INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
B.Tech III Semester End Examinations (Regular) - December, 2017
Regulation: IARE – R16
SURVEYING
(Civil Engineering)

Time: 3 Hours   **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) List the obstacles in chaining and explain in detail with sketches.   **[7M]**
    (b) A tape of standard length 20 m at 85°F was used to measure a base line. The measured distance
        was 882.50 m. The following Table 1 being the slopes for the various segments of the line. **[7M]**
        Calculate the true length of the line if the mean temperature during measurement was 63°F and

Table 1

100	2°20
150	4°12
50	1°06
200	7°48
300	3°00
82.5	5°10

the coefficient of thermal expansion of the tape material is 6.5×10^{-6} per °F.

2. (a) Describe the principles of surveying.   **[7M]**
    (b) The following Table 2 are the bearings of a closed traverse. Find the interior angles.   **[7M]**

Table 2

Side	Fore bearing	Back Bearing
AB	N45°30'E	S 45°30' W
BC	S60°0'E	N 60°0'W
CD	S10°30'W	N10°30'E
DA	N75°45'W	S75°45'E

UNIT – II

3. (a) The following staff reading was observed successively with a level, the instrument was moved after third, sixth and eight reading: 2.230, 1.605, 0.985, 2.090, 2.845, 1.260, 0.600, 1.980, 1.045 and 2.685. Enter the above reading in a page of level book and calculate the RL of points if the first reading was taken with staff held on bench mark of 432.385 m. Adopt rise and fall method. **[7M]**

   (b) With sketches describe the characteristics of contours. **[7M]**

4. (a) The following consecutive readings were taken along AB with a 4m leveling staff on continuously slowing ground at intervals of 20m: 0.340m on A, 1.450,2.630,3.875,0.655,1.745,2.965,3.945,1.125,2.475,3.865 on B. The elevation A was 60.350. Enter the above readings in a level book form and compute reduced levels by height of instrument method. Also find the gradient of the line AB. **[7M]**

   (b) Describe the method indirect contouring using block leveling and plotting of contours. **[7M]**

UNIT – III

5. (a) The following offsets were taken from a chain line to an irregular boundary line at an interval of 10 m. 0, 2.50, 3.50, 5.00, 4.60, 3.20, 0 m. Compute the area between the chain line, the irregular boundary line and the end offsets by Trapezoidal Rule and Simpson's Rule **[7M]**

   (b) An embankment of width 10 m and side slopes 1 ½:1 is required to be made on a ground which is level in a direction transverse to the center line. The center heights at 40 m intervals are as follows: 0.90, 1.25, 2.15, 2.50, 1.85, 1.35, and 0.85 Calculate the volume of earth work according to **[7M]**
   i) Trapezoidal formula
   ii) Prismoidal formula

6. (a) The following Table 3 offsets were taken from a chain line to a hedge **[7M]** Calculate the area

Table 3

Distance	0	6	12	18	24	30	36	48	60	72	81	90
Offset m	3.8	3.3	2.4	1.8	0.9	1.5	1.8	2.2	3.0	3.3	3.6	2.6

   enclosed between chain line, hedge and the end offsets by Simpson's and trapezoidal rule.

   (b) The areas within the contour lines at the side of a reservoir and along the face of a proposed dam are shown in Table 4. **[7M]**
   If the bottom level is 238.0m and Full supply level is 250.0m, determine the capacity of the reservoir by any two methods.

Table 4

Contour	Area sq. m.
250	705600
248.5	642600
247	508500
245.5	461700
244.0	295200
242.5	157500
241	83700
239.5	11700
238.0	360

UNIT – IV

7. (a) Find the omitted measurements of length CD and bearing DE of traverse ABCDEA as shown in Table 5. **[7M]**

Table 5

LINE	LENGTH(m)	BEARING
AB	281.4	S 69°11' E
BC	129.4	N 21°49' E
CD	X	N 19°34' W
DE	144.5	Y
EA	168.7	S 74°24' W

(b) Explain measurement of Horizontal angle by the method of reiteration. **[7M]**

8. (a) Explain the methods of temporary and permanent adjustment of a theodolite. **[7M]**

(b) Explain the methods of correcting the closing errors in a traversing with sketch. **[7M]**

UNIT – V

9. (a) What is the field procedure to set out a simple circular curve by Rankin's method? Explain with neat sketch. **[7M]**

(b) What are the various components in Total station? Also write the Advantages and disadvantages of Total station. **[7M]**

10. (a) Derive the expression to find out distance when staff held vertical for angle of elevation and depression using tachometric principles. **[7M]**

(b) Write a note of GPS and GIS. Elaborate on the applications of GPS and GIS in civil engineering.

[7M]

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