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Question Paper Code: ACE002



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech III Semester End Examinations (Supplementary) - February, 2018

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

- (a) A line was measured with a steel tape which was exactly 30 m at a temperature of 20°C and a pull of 10 kg. The measured length was 1650 m. The temperature during measurement was 30°C and the pull applied 15 kg. Find the true length of the line, if the cross-sectional area of the tape was 0.025 cm^2 . The coefficient of expansion of the material of the tape per 1°C is 3.5×10^{-6} and modulus of elasticity of the material of tape is $2.1 \times 10^5 \text{ kg/cm}^2$. [7M]
 - (b) The following are the observed bearings of a closed traverse ABCDEA with a compass in a place as shown in table 1. [7M]

Table 1

Line	Fore Bearing	Back Bearing
AB	191° 45'	13° 0'
BC	39° 30'	222° 30'
CD	22° 15'	200° 30'
DE	242° 45'	62° 45'
EA	330° 15'	147° 45'

Find out where local attraction was suspected and correct the readings.

- (a) Explain the various classifications of surveying in detail? [7M]
 - (b) The following bearings were observed with a compass in a closed traverse correct them for local attraction shown in Table 2. [7M]

Table 2

Line	Fore Bearing	Back Bearing
AB	N 55 ⁰⁰ ' E	S 54 ⁰⁰ ' W
BC	S 67 ⁰³⁰ ' E	N 66 ⁰⁰ ' W
CD	S 25 ⁰⁰ ' W	N 25 ⁰⁰ ' E
DE	S 77 ⁰⁰ ' W	N 75 ⁰³⁰ ' E
EA	N 64 ⁰³⁰ ' W	S 63 ⁰³⁰ ' 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 432.385m. Adopt height of instrument method. [7M]
- (b) With sketches describe the characteristics of contours. [7M]
4. (a) What are the various methods of locating contours? Explain in detail [7M]
- (b) The following staff readings were observed successively with level ,the instrument having been moved forward after the third ,sixth and eighth readings: 2.228, 1.606, 0.988, 2.090, 2.864, 1.262, 0.602, 1.982, 1.044, 2.684 metres. The first reading was taken with the staff held upon a benchmark of elevation 432.384 m .Enter the readings in level book-form and calculate the reduced levels of the points by rise and fall method also the gradient of the line joining the first and last point. If the first and last points are separated by a distance of 100 m. [7M]

UNIT – III

5. (a) Derive formula to find the area of two-level section [7M]
- (b) A chain line was divided into eight sections of 12m each and off sets were taken from the chain line to a hedge. The length of the off sets were 0, 5.2, 7.4, 8.6, 7.9, 8.5, 8.2, 9.1 and 7.6 mts. Find area between the chain line, boundary and first and last off sets by trapezoidal rule. [7M]
6. (a) The following Table 3 offsets were taken from a chain line to a hedge [7M]

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

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

- (b) The road embankment 10m wide at formation level with side slopes 2:1 and with an average height of 5m is constructed with an average gradient 1 in 40 from contour 220m to 280m. calculate
- length of the road [7M]
 - volume of embankment in m³.

UNIT – IV

7. (a) Explain the detail the procedure for measuring horizontal angles by the method of Repetition. [7M]
- (b) the length and bearing of closed traverse is given in Table 4. [7M]

Table 4

Line	Length (m)	Bearing (m)
AB	130	S 88 ⁰ E
BC	158	S 6 ⁰ E
CD	145	S 40 ⁰ W
DE	308	N 81 ⁰ W
EA	337	N 48 ⁰ E

Find out latitude and departure of the traverse and calculate the closing error if any.

8. (a) What is closing error? What are the checks in a closed traverse. [7M]
- (b) Derive the horizontal distance between A and B and R.L of the top of the chimney when the height of instrument at B is greater than that of A. (Instrument stations and object are in the same vertical plane) [7M]

UNIT – V

9. (a) What is the basic principle of GPS? Explain advantages and disadvantages [7M]
- (b) What is meant by total station? What are the various applications of total station? Explain in detail. [7M]
10. (a) Briefly describe the Components and source of errors in GIS. [7M]
- (b) To determine the distance between two points A and B, a tachometer was setup at P and the following observations were recorded.
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|-----------------|--------------------------------------|--------------------------------------|
| (i) Staff at A | Staff readings = 2.225, 2.605, 2.985 | Vertical angle = + 7 ⁰ 54 |
| (ii) Staff at B | Staff readings = 1.640, 1.920, 2.200 | Vertical angle = – 1 ⁰ 46 |
- If horizontal angle APB = + 68°32'30" Elevation of A = 315.600 m, k = 100 m, c = 0.00 m. Determine the distance AB and the elevation of B.

