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Instructions – (1) All Questions are *Compulsory*.

(2) Figures to the right indicate full marks.

(3) Assume suitable data, if necessary.

(4) Use of Non-programmable Electronic Pocket Calculator is permissible.

(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any SIX of the following:**   **12**

(i) Differentiate between contour interval and horizontal equivalent.

(ii) Define interpolation of contour and state its methods.

(iii) State importance of digital planimeter over polar planimeter.

(iv) Define telescope inverted and telescope normal for transit theodolite.

(v) Define the terms, swinging and transiting.

(vi) State the principle of tacheometry.

(vii) State any two special features of electronic theodolite.

(viii) Define compound curve and reverse curve.

Marks

b) **Attempt any <u>TWO</u> of the following:** 8

    (i)   Draw a neat sketches of contour for following:

        1) Hill

        2) Gentle slope

        3) Overhanging cliff

        4) Ridge line

    ii) State any two advantages and limitations of remote sensing.

    iii) State the procedure for measurement of deflection angle by transit theodolite.

2. **Attempt any <u>FOUR</u> of the following:** 16

    a) State methods of locating contours and explain any one.

    b) State any four applications of contour map.

    c) Describe the procedure to locate grade contour in field.

    d) State the procedure for measuring a horizontal angle by method of repetition.

    e) Explain temporary adjustment of transit theodolite.

    f) State different relationship between fundamental lines of theodolite.

3. **Attempt any <u>FOUR</u> of the following:** 16

    a) Explain construction and use of 'one second micro optic theodolite'.

    b) Explain the procedure of measuring of vertical angle by using electronic theodolite.

    c) Describe procedure for setup of total station.

    d) State any four special features of total station.

    e) Draw a neat sketch of simple circular curve and show notations there on.

    f) Explain the principle of EDM with a neat sketch.

4. **Attempt any FOUR of the following:** **16**

a) The following reading were obtained when the area was measured by a planimeter, the tracing arm so set to give 100 sq cm as the value of one revolution of the roller.

IR	FR	Position of anchor point	Remark
7.225	3.125	Outside the figure	The zero of disc passed the fixed mark twice in clockwise direction
1.252	4.38	Inside the figure	The zero of disc passed the index mark once in reverse direction

b) State any two application of each of GIS in land information and land environmental field.

c) Explain application of remote sensing in civil engineering.

d) Explain the procedure of curve setting by method of offsets from long chord.

e) Define tacheometer. State essential characteristics of tacheometer.

f) What is degree of curve? Derive relation between radius and degree of curve.

5. **Attempt any TWO of the following:** **16**

a) Calculate consecutive co-ordinates of all the survey lines of following traverse.

Line	WCB	Length in meter
AB	121° 30′	161.20
BC	18° 09′	141.38
CD	218° 31′	201.39
DA	332° 27′	121.21

b) Following are length and bearing of sides of traverse of PQRSP.

Line	Length in meter	Bearing
PQ	76.80	140° 12′
QR	195.60	35° 24′
RS	37.20	338° 48′
SP	–	–

Find length and bearing of line SP.

c) A tacheometer fitted with anallatic lens was set up at station 'A' and the following readings were obtained on vertically held staff.

Inst. Station	Staff station	Vertical Angle	Stadia readings in meter
A	BM	+8° 00′	0.900, 1.16, 1.420
A	B	–2° 30′	1.140, 1.235, 1.330

The constant of tacheometer was 100. Find the horizontal distance AB and RL of B, if BM RL is 100.00 m.

6. **Attempt any TWO of the following:** 16

a) The formation level of a road is at a constant RL of 150.00 m. The ground level is along centre line of road are as follows:

Chainage (m)	0	40	80	120	160	200	240
Ground level	152.6	151.90	149	150.90	151.50	152.45	151.20

Calculate the volume of earthwork given that formation width is 8 m and side slope is 2:1.

b) State any eight practical applications of E.D.M.

c) Tabulate the data required for setting out a circular curve by the deflection angle method, using the following information:

(i) Chainage of intersection point = 1580 m

(ii) Angle of intersection = 145°

(iii) Degree of curve = 5°

(iv) Peg interval = 30 m

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