# 17419

**15116**

**3 Hours / 100 Marks** Seat No. | | | | | | | | |

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

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

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

(7) 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) Define contour interval and horizontal equivalent.

(ii) What do you mean by zero circle in area measurement?

(iii) Define grade contour.

(iv) Define transiting and swinging of theodolite.

(v) Define lattitude and departure.

(vi) State any four component parts of micro-optic theodolite.

(vii) Give classification of curve and explain any one in detail.

**Marks**

b) **Attempt any TWO of the following:** **8**

(i) Explain direct method of contouring.

(ii) State any four applications of remote sensing.

(iii) Explain the procedure of measurement of deflection angle.

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

a) State any four characteristics of contours with sketches.

b) Define interpolation of contour. Explain in brief the method of arithmetical calculation for interpolation of contour.

c) Explain the procedure of establishing grade contour on ground.

d) Explain the method of repetition to measure horizontal angle using transit theodolite.

e) The co-ordinates of two points C and D are as follows:

| Point | Co-ordinates | |
|---|---|---|
| C | 982.5 | 825.2 |
| D | 1198.6 | 576.4 |

Find the length and bearing of line CD.

f) State and explain temporary adjustments of theodolite.

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

a) Enlist any four component parts of digital level. State the functions of each.

b) Explain the procedure for measurement of vertical angle using digital theodolite.

c) State any four advantages of total station over other surveying instruments.

d) Explain the classification of EDM instruments.

e) Explain the working principle of EDM with neat sketch.

f) Calculate the ordinates at 25 m interval to set a circular curve having long chord of 300 m and versed sine of 10 m.

**Marks**

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

a) Write stepwise procedure to measure area of irregular figure using digital planimeter.

b) State the two applications each of GIS in land information and land environmental field.

c) Define G.I.S. Enlist the key components of G.I.S.

d) State any four essential characteristics of tacheometer.

e) How would you determine the constants of given tacheometer on field?

f) Determine reduced level of horizontal line of sight from given data. Assume multiplying constant with anallatic lense.

| Instrument station | Staff Station | Vertical Angle | Staff reading | RL of B |
|---|---|---|---|---|
| A | B | +8°20′ | 0.990, 1.555, 2.120 | 100.000 m |

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

a) Define closed traverse. Calculate length and bearing of line DA from following data:

| Line | AB | BC | CD | DA |
|---|---|---|---|---|
| Length (m) | 258 | 321 | 180 | ? |
| Bearing | 30° | 140° | 210° | ? |

b) Define independent co-ordinates. Calculate independent co-ordinates from following data showing calculations:

| Line | Lattitude | | Departure | |
|---|---|---|---|---|
| | N | S | E | W |
| AB | | 182.63 | 313.12 | |
| BC | 244.72 | | 470.12 | |
| CD | 495.17 | | | 318.34 |
| DE | | 268.70 | | 388.46 |
| EA | | 288.27 | | 113.44 |

**Marks**

c) A tacheometer was fixed with an anallatic lens and having multiplying constant 100 was used and the following observations were made on staff held vertical.

| Instrument Station | $HI_{(m)}$ | Vertical Angle | Staff at | Staff reading |
|---|---|---|---|---|
| P | 1.50 | + 2°30′ | M | 1.20, 1.83, 2.46 |
| P | 1.50 | – 4°40′ | Q | 1.35, 1.85, 2.29 |

RL of station M is 50 m. Calculate RL of P and Q and horizontal distance PQ.

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

a) Explain the procedure to set out circular curve using Rankine's method of deflection angle using necessary sketch.

b) Enlist component parts of mechanical planimeter. Calculate area of figure from following data:

(i) Initial reading - 1.586

(ii) Final reading - 0.392

(iii) Multiplying constant - 100

(iv) Additive constant - 20

(v) Rotation of disc - once in reverse direction

c) Describe layout of small building by using total station.