

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

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

B.Tech Degree S3 (S,FE)/S1 (PT)(S) June 2024 (2019 Scheme)/S3 (WP)(R) December 2023 Examination

**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 the basic principle of surveying.  | (3) |
| 2  | What is local attraction? How is it detected and eliminated?                         | (3) |
| 3  | What is a mass diagram? Mention any three uses.                                      | (3) |
| 4  | What is a satellite station? Explain reduction to centre.                            | (3) |
| 5  | Define i) Centering ii) Transiting iii) Line of collimation                          | (3) |
| 6  | Differentiate between latitude and departure.  | (3) |
| 7  | Define (i) Most probable value (ii) Residual error.                                  | (3) |
| 8  | Explain with neat sketches:<br>i) Simple curve ii) Compound curve iii) Reverse curve | (3) |
| 9  | What is electromagnetic spectrum in remote sensing?                                  | (3) |
| 10 | Differentiate between Raster and Vector data.  | (3) |

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

- 11(a) It was required to ascertain the elevation of two points P and Q and a line of levels was then continued to a bench mark of 83.5, readings obtained being as shown below. Obtain the R.L of P and Q. (10)

BS	IS	FS	RL	Remarks
1.622				P
1.874		0.354		
2.032		1.78		
	2.362			Q
0.984		1.122		
1.906		2.824		
		2.036	83.5	B.M

- (b) In a reciprocal levelling between two stations A and B, the level was set up near A and the staff reading on A and B were 2.645 and 3.220 m respectively. The level was then moved and set up near, the respective staff readings on A and B were 1.085 and 1.665. Find the true difference in level between A and B. (4)

- 12 The following bearings were observed in running a closed traverse. (9)

(a)

Line	F.B	B.B
AB	$71^{\circ}05'$	$250^{\circ}20'$
BC	$110^{\circ}20'$	$292^{\circ}35'$
CD	$161^{\circ}35'$	$341^{\circ}45'$
DE	$220^{\circ}50'$	$40^{\circ}05'$
EA	$300^{\circ}50'$	$121^{\circ}10'$

Determine the correct magnetic bearings of the lines.

- (b) What are the errors in compass surveying? Explain in detail. (5)

### Module 2

- 13 In measuring angles from a triangulation station B, it was found necessary to set the instrument at a satellite station S, due south of the main station B and at a distance of 12.2 m from it. The line BS approximately the exterior angle ABC. The angles ASB and BSC were observed to be  $30^{\circ}20'30''$  and  $29^{\circ}45'6''$  respectively. When the station B was observed, the angles CAB and ACB were observed to be  $59^{\circ}18'26''$  and  $60^{\circ}26'12''$  respectively. The side AC was computed to be 4248.5 m from the adjacent triangle. Determine the correct value of the angle ABC. (14)

- 14(a) What is transit theodolite? What are face left and face right observations? (6)

- (b) Explain the procedure to measure the height of an object using vertical angle. (8)

### Module 3

- 15 a) Explain the principle of least squares. (8)

- (b) Distinguish between closed traverse and open traverse. Write a note on the checks in closed traverse. (6)

- 16 A closed traverse ABCDA is conducted on field. The survey details are given below: (14)



Line	Length	Bearing
AB	371	$0^{\circ} 42'$
BC	164	$94^{\circ} 42'$
CD	245	$185^{\circ} 04'$
DA	192.5	$232^{\circ} 51'$

Compute the coordinates for the traverse by applying correction by Bowditch's rule.

#### Module 4

- 17(a) With a neat sketch, explain the elements of a compound curve? (10)
- (b) What are the applications of total station? (4)
- 18 Two tangents meet at chainage 1236m, the deflection angle being  $42^{\circ}$ . A circular curve of radius 400m is to be introduced in between them. Calculate the tangent length, length of circular curve, chainage of the tangent points and deflection angles for setting out the first three pegs and the last peg on the curve by Rankine's method (pegs are to be fixed at 20m interval). (14)

#### Module 5

- 19(a) Differentiate between active and passive systems of remote sensing. (6)
- (b) What is map projection? Explain various methods of map projection. (8)
- 20 What are the components and principles of GPS? Explain in detail with sketches. (14)