



11819

22205

**3 Hours / 70 Marks**

Seat No.

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- 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.*

**Marks**

**1. Attempt any five of the following :**

**(5×2=10)**

- a) State the classification of survey based on object of survey.
- b) Define representative fraction of scale.
- c) List different types of tapes based on material of which they are made.
- d) List the types of meridian.
- e) Define the term “line of sight”.
- f) Define the terms “contour” and “contour line”.
- g) List component parts of a digital planimeter.

**2. Attempt any three of the following :**

**(3×4=12)**

- a) Explain the principles of surveying.
- b) Convert the following bearings into relevant bearings :
  - i)  $138^{\circ}15'$
  - ii)  $309^{\circ}30'$
  - iii)  $N42^{\circ}E$
  - iv)  $S17^{\circ}25'W$
- c) Explain the temporary adjustments of prismatic compass.
- d) Define the following terms :
  - i) Level line
  - ii) Bench mark
  - iii) Change point
  - iv) Profile levelling.

**P.T.O.**



3. Attempt **any three** of the following :

(3×4=12)

- Draw conventional symbols for :
  - Cutting
  - Dam
  - Electric line with pole
  - Forest
- Explain graphical method of adjustment of closing error of a traverse.
- Distinguish between HI and rise and fall method.
- List the sources of errors in levelling and explain any one in detail.

4. Attempt **any three** of the following :

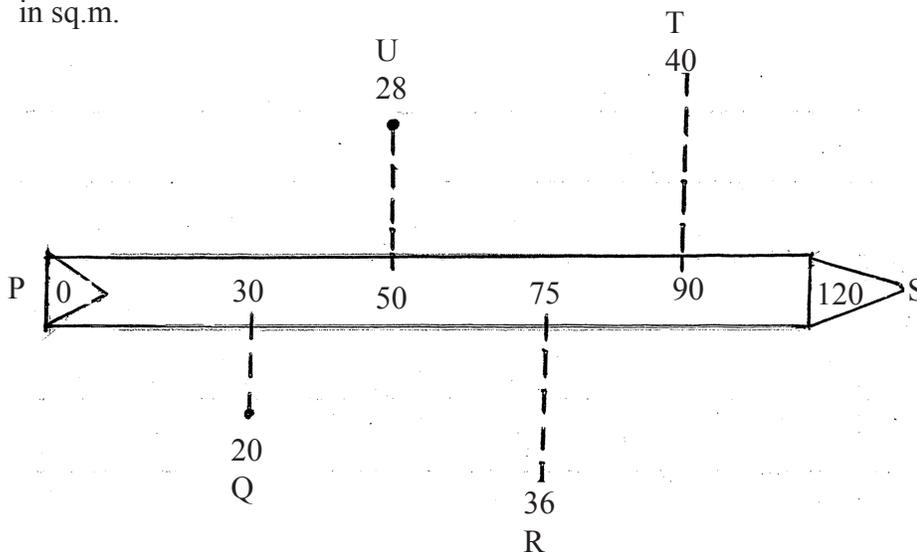
(3×4=12)

- Explain types of bench marks.
- State any eight component parts with its functions of dumpy level.
- State the methods of contouring and explain any one in detail.
- Describe the procedure for measuring the area using digital planimeter.
- Explain the procedure of computing the volume of reservoir from any contour map.

5. Attempt **any two** of the following :

(2×6=12)

- Plot the given cross staff survey of the field PQRSTUP given Fig. 1 and calculate its area in sq.m.



(Fig. 1)

- Define the term magnetic declination and deep of the needle.
  - Calculate the magnetic declination at a point if the true bearing is  $358^{\circ}0'$  and magnetic bearing is  $1^{\circ}30'$ .
- The following readings were observed with a dumpy level.  
1.265, 2.345, 2.420, 3.625, 0.365, 3.255, 1.265, 2.380 and 3.215.  
The instrument was shifted after fourth and sixth readings and the first staff reading was taken on BM of RL 335.435 m. Prepare the level page of field book, enter the readings and calculate the reduced levels of all the points by HI method. Also apply usual arithmetic checks.



6. Attempt **any two** of the following :

- a) Following bearings were observed for the traverse ABCDEA. Detect the local attraction at the stations and correct the bearings of remaining lines. Also calculate included angles.

Line	FB	BB
AB	68°15'	248°15'
BC	148°45'	326°15'
CD	224°30'	46°0'
DE	217°15'	38°15'
EA	327°45'	147°45'

- b) Calculate the missing readings and apply arithmetical checks also.

Station	BS	IS	FS	Rise	Fall	RL	Remark
1	3.125					×	B.M.1
2	×		×	1.325		125.005	C P 1
3		2.320			0.055	×	
4		1.920		×		125.350	
5	×		2.655		×	124.615	C P 2
6	1.620		3.205		2.165	×	C P 3
7		3.625			×	122.450	
8			×	2.145		122.590	B. M. 2

- c) Points P and Q are two ground points at a distance of 10 m, with their reduced levels 45.490 and 48.430 m respectively. Interpolate the contours of 46, 47 and 48 m between points P and Q.
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