



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF  
SCIENCE AND TECHNOLOGY  
(MMUST)**

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS  
2022/2023 ACADEMIC YEAR**

**SECOND YEAR SECOND SEMESTER EXAMINATIONS**

**FOR THE DEGREE  
OF  
BACHELOR OF TECHNOLOGY EDUCATION IN CIVIL AND  
BUILDING TECHNOLOGY**

**COURSE CODE: TEB 222**

**COURSE TITLE: SOIL MECHANICS I**

**DATE: 14<sup>TH</sup> APRIL 2023 DURATION: 8 – 10 A.M**

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**INSTRUCTIONS:**

1. This paper consists of **FIVE** questions
2. Answer question **ONE** and **ANY** other **THREE** questions
3. All symbols have their usual meaning unless otherwise stated

MMUST observes **ZERO** tolerance to examination cheating

This Paper Consists of 3 Printed Pages. Please Turn Over.

**Question ONE {COMPULSORY (25 marks)}**

- Explain how Time, Climate and Topography affect the rate of soil formation (6 Marks)
- Give two uses of the knowledge on soil particles and relative proportions in a soil type (2 Marks)
- For Engineering purposes, give 3 clay minerals of interest outlining their contribution to the behavior of clay under saturation (6 marks)
- Give the two broad categories used in soil classification using the Unified Soil Classification System(USCS) (2 Marks)
- An undisturbed soil sample specimen has a volume of  $200\text{cm}^3$  and weighs 400g. After drying the sample in an oven at  $105^\circ\text{C}$  for 24 hours, the weight reduced to 360g. Assuming 2.65 specific gravity, determine the void ratio and porosity of the soil. (9 Marks)

**Question TWO (15 marks)**

- Differentiate Physical Weathering and Mechanical Weathering giving one example of each (4 marks)
- A soil sample of mass 640grams was shaken through a nest of sieves and the following results were obtained;

Sieve No.	Opening(mm)	Mass Retained
4	4.75	0
10	2.00	18.2
20	0.85	102.5
40	0.43	115.8
100	0.15	191.6
200	0.08	206.4
Pan		5.2

Present the particle size distribution in a semi logarithmic plot of % finer versus particle size. Determine the effective size and the Coefficient of Uniformity of the soil sample. (11 marks)

**Question THREE (15 marks)**

- Outline the importance and use of the soil phase diagram (2 marks)
- Differentiate cohesive and non- cohesive soils giving examples of each (4 marks)
- A Laboratory test on a soil sample indicated that the Plastic Limit (PL) =20.6% and the Liquid Limit (LL) = 30.4%. Additions results are as given below;

Sieve No.	Opening(mm)	% Passing
4	4.75	98.00
40	0.43	38.50
200	0.08	26.50

A visual inspection of the sample showed gravel larger than 5mm. Classify the soil using USCS (8 Marks)

**Question FOUR (15 marks)**

- a) Explain the following physical properties of soil; Void Ratio  $e$ , Porosity( $n$ ) and Water content ( $w$ ) (3 marks)
- b) Give at least 3 limitations of sieve analysis (3 marks)
- c) Give three purposes of soil compaction (3 marks)
- d) Explain how particle size, void ratio and temperature may affect permeability and hydraulic conductivity of a soil mass. (6 marks)

**Question FIVE (15 marks)**

- a) Differentiate between the Degree of Saturation and the Saturated Unit Weight of soil (2 marks)
- b) Explain why it's usually challenging to get representative samples for sieve analysis from a stock pile (2 marks)
- c) Explain 3 factors that affect soil compaction (3 marks)
- d) Name the two forces that contribute to stress in a soil mass (2 marks)
- e) Explain 3 factors that affect permeability of soils (6 marks)



50



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**UNIVERSITY EXAMINATIONS 2022/2023 ACADEMIC YEAR**

**THIRD YEAR SECOND SEMESTER EXAMINATIONS**

**FOR THE DEGREE  
OF  
BACHELOR OF TECHNOLOGY EDUCATION IN CIVIL AND  
BUILDING TECHNOLOGY**

**COURSE CODE: TEC 302**

**COURSE TITLE: WORKSHOP ORGANIZATION AND  
MANAGEMENT**

**DATE: 13<sup>TH</sup> APRIL 2023**

**TIME: 8 – 10 A.M**

**INSTRUCTIONS:**

1. This paper contains FIVE questions
2. **Question ONE (1) is Compulsory and ANY other Two**
3. Marks for each question are indicated in the parenthesis.
4. Examination duration is **2 hours**

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 2 Printed Pages. Please Turn Over.

### Question 1.

Use well labeled sketch to show the wood workshop outline and layout of various tools and equipment, gang ways, and everything to convenience work out put that is housed in the workshop of a Technical Training institute. (26 marks)

### Question 2.

- i). Explain the term plant layout as used in workshop organization and management. (5 marks)
- ii). Mention *nine* objectives of a good plant layout. (9 marks)
- iii). Mention *four* types of plant layout. (4 marks)
- iv). Significance of location of a plant layout is important to consider. Mention three points in support of the statement. (4 marks)

### Question 3.

- i). Mention five advantages and five disadvantages of product Layout as a type of plant layout: (10 marks)
- ii). Mention five advantages and five disadvantages of process (functional) Layout as a type of plant layout: (10 marks)
- iii). process (functional) layout is also suitable in some cases. Mention any two such cases. (2 marks)

### Question 4.

- i). Explain the meaning of '**workplace safety is important**'. (8marks)
- ii). State four potential sources of danger in a workshop. (4 marks)
- iii). Outline the meaning of the two terms as used in the study:
  - a). Workshop organization (4 marks)
  - b). Workshop management (6 marks)