



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## UNIVERSITY EXAMINATIONS 2023/2024

FIRST YEAR SECOND SEMESTER EXAMINATION FOR THE DIPLOMA IN CIVIL ENGINEERING,  
DIPLOMA IN WATER AND SANITATION ENGINEERING AND DIPLOMA IN BUILDING CONSTRUCTION

### ECV 2103 ENGINEERING SURVEY I

DATE: APRIL 2024

TIME: 3 HOURS

#### **INSTRUCTIONS TO THE CANDIDATE**

*This paper consists of two sections; SECTION A and B*

*Answer ALL the questions in section A and any THREE in section B in the answer-booklet provided.*

*Marks for each question are indicated in the brackets*

*Candidate should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing*

*Use scientific calculators where necessary.*

*Do not write in this question paper.*

## **SECTION A**

1. What is levelling in engineering survey? (2mks)
2. Define the following terms:
  - i. Contour interval
  - ii. Horizontal equivalent (2mks)
- 3) What are the objectives of a preliminary survey? (4mks)
- 4) Name the different types of levelling in surveying. (4mks)
- 5) What is the significance of the term "rise and fall" in leveling surveys? (4mks)
- 6) Describe the two methods used for contouring. (4mks)
- 7) List the types of levelling machines used in surveying. (4mks)
- 8) Explain the role of a benchmark in ordinary spirit leveling. (4mks)
- 9) Define contouring and explain its importance in construction projects. (4mks)
- 10) Describe the main types of benchmarks used in levelling. (4mks)
- 11) List at least four elements of a profile. (4mks)

## **SECTION B**

- 1) The following consecutive readings were taken with 4m leveling staff on a continuously slopping ground at 30m intervals.

0.906 (on A), 1.745, 2.345, 3.125, 3.725, 0.545, 1.390, 20.55, 2.955, 3.455, 0.595, 1.015, 1.850, 20655, and 2.945 (on B)

The R.L of A was 395.500. Calculate the R.Ls of different points and find the gradient of line AB.

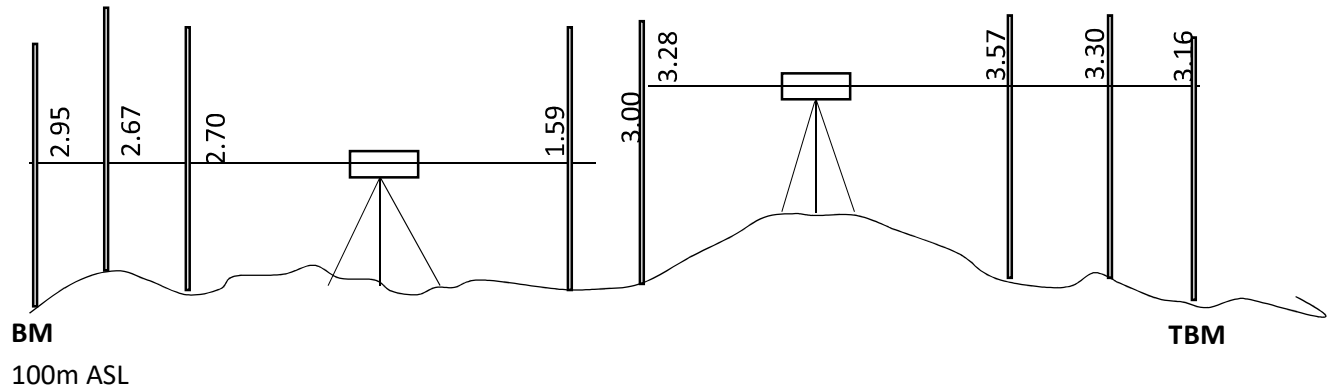
(20mks)

- 2) a) Determine the missing data and carry out the arithmetic checks.

<i>Station</i>	<i>B.S.</i>	<i>I.S.</i>	<i>F.S.</i>	<i>Rise</i>	<i>Fall</i>	<i>HC</i>	<i>RL (m)</i>
1.	?					23.18	20.00
2.		1.59		?			?
3.	0.28		?		1.08	?	?
4.	?		4.00		?	18.33	?
5.		?			2.19		?
6.		?		?			15.72
7.			2.95		?		?

(20mks)

3. The following staff readings were observed at proposed road center line, book the readings in a standard format and reduce them by rise and fall method (apply necessary arithmetic checks and find the gradient between BM and TBM (given the horizontal distance between the two stations is **125m**)). (20mks)



- 4) In details, describe the process of setting up a dumpy level for ordinary spirit leveling. Include the necessary equipment, and the steps involved. (20mks)