

CVL 111 Elements of Surveying

Minor 1 Examination: Total Marks 25 Time: 1 Hr

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. That shall be considered while evaluating the answer scripts.

Provide sketches where ever it is possible. Use the tables provided in the question paper. Write your name and roll number and return the question paper inside the answer booklet.

You should not keep your mobile / cell phone with you during the examination

EXCHANGE OF CLACULATOR / ANY MATERIAL IS NOT ALLOWED

1. Compass surveying:

- A. If the Forward Bearing of line PQ is $320^{\circ} 19' 20''$, calculate its Backward Bearing (in Quadrant Bearing). (2 marks)
- B. ABCDA is a closed traverse. If the bearings of lines BA and BC are $62^{\circ} 29' 40''$ and $318^{\circ} 41' 50''$ respectively, estimate the included traverse angle at B. (2 marks)
- C. ABCDA is another closed traverse. The bearings of lines AB and BA are $80^{\circ} 15' 20''$ and $260^{\circ} 14' 00''$ respectively. The bearings of lines BC and CB are $130^{\circ} 25' 40''$ and $310^{\circ} 25' 40''$ respectively. With this given information, bearing of which line is likely to be incorrect? Why? Estimate its correct bearing. (4 marks)
2. A theodolite was used to find out the horizontal distance between the points P and Q. The theodolite was kept at two stations O_1 and O_2 for taking the readings and the readings are given in table 1. The line joining O_1 and O_2 is 61.40 m long and is *approximately* perpendicular to the line joining P and Q. Points O_1 and O_2 are on opposite sides of the line joining P and Q. Calculate the horizontal distance between P and Q. (8 marks)
3. Contours are to be drawn for a contour interval of 2.0 m. The spot levels of points A & B are +77.800m and +83.200m. These points are 16m apart (horizontal distance). Estimate the points where the contours cut the line AB. (4 marks)
4. A fly leveling (Rise & Fall Method) was carried out near the reservoir of a dam to find out the probabilities of submergence of a pumping station. The observations given in Table. Do you think the pumps will be in danger during floods? What is the level difference between the floor and the roof of the pumping station? How much is the error involved in this work? If the total distance involved in this surveying is 600 m, comment on the accuracy with which this work has been carried out. (05 marks)

1/3

Rise & Fall !!

Stations	Leveling Staff Readings in m			RL	Remarks
	BS	IS	FS		
A	1.285			50.000 ✓	BMI of RL +50.000
B	1.205		1.005	50.280 ✓	CP
C		0.035		51.450 ✓	Floor of pumping station
D		-2.345		53.830 ✓	BM2
E	1.205		-2.045	53.400 ✓ 530	CP-Below the Roof of pumping station
F	-2.005		1.035	53.700 ✓	CP
G		2.005		49.690 ✓	High water level in reservoir
A			1.665	49.970 ✓	

$$\begin{aligned}
 \text{Check} &= \sum FS - \sum BS = \text{Last RL} - 1^{\text{st}} \text{RL} \\
 &= 1.66 - 1.69 = 49.970 - 50.00 \\
 &= -0.03 = 0.03 \checkmark
 \end{aligned}$$

$\sum R - \sum F$

Theodolite problem: To estimate the horizontal distance between points P and Q. Both points are inaccessible from the Instrument stations O1 & O2.

Given: O1O2 is approximately perpendicular to PQ; and are on opposite sides of PQ, Distance O1O2 = 61.40m.

Theodolite		FACE LEFT READINGS - Right Swing				FACE RIGHT READINGS - Left Swing				Average Angles	
at	to	A	B	Mean	included angle	A	B	Mean	included angle	Horizontal	
	P	0° 0' 00"	0' 00"	0° 0' 01"		0° 0' 00"	0' 00"	0° 0' 01"	angle		
O1	O2	52° 4' 00"	4' 20"	52° 4' 16"	52° 4' 10"	52° 4' 30"	4' 10"	52° 4' 20"	52° 4' 20"	52° 4' 15"	Q1
	Q	88° 45' 20"	45' 20"	88° 45' 20"	36° 41' 10"	88° 45' 30"	45' 10"	88° 45' 20"	36° 41' 0"	36° 41' 5"	Q2
	P	360° 0' 00"	0' 00"	360° 0' 01"	271° 14' 40"	360° 0' 00"	0' 00"	360° 0' 01"			
	Q	0° 0' 00"	0' 00"	0° 0' 01"		0° 0' 00"	0' 00"	0° 0' 01"			
O2	O1	32° 22' 40"	22' 20"	32° 22' 30"	32° 22' 30"	32° 22' 30"	22' 10"	32° 22' 20"	32° 22' 20"	32° 22' 25"	Q3
	P	85° 6' 00"	6' 00"	85° 6' 01"	52° 43' 30"	85° 6' 00"	6' 20"	85° 6' 10"	52° 43' 50"	52° 43' 40"	Q4
	Q	360° 0' 00"	0' 00"	360° 0' 01"	274° 54' 01"	360° 0' 00"	0' 00"	360° 0' 01"	274° 53' 30"		

Remarks