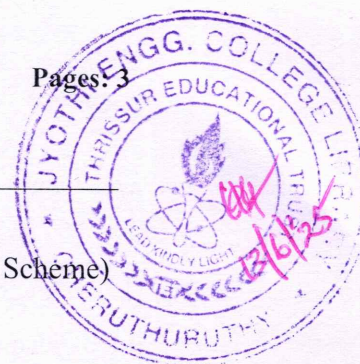


Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

B.Tech Degree S3 (S,FE) (FT/WP) (S1 PT) Examination May 2025 (2019 Scheme)

**Course Code: CET205****Course Name: SURVEYING & GEOMATICS**

Max. Marks: 100

Duration: 3 Hours

**PART A***Answer all questions. Each question carries 3 marks*

Marks

- |    |  |     |
|----|--|-----|
| 1  | Explain briefly the principles of surveying.   | (3) |
| 2  | Define the terms, fore bearing and back bearing. What is the relation between the two? | (3) |
| 3  | With the help of a neat sketch list out the elements of a horizontal curve             | (3) |
| 4  | Explain balancing of closed traverse by Bowditch's rule.                               | (3) |
| 5  | Discuss the errors in total station survey.  | (3) |
| 6  | Explain GPS principle in range calculation.  | (3) |
| 7  | What are the characteristics of mass diagram?  | (3) |
| 8  | Explain the uses of contour maps.  | (3) |
| 9  | Explain any one method to measure horizontal angle using a theodolite                  | (3) |
| 10 | Explain the principle of least squares.  | (3) |

**PART B***Answer any one full question from each module. Each question carries 14 marks***Module 1**

- 11 The following bearings were observed in traversing with a compass, an area where (8)
- a) local attraction was suspected. Find the correct bearings of lines.

| Line | FB      | BB      |
|------|---------|---------|
| AB   | 67°25'  | 247°10' |
| BC   | 126°15' | 306°15' |
| CD   | 110°25' | 290°20' |
| DE   | 18°30'  | 198°45' |
| EA   | 38°25'  | 218°30' |

- b) Explain reciprocal ranging with help of a neat sketch. (6)
- 12 The following consecutive readings were taken with a level and 4m levelling staff (7)



- a) on a continuously sloping ground at common interval of 30m. 0.506, 1.356, 1.789, 2.472, 3.288, 0.315, 1.176, 2.244, 3.130, 0.462, 1.575, 2.562, 2.985. The reduced level of the first point was 225.80m. Calculate the reduced levels of the points and also find the gradient of the line joining first and last points.
- b) What is meant by orientation? What are the methods of orientation? (7)

### Module 2

- 13a) Determine the area between a line AB and the irregular boundary by trapezoidal rule and Simpson's rule. The following perpendicular offsets were taken from line AB to the irregular boundary: (6)

|                    |    |    |    |    |    |     |     |     |
|--------------------|----|----|----|----|----|-----|-----|-----|
| Chainage (m)       | 0  | 20 | 40 | 60 | 80 | 100 | 120 | 140 |
| Offset lengths (m) | 18 | 34 | 38 | 26 | 28 | 60  | 12  | 20  |

- b) Differentiate between the following pairs: (8)
- i) Face left and face right
  - ii) Telescope normal and inverted
  - iii) Transiting and swinging telescope
  - iv) Repetition and re-iteration methods of measuring horizontal angles
- 14a) Briefly explain triangulation figures. (6)
- b) State and explain the principles of stadia and tangential tacheometry. (8)

### Module 3

- 15a) For a closed traverse ABCDA, compute the missing data. (8)

| Line | Length (m) | Bearing  |
|------|------------|----------|
| AB   | 100.00     | N42°20'W |
| BC   | 560.00     | N7°40'E  |
| CD   | 115.00     | N92°30'E |
| DA   | ?          | ?        |

- b) Explain the principle of least squares. Explain how it is used for determining the most probable value of a quantity having 'N' observations and the observations are equally weighted to one. (6)
- 16a) What is meant by balancing a traverse? State the various rules used for balancing traverse. (6)



- b) The telescope of a theodolite is fitted with stadia wires. It is required to find the most probable values of the constants C and K of tacheometer. The staff was kept vertical at three points in the field and with line of sight horizontal, the staff intercepts observed were as follows: (8)

| Distance a staff from tacheometer, D (m) | Staff intercept, S (m) |
|--|------------------------|
| 130                                      | 1.375                  |
| 190                                      | 1.900                  |
| 240                                      | 2.405                  |

#### Module 4

- 17a) Explain Rankine's method of setting out a simple curve. (7)
- b) How is topographic survey performed with a total station? Explain briefly. (7)
- 18a) In setting out a circular railway curve, it is found that the curve must pass through a point 20m from the intersection point and equidistant from the tangents. The chainage of the intersection point is 2640.00m and the intersection angle (deflection angle) is  $26^\circ$ . Calculate the radius of the curve, the chainage at the beginning and end of the curve and the degree of the curve for a 20m chord. (10)
- b) Explain the principle of EDM. (4)

#### Module 5

- 19a) List the applications of remote sensing and describe any two in detail. (6)
- b) What do you understand by Global Positioning System? Give an overview of GPS. (8)
- 20a) Define Geographic Information System (GIS). Explain the components of GIS. (6)
- b) What are the basic processes and elements involved in electromagnetic remote sensing of earth resources? (8)

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