NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCES

DEPARTMENT OF APPLIED PHYSICS

BSc HONOURS IN EARTH SCIENCES

SURVEYING 1

SES 2104

First Semester Examination Paper

December 2024

This examination paper consists of 3 pages

Time Allowed:	3 hours
Total Marks:	100
Special Requirements:	Scientific Calculator, Ruler
Examiner's Name:	C. Makura

INSTRUCTIONS

ANSWER ALL QUESTIONS IN SECTION A AND ANY THREE QUESTIONS FROM SECTION B.

MARK ALLOCATION

QUESTION	MARKS
1.	40
2.	20
3.	20
4.	20
5.	20
Maximum possible mark	100

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SECTION A

QUESTION 1

a. Find the missing readings indicated by * and apply usual checks in the level book page given below. [20]

Point ID	B.S	I.S	F.S	RISE	FALL	R.L	Remark
1	3.125					*	B.M
2	*		*	1.325		125.505	C.P
3		2.32			0.055	*	
4		*		*		125.850	
5	*		2.655		*	*	C.P
6	1.62		3.205		2.165	*	C.P
7		3.625			*	*	
8			*	*		123.090	T.B.M

b. What are the different sources of error in levelling and explain them in detail? [4]

c. State the Trapezoidal Rule and the Simpson's Rule for calculating areas. Why is the Simpson's Rule recommended for calculating areas of irregular figures as compared to the Trapezoidal Rule? [4]

d. A sand hill within the areas of contour line at the site for the reservoir and along the face of the proposed dam as given below.

Contour	152	150	148	146	144	142	140	138	136
Area (m)	300	510	620	740	580	720	570	630	900

Take 152m and 136m as top of the sand hill and bottom level of the reservoir respectively, find

i) Volume of soil to be removed from sand hill by Trapezoidal method. [6]

ii) Volume of soil to be removed from sand hill by Prismoidal method. [6]

SECTION B

QUESTION 2

a. Distinguish between True Meridian and Magnetic Meridian. [3]

b. Discuss in detail about the adjustments of Surveyor's compass. [4]

c. The following bearings were observed with a compass. Calculate the interior angles. [8]

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LINE	F.B
AB	60°30'
BC	122°0'
CD	46°0'
DE	205°30'
EA	300°0'

d. Discuss about the errors in compass survey. [5]

QUESTION 3

a. A 20 m steel tape was standardized on flat ground at a temperature of 20°C under a pull of 15 kg. The tape was used in catenary at a temperature of 30°C under a pull of 10 kg. The cross sectional area of the tape is 22 mm² and its total weight is 400 gm. The young's modulus and coefficient of thermal expansion for steel are 21000 kg/mm² and 11 x 10⁻⁶ / °C respectively. Find the correct distance. [8]

b. A tape of nominal length 100m when standardized was found to be 101m. If the recorded length of the line AB measured with this tape was 653m. Calculate the true length of line AB. [4]

c. Explain what is meant by the term taping and briefly discuss why steel tapes are standardized. [4]

d. How will you correct errors in tape which occurs due to change in temperature? [2]

e. What is meant by sag correction? [2]

QUESTION 4

a. Briefly explain the principles of surveying? [5]
b. Write brief notes on types of errors. [6]
c. Explain in detail the classifications of surveying. [9]

QUESTION 5

a. Explain with neat sketches the radiation and intersection method in plane table surveying. [8]

b. Describe in detail about the following EDM instruments.
   (i) Microwave instrument [4]
   (ii) Visible light instrument. [4]

c. Give a list of the permanent adjustments of a transit theodolite. [4]

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