(3 Hours)

Maximum Marks: 80

Question No.1 is compulsory.
Attempt any three from remaining.
Assume suitable data if required, state the same clearly.
Figures to the right indicate full marks.
Attempt sub questions in order.
Explain with neat sketches, wherever necessary

1. Write detailed notes on: (4x5=20)
(i). Principle of surveying.
(ii). Principle of Chain surveying and its applications in civil engineering projects.
(iii). Principle of Plane table surveying and advantages of plane table surveying.
(iv). Principle of leveling and importance of leveling in civil engineering projects.

2. a. The following readings have been taken from a page of an old level book. The readings in level book were written with pencil and some of these got erased. The erased readings were marked with question marks. It is required to reconstruct the page. Fill up the missing quantities showing the calculation & apply the usual checks. (08)

STATION	B.S	I.S	F.S	RISE	FALL	RL	REMARKS
1	?					150.000	BM
2		2.457			0.827	?	
3		2.400		0.057		?	
4	2.697		?		?	148.07	TP
5	?		2.051	0.646		148.716	TP
6		2.500		1.068		148.784	
7		2.896			?	149.388	
8		?			0.124	?	
9			2.672	0.348		149.612	

2. b. Describe procedure and application of reciprocal leveling. (06)
2. c. Define any three from following: (06)
  i) GTS bench marks & Permanent bench marks.   ii) Leveling staff & Open cross staff.
  iii) Reduced level & Line of collimation.   iv) Telescope normal & axis of telescope.

3. a. List accessories required for PTS and explain traversing method with its suitability. (06)
3. b. The circle of a theodolite is divided into degree and ¼ of degree. Design a suitable decimal vernier to read up to 0.005^o. (02)
3. c. Define Contour. State engineering applications of Contour maps. (06)
3. d. A big pond obstructs chain line PQ. Line PL was measured as 901m on left of the line PQ for circumventing the obstacle. Similarly line PM was measured as 1100m on right of line PQ such that points L-Q-M are in the same straight line. Lengths of QL and QM are 502m and 548m respectively. Find distance PQ. (06)

4. a. The following bearings were taken for a closed compass traverse in survey project:

Line	AB	BC	CD	DE	EA
FB	$48^O 25'$	$177^O 45'$	$104^O 15'$	$165^O 15'$	$259^O 30'$
B B	$230^O 0'$	$356^O 0'$	$284^O 55'$	$345^O 15'$	$79^O 0'$

 (i). State which stations are affected by local attraction and by how much?   (01)
(ii). Determine correct bearings.   (06)
(ii). Calculate the true bearings, if the declination was $1^O30'$ W.   (02)
(iii). Tabulate the correct bearings and true bearings.   (01)

4. b. Write short note on any two from following: (10)
i) Declination and variation of magnetic declination.
ii) Trough Compass and Prismatic compass with their use in surveying.
 iii) Direct and indirect ranging

5.a. The following table gives the corrected latitudes and departures of the closed traverse.
    Calculate its area by DMD method.   (05)

Side	Latitude in m		Departure in m	
	Northing	Southing	Easting	Westing
PQ	128		9	
QR	15		258	
RS		143	9	
SP	0			276

5.b. Describe in detail procedure of taking bearing of a line with theodolite.   (05)
5.c. Explain in detail the use of theodolite as a level   (05)
5.d. Attempt following: (05)
    (i) One hectare of an area is equal to _____
   (ii) What will be the curvature correction for a distance of 1000m?
   (iii) The magnetic bearing of sun at noon is 178º, what is magnetic declination at that place?
   (iv) Define offset
    (v) Sketch symbol for Lake in contour map

6. a. For a closed traverse ABCD, due to some obstructions, it was not possible to observe bearings
of lines BC & CD. Calculate missing bearings.   (07)

Line	AB	BC	CD	DA
Length in m	500	1200	880	1050
W C B	60º	?	?	310º

6. b. Explain working of Amsler polar planimeter.   (05)
6. c. Write short note on: (08)
(i) Trapezoidal and parabolic rule for area calculation.
(ii). GTT.

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