

- N. B. :
- (1) Question No. 1 is compulsory.
 - (2) Attempt any **three** question out of remaining questions.
 - (3) Illustrate answers with neat sketches wherever required.
 - (4) Attempt sub-question in order.
 - (5) Assume any suitable data if required and state the same clearly.

1. Attempt any **four** :- 20
 - (a) Explain principles of surveying with suitable example.
 - (b) Explain with neat sketch dip of magnetic needle.
 - (c) Describe various method of plane table surveying.
 - (d) Write an exhaustive note on characteristics of contour.
 - (e) Explain Bowditch rule for adjustment of theodolite traverse.
 - (f) Compare Trapezoidal Rule and Simpson's Rule for determination of area.

2. (a) Explain the obstacles in chaining. 6
 - (b) On a map drawn to a scale of 40 m to 1 cm a surveyor measured the distance between two stations as 4000 m. But it was found that by mistake he had used a scale of 100 m to 1 cm. Find the true distance between the stations. 7
 - (c) A closed traverse is conducted with five stations A, B, C, D and E taken in anticlockwise order, in the form of regular pentagon. If the F.B. of AB is 30° find the F.B. of other side. 7

3. (a) Explain the various type of bench marks in levelling. 4
 - (b) Discuss the advantages and disadvantages of plane table survey. 6
 - (c) The following consecutive reading were taken with a levelling instrument of intervals of 20 m 2.375, 1.730, 0.615, 3.450, 2.835, 2.070, 1.835, 0.985, 0.435, 1.630, 2.255 and 3.630 m. 10
The instrument was shifted after the fourth & eighth reading. The last reading was taken on BM of RL 100 200 m. Find the RL of all the points.

4. (a) What is the spire test & how is it carried out in the field. 8

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- (b) Calculate latitudes, departures & closing error for the following traverse & adjust using Bowditch Rule 12

Line	length	W.C.B.
AB	89.31	45°10'
BC	219.76	72°05'
CD	151.18	161°52'
DE	159.10	228°43'
EA	232.26	300°42'

5. (a) The following perpendicular offsets was taken from a chain line to an irregular boundary. Calculate the area using trapezoidal and simpsons rule. 10

Chainage (m)	0	30	60	90	120	150	180	210
Offsets (m)	0	2.65	3.80	3.75	4.65	3.60	5.00	5.18

- (b) Explain interpolation method of contour. 5
- (c) Explain fly levelling. 5

5. Write short notes on any four :- 20
- Reciprocal levelling
 - Orientation in PTS
 - Area of zero circle
 - Hyptenusal allowance
 - Fundamental lines of a theodolite & relation between them