(Time: 3 Hours) [Marks: 80]

Please check whether you have got the right question paper.
1. Question number 1 is compulsory.
2. Solve any 3 questions out of remaining.
3. Assume data wherever necessary and clearly mention the assumptions made.

Attempt sub questions in order.

1		Compare any five:	**20**
	a	Dumpy level and Auto level.	
	b	GTS bench marks and Permanent bench mark.	
	c.	Electronic theodolite and conventional theodolite.	
	d.	Plane survey and Geodetic survey.	
	e.	Surveyors compass and Prismatic compass.	
	f.	Direct reading vernier and Retrograde vernier.	

2	**a**	What is magnetic declination and types of variations in declination?	**08**
	b	Explain traversing with chain and compass having five stations and precautionary measures to be taken during traversing.	**08**
	c.	Discuss various errors in compass surveying.	**04**

3 **a.** The following reciprocal levels were taken during testing of a dumpy level. Is the line of collimation in adjustment? What should be the staff reading on A during the second set up of the instrument to make line of collimation truly horizontal? **08**

Level at	Staff readings on	
	A	B
A	1.37	2.105
B	1.14	1.765

b. A level is set up at a station A. the reading held on staff held at B which is at a distance of 540m is 3.625m. The same staff when held at C, 360m away from A reads 2.376m. Calculate the true difference of level B and C allowing for curvature and refraction. **02**

c. Write detailed note on: (i) Reciprocal leveling. (ii) Fly leveling. **10**

4 **a** Calculate independent co-ordinates and area of the closed traverse ABCD from the following tabulated latitudes and departures. **08**

Side	Latitude in m		Departure in m	
	N	S	E	W
AB	107.4		62	
BC		122.6	102.9	
CD		77.9		45
DA	93.1			119.9

b. Write exhaustive note on GTT. **06**

c. Explain reiteration method of horizontal angle measurement. **06**

5	**a.**	Explain procedure of calculating volume from spots levels with suitable example.	**06**
	b.	Define contour, contour interval and horizontal equivalent. Explain graphical method of interpolation of contours with suitable example.	**08**
	c.	Discuss orientation methods in PTS	**06**
6	**a.**	Explain zero circle in case of measuring irregular area on plan using Amsler Polar planimeter	**05**
	b.	Describe procedure of PTS by traversing method for a four sided closed traverse.	**05**
	c.	Sketch conventional symbols used in surveying for: (i) North direction, (ii) Lake , (iii) Cutting and (iv) Road and rail level crossing	**04**
	d.	Define ranging and its necessity. Explain reciprocal ranging.	**06**

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