

(3 hours)

[Total Marks-80]

- N.B.** (1) Question no. 1 is compulsory
 (2) Attempt any three questions out of remaining five.
 (3) If any additional data is assumed.
 (4) Explain with neat sketches, wherever necessary

1. a) Explain Geodetic surveying [05]
 b) State advantages of plane tabling surveying. [05]
 c) Explain the characteristics of contours [05]
 d) Enumerate the various sources of errors in Compass survey. [05]

2. a) Explain reiteration methods for computing horizontal angle. [05]
 b) What do you understand by reciprocal levelling? Give the corrections for curvature and refraction. [05]
 c) The following consecutive readings were taken with a level and 4.0m Staff on a continuously sloping ground at a common interval of 30 mt [10]
 0.780, 1.535, 1.955, 2.430, 2.985, 3.480, 1.155, 1.960, 2.365, 3.640, 0.935, 1.045, 1.630 and 2.555.
 The RL of first point A was 190.75 m. Rule out a page of level book & enter above readings. Calculate the RL of all the points by Rise & Fall Method. Also calculate the gradient of the line joining the first & last point.

3. a) Calculate latitudes, departures and closing error for the following traverse and adjust using Bowditch's rule [08]

Line	Length(m)	WCB
AB	156.5	78°40'
BC	178.2	152°32'
CD	234.8	251°18'
DA	202.6	356°15'

- b) Following data refers to a site of a reservoir. The areas are the ones which will be contained by a proposed dam and contour lines as given below: [08]

Contour (in metres)	Area enclosed (in hectares)
610	22
615	110
620	410
625	890
630	1158

- Calculate the total volume of the water impounding.
- c) Represent the following with conventional symbols [04]
- i. Cultivated land
 - ii. Embankment
 - iii. Railway crossing
 - iv. Fence

TURN OVER

4. a) Explain Temporary adjustments of a level. How reading of the vernier theodolite is taken? [07]
- b) Explain the civil engineering applications of contour maps. [08]
- c) Select only one from the following multiple choices [05]
- The principle of plane tabling is
 - Triangulation
 - Traversing
 - Parallelism
 - None of above
 - The face left position is called
 - Telescope reverse
 - Telescope inverted
 - Telescope normal
 - None of above
 - Balancing of traversing is done according to
 - Bowditch's rule
 - Transit rule
 - Third rule
 - All of above
 - If N be the number of lines of the traverse, then sum of measured interior angles should be equal to
 - $(2N+4) \times 90^\circ$
 - $(2N \times 4) \times 90^\circ$
 - $(2N-4) \times 90^\circ$
 - $(N+4) \times 90^\circ$
 - The area of zero circle is equal to
 - C
 - M
 - $M \times C$
 - M / C
5. a) Give a list of sources of errors in chain surveying and say which of them are cumulative and which of them are compensating. [04]
- b) Compare Trapezoidal and Simpson's rule. [04]
- c) Discuss the advantages of prismatic compass over surveyor's compass. [04]
- d) A closed compass traverse ABCDEA was conducted round a lake and the following bearings were obtained. Correct for local attraction and find included angles and corrected bearings [08]

Line	Length(m)	Whole Circle Bearing
AB	89.31	$45^\circ 10'$
BC	219.76	$72^\circ 05'$
CD	151.18	$161^\circ 52'$
DE	159.10	$228^\circ 43'$
EA	232.26	$300^\circ 42'$

6. Write short notes on: (any 4) [20]
- Orientation of Plane Tabling
 - Gales Traverse Table
 - Volume by Spot levels
 - Precise Leveling
 - Triangulation