



ZIMBABWE

HIGHER EDUCATION EXAMINATIONS COUNCIL

NATIONAL DIPLOMA

IN

IRRIGATION ENGINEERING

**SUBJECT: Survey For Irrigation
Development**

PAPER NO: 579/S07

DATE: 01 December 2009

TIME: 0900 – 1200 hours

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

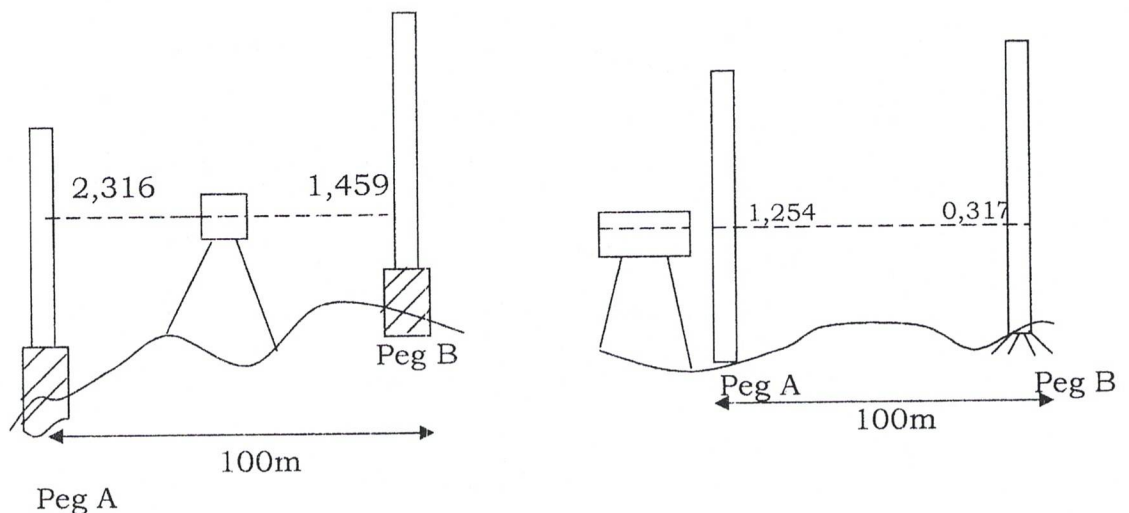
- 1. Answer any 4 (four) questions.**
- 2. All questions carry equal marks.**
- 3. Answer each question on a fresh page.**

QUESTION 1

- a) Discuss the difference between geodetic and plane surveying. (5 marks)
- b) Discuss the reasons for listing date, weather station instrument and part information in field notes. Explain why field notes should be original and without errors. (5 marks)
- c) With the aid of diagrams, define the terms vertical line, horizontal plane, datum, mean sea level, horizontal line and elevation. (10 marks)
- d) Describe the three types of error that can influence any measurement process. Give an example of each type. (5 marks)

QUESTION 2

- a) Surveying techniques are used to both determine the Location of existing features on a site (mapping) and to establish the position of next features (setting out). Describe each of these tasks and illustrate by giving appropriate examples. (5 marks)
- b) A surveyor decides to conduct a two-peg test on a level before doing some set-out work on a building site. What will this test achieve? (5 marks)
- c) The results of the two-peg test mentioned above are shown below, perform the necessary calculations and provide an interpretation of these results. (5 marks)



QUESTION 3

a) The following table shows an extract from a surveyor's field book, completed during a leveling survey of a next building site. He has asked if you can complete the following tasks before providing the final reduced levels to the builder.

- Copy the data to your answer script
- Reduce the levels using the rise and fall method, apply all arithmetic checks.
- Compare the misclosure to the third order standard (distance 800m)
- Adjust the Rhs to eliminate the misclosure. (15 marks)

Back	Inter	Fore	Rise	Fall	RL	Comment
1,74					50,00	BM A
3,14		2,98				Charge Point 1
	2,37					Footing at A
	0,88					Footing at B
1,25		0,53				Change Point 2
	1,70					Drain Insert
2,42		3,51				Change Point 3
		1,45				BMA

b) Why is it important to carryout a line survey before setting irrigation pipes? (5 marks)

c) List all the processes done when carrying out a traverse. (5 marks)

QUESTION 4

a) The following table shows partial dimensions for a four-sided traverse. The side dimensions are expressed as a mixture of polar and rectangular coordinates. You are required to complete the table.

Line	Bearing	Distance (m)	$\Delta Y(m)$	$\Delta X(m)$
AB	41°	103,30		
BC			88,09	-1,54
CD			-6,68	-76,41
DA	270°	149,16		

b) Assume the coordinates for point A are (100,100). Calculate the coordinates of the other three points. (8 marks)

c) Suppose that the distances in the above table were slope distances. Describe the impact of failing to reduce the distance to horizontal and outline a procedure you could use to perform this reduction. (7 marks)

QUESTION 5

A reservoir is to be constructed in a river valley by building an earth dam across it. The entire area that will be covered by the reservoir has been contour drawn 1.5 interval the lowest point in the reservoir is at a reduced level 249 above datum whilst the top water level will not be above level of 264.5m. The area is shown in the table. Estimate by the use of trapezoidal rule the capacity of the reservoir when full. If the volume is reduced by 25% due to a draught, what will be the reduced level of the water surface?

(25 marks)

Contour	Area (m ²)	Volume Increment	Volume
250	1874	-	
251,5	6355	6 171,75	
253	11070	13 068,75	
254,5	14152	18 916,5	
256	19310	25 096,5	
257,5	22605	31 436,25	
259	24781	35 539,5	
260,5	26349	38 347,5	
262	29830	42 134,25	
263,5	33728	47 668,6	
265	37800	53 646	

...../rg