CEL 271 Elements of Surveying

Major Examination: Total Marks 40 (major exam weightage: 30%) **Time: 2Hrs**

Please do not ask any doubt. Any missing data / info may suitably be assumed and highlighted in the answer book. If there is any fault with any question, you may mention that in your answer script. I shall consider that while evaluating the scripts.

EXCHANGE OF ANY MATERIAL IS NOT ALLOWED DURING THE EXAMINATION

1. A simple circular curve is to be set on the ground by the Tacheometric method. Radius of the curve is 180 m and the total deflection angle (Δ) 30°. Calculate the lengths of back tangent, forward tangent, long chord and the length of the curve. Calculate the other parameters necessary for setting the curve on the ground and show the details on a sketch. The tacheometric multiplication and addition constants are 100.01 and 0.02 respectively.
(10 marks)

2. Points A, B and C are on the ground. It is required to estimate the area within ΔABC using a plain table. After reaching the area you realized that you have forgotten to bring the trough compass and measuring tape along with you. Other accessories like plain table with a drawing sheet fixed on it, an alidade, and spirit level are all available. Find the site plan overleaf. Explain how will you proceed (give the step by step procedure) **(10 Marks)**

3. The following are the fore and back bearings of the sides of a closed traverse ABCDEA taken with a prismatic compass. Calculate the interior angles of the traverse. Do you suspect 'local attraction' at any of the station ? Why ? Is there any experimental error ? why ? **(6 marks)**

Sides	Fore bearing	Back bearing
AB	150°15'	330°15'
BC	20°30'	200°30'
CD	295°45'	115°45'
DE	218°00'	38°00'
EA	120°30'	300°30'

4. A tilting level was used to estimate the level difference between points A and B. Point A and point B are away from the tilting level by 1.500km and 1.650km respectively. Corresponding staff readings are +2.345m and -1.545m. Estimate accurately the level difference between A and B. The readings are taken when the atmospheric condition was calm and uniform.
(4 marks)

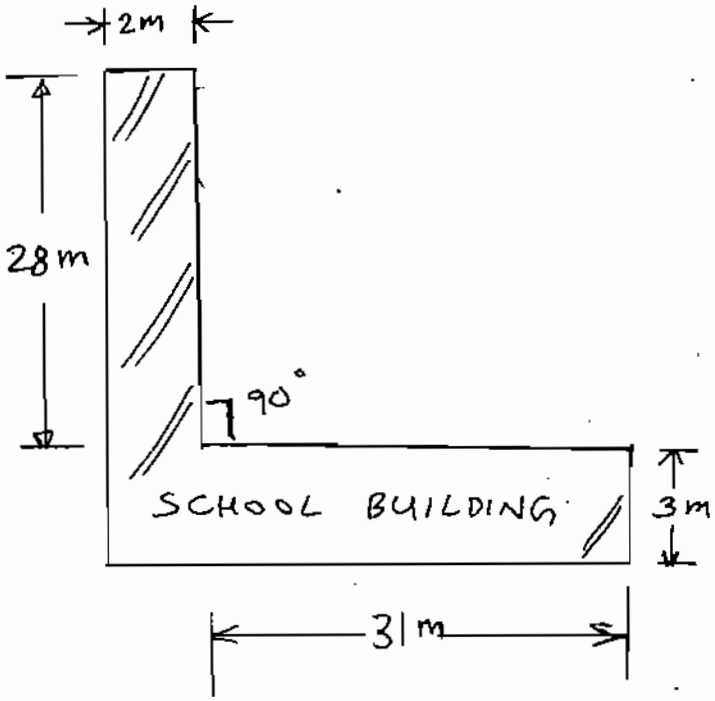
5. Calculate the horizontal distance and level difference between the points P and Q. A vernier theodoloite was used at two stations (O1 and O2) to take readings to P and Q. Readings taken are given in Table 1. The line joining the theodolite stations (O1 and O2) is 69.40m long and is approximately parallel to the line joining the points P and Q. **(10 marks)**

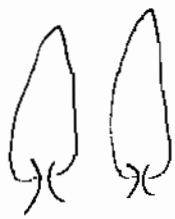
B

C

A

Plane Ground





Name:

No. :

Table :1

Theodolite		FACE LEFT - RIGHT SWING							FACE RIGHT - LEFT SWING						
At	To	A	B			C	D		A	B			C	D	
O_1	O_2								0° 0' 00"	0' 00"					
	P	0° 0' 00"	0' 00"			+0° 55' 20"	+0° 55' 00"		96° 25' 00"	25' 20"			+0° 44' 00"	+0° 44' 40"	
	Q	55° 24' 00"	24' 40"			+0° 32' 40"	+0° 33' 00"		42° 44' 20"	45' 20"			+0° 23' 20"	+0° 23' 00"	
	O_2	98° 10' 40"	10' 40"						0° 0' 00"	0' 00"					
	P	0° 0' 00"	0' 00"												
O_2	Q								0° 0' 00"	0' 00"					
	O_1	0° 0' 00"	0' 00"						86° 51' 40"	51' 20"					
	P	39° 36' 20"	35' 40"						47° 14' 20"	5' 40"					
	Q	87° 06' 20"	06' 40"						0° 0' 00"	0' 00"					
	O_1	0° 0' 00"	0' 00"												

DISTANCE $O_1 O_2$ = 69.40 m