

**SURVEYING – I**

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

**PART – A**

(Compulsory Question)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- Differentiate between plane surveying and geodetic surveying.
  - Differentiate between well-conditioned triangle and ill-condition triangle. Give an example of ideal condition triangle.
  - Differentiate between Whole Circle Bearing (WCB) and Reduced Bearing (RB).
  - Define plane table surveying. Give any two advantages of plane table surveying.
  - Write short note: (i) Back Sight Reading. (ii) Fore Sight Reading. (iii) Height of Instrument. (iv) Change Point.
  - Draw the contour lines for: (i) Hill. (ii) Valley. (iii) Vertical cliff. (iv) Saddle.
  - Classify theodolites. Which type of theodolite is commonly used?
  - What is error of closure? How precision can be found from error of closure? What are the typical precisions for rural, sub-urban and urban land?
  - How does reservoir capacity can be estimated in surveying?
  - What is clinometer? Which type of clinometers is commonly used now a day?

**PART – B**

(Answer all five units, 5 X 10 = 50 Marks)

**UNIT – I**

- 2 A rectangular plot of land measure 20 cm x 30 cm on a village map drawn to scale of 100 m to 1 cm. Calculate its area in hectares. If the plot is re-drawn on a topo sheet to a scale of 1 km to 1 cm, what will be its area on the topo sheet? Also determine the R.F of the scale of the village map as well as on the topo sheet.

**OR**

- 3 A 20 m chain was found to be 10 cm too long after chaining a distance of 1500 m. It was found to be 18 cm too long at the end of the day's work after chaining total distance of 2900 m. Find the true distance if the chain was correct before the commencement of the work.

**UNIT – II**

- 4 The following bearings were observed with a compass. Calculate the interior angles.

Line	AB	BC	CD	DE	EA
Fore Bearing	60°30'	122° 0'	46° 0'	205° 30'	300° 0'

**OR**

- 5 Explain with sketches, the following methods of locating a point by plane table survey:

(i) Radiation. (ii) Intersection.

Discuss the relative merits and application of the above methods.

**UNIT – III**

- 6 The following consecutive readings were taken with a level and 5 m levelling staff on continuous sloping ground a common interval of 20 m: 0.385; 1.030; 1.925; 2.825; 3.730; 4.685; 0.625; 2.005; 3.110; 4.485. The reduced level of the first point was 208.125 m. Rule out a page of a level field book and enter the above readings. Calculate the reduced levels of the points by rise and fall method also gradient of the line joining the first and the last point.

**OR**

- 7 Explain with net sketches the characteristic of contours.

Contd. in page 2

## UNIT – IV

- 8 In order to determine the elevation of top Q of a signal on a hill. Observations were made from two stations P and R. The stations P, R and Q were on the same plane. If the angles of elevation of the top Q of the signal measured at P and R were  $25^{\circ} 35'$  and  $15^{\circ} 05'$  respectively, determine the elevation of the foot of the signal if the height of the signal was 4 m above its base. The staff readings upon the bench mark (RL 105.42 m) were 2.755 m and 3.855 m respectively when the instrument was kept at P and R. The distance between P and R was 120 m.

OR

- 9 The length and bearing of closed traverse ABCDEA and the latitude and departures of the known sides are given below. The lengths of two sides BC and CD could not be measured. Compute the omitted measurement.

Line	Length (m)	Reduced bearing	Latitude	Departure
AB	730.00	S $60^{\circ} 00'$ E	-365.00	+632.20
BC	?	N $62^{\circ} 18'$ E	-	-
CD	?	N $37^{\circ} 42'$ W	-	-
DE	940.00	S $55^{\circ} 24'$ W	-533.70	-773.80
EA	575.00	S $02^{\circ} 42'$ W	-574.40	-27.08

## UNIT – V

- 10 The following offsets are taken from a survey line to a curves boundary line, and the first and the last offsets. Calculate the area enclosed between the survey line, the irregular boundary line, and the offsets, by: (i) Trapezoidal Rule. (ii) Simpson's Rule.

Distance (m)	0	5	10	15	20	30	40	60	80
Offset (m)	2.5	3.8	4.6	5.2	6.1	4.7	5.8	3.9	2.2

OR

- 11 Explain with neat diagrams the construction and working principles of the following:
- Optical Square.
  - Prism Square
  - Cross Staff.

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