elements of a compound curve. **(06 Marks)**

c.  Two parallel railway lines are to be connected by reverse curve, each section having the same radius. If the lines are 12m apart and the maximum distance between tangent points measured parallel to the straights is 48m, find the maximum allowable radius. If however, both the radius are to be different, calculate the radius of the second branch if that of the first branch is 60m. Also calculate the length of both the branches. **(10 Marks)**

## Module-5

9   a.  Derive an expression for relief displacement on vertical photograph. **(08 Marks)**
    b.  What are the advantages of LiDAR? **(04 Marks)**
    c.  Explain the components of GIS, with neat sketch. **(08 Marks)**

### OR

10  a.  What is an EDM? Explain the principle used by EDM for distance measurement. **(08 Marks)**
    b.  Explain in brief any two applications in Civil engineering of
        i)  Remote sensing         ii)  GPS. **(04 Marks)**
    c.  A vertical photograph was taken at an altitude of 1200m above MSL. Determine the scale of the photograph for terrain lying at elevations of 80m and 300m, if the focal length of the camera is 15cm. **(08 Marks)**

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