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# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Four Year B.Tech III Semester End Examinations (Regular) - November, 2018

**Regulation: IARE – R16**

## SURVEYING

**Time: 3 Hours**

**(CE)**

**Max Marks: 70**

**Answer ONE Question from each Unit**

**All Questions Carry Equal Marks**

**All parts of the question must be answered in one place only**

### UNIT – I

1. (a) State the objectives of Surveying? What is a well-conditioned triangle and mention the necessity of well-conditioned triangles? [7M]
- (b) Table 1 below shows the bearings observed in a traverse survey conducted with a prismatic compass at a place where local attraction was suspected? At what stations do you suspect local attraction? Find the corrected bearings of the lines and compute the interior angles. [7M]

Table 1

Line	F.B	B.B
AB	$48^{\circ}25^1$	$230^{\circ}00^1$
BC	$177^{\circ}45^1$	$356^{\circ}00^1$
CD	$104^{\circ}15^1$	$284^{\circ}55^1$
DE	$165^{\circ}15^1$	$345^{\circ}15^1$
EA	$259^{\circ}30^1$	$79^{\circ}00^1$

2. (a) Explain the difference between prismatic compass and surveyor compass. [7M]
- (b) A 20m steel tape was standardized on a flat ground at temperature of  $20^{\circ}\text{C}$  under a pull of 15kg. The tape was used in catenary at a temperature of  $30^{\circ}\text{C}$  under a pull of 10kg. The cross sectional area of the tape is  $22\text{mm}^2$  and its total weight is 400 gm, the Youngs modulus and co-efficient of thermal expansion for steel are  $21000\text{ kg/mm}^2$  and  $11 \times 10^{-6}$  per C respectively. Find the correct distance [7M]

### UNIT – II

3. (a) What is a contour? Explain the characteristics of contours with neat sketches. [7M]
- (b) The following staff readings were observed successively with a level. The instrument having been moved after the second, fifth and seventh readings. 0.675, 1.230, 0.750, 2.565, 2.225, 1.935, 1.835, 3.115 and 2.875. The first reading was taken with a staff held on a bench mark of reduced level +100.000. Enter the readings in the level book form and find the reduced level of all the points. [7M]

4. (a) Explain the various methods of direct leveling and temporary adjustments required in leveling instrument. [7M]  
 (b) Describe the various types of leveling instruments with neat sketches [7M]

**UNIT – III**

5. (a) The following Table 2 gives a corrected latitudes and departures of sides of a closed traverse ABCD. Compute its area by (i) Meridian distances and latitudes (ii) Double meridian distances and latitudes. [7M]

Table 2

Side	Latitude		Departure	
	N	S	E	W
AB	108		4	
BC	15		249	
CD		123	4	
DA	0			257

- (b) The following perpendicular offsets were taken at 10 m intervals from a survey line to an irregular boundary line 2.95, 5.70, 4.00, 6.35, 8.25, 6.00, 3.30, 4.85, 5.70. Calculate the area included between the survey line, the irregular boundary line, and the first and last offsets by i) Mid Ordinate rule ii) Trapezoidal rule [7M]
6. (a) State and derive Simpson’s rule and write down its limitations. [7M]  
 (b) A road embankment is 18m wide at the formation level with side slopes of 2 : 1. The average height of the embankment is 6m with an average gradient of 1 in 30 from a 230m contour to 350m contour. Find the length of the road and the quantity of earthwork. [7M]

**UNIT – IV**

7. (a) Draw a neat sketch of theodolite and describe purpose of various components? Why both Verniers are read? [7M]  
 (b) What are the different errors in theodolite work? How they are eliminated? [7M]
8. (a) Discuss the procedure of measuring horizontal angle with a theodolite. [7M]  
 (b) An instrument was set up at P and the angle of elevation to a vane 4m above the foot of the staff held at Q was  $9^{\circ} 30'$ . The horizontal distance between P and Q was known to be 2000 meters. Determine the R.L. of the staff station Q, given that the R.L. of the instrument axis was 2650.38 m. [7M]

**UNIT – V**

9. (a) List out the advantages and disadvantages of a total station. Explain the functions of the various parts of total station. [7M]  
 (b) Derive an equation for calculation of heights and distances using principles of tacheometry survey. [7M]
10. (a) Explain the types of curves used in surveying in detail. [7M]  
 (b) Explain the difference between tangential and stadia tacheometry [7M]

