



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

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2021 / 2022 ACADEMIC YEAR

THIRD YEAR SEMESTER TWO MAIN EXAMINATIONS

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

COURSE CODE: TEB 312

**COURSE TITLE: CONSTRUCTION TECHNOLOGY &
PRACTICES II**

DATE: THURSDAY 21ST APRIL 2022 TIME: 12.00 – 2.00 PM

INSTRUCTIONS:

1. This paper consists of **FOUR** questions.
2. **ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS.**
3. Marks for each question are indicated in the parenthesis.
4. The paper is strictly 2 hours.
5. Bonus marks shall be awarded for creative and well thought answers.

MMUST observes **ZERO** tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over.

Question ONE (30 Marks)

- a) What is a floor? Differentiate between single storeyed building and basement floors. [3 Marks]
- b) Differentiate between sub – floor and paving. [2 Marks]
- c) Explain the following terms as used in the floor construction. [3 Marks]
- I. Floor system
 - II. Underlayer
 - III. Bedding
- d) What is an Arch? Highlight TWO application areas of Arches. [2 Marks]
- e) With the aid of a well-labelled diagram, outline the importance of the following parts of an arch system. [3 Marks]
- i. Abutment
 - ii. Keystone
 - iii. Crown
- f) The county Govt of Kakamega intends to install water supply system to the interior residents who have not been connected to the piped water system. The water department decides to sink boreholes to provide the necessary water supply as opposed to using hand-dug wells. As a water expert, explain **THREE** reasons to justify why sinking of borehole is most economical to the concerned water department in the long run. [3 Marks]
- g) Using diagrams briefly **describe** THREE types of retaining walls commonly used. [3 Marks]
- h) What is scaffolding? Highlight **THREE** uses of scaffolding in construction works. [4 Marks]
- i) Wastewater disposal is a common challenge in the developing countries where policies are not being strictly enacted. As a wastewater specialized, state and explain **FOUR** wastewater contaminants that adversely pollutes the water bodies. [4 Marks]
- j) Outline **THREE** objectives of wastewater treatment before discharging into the natural water bodies. [3 Marks]

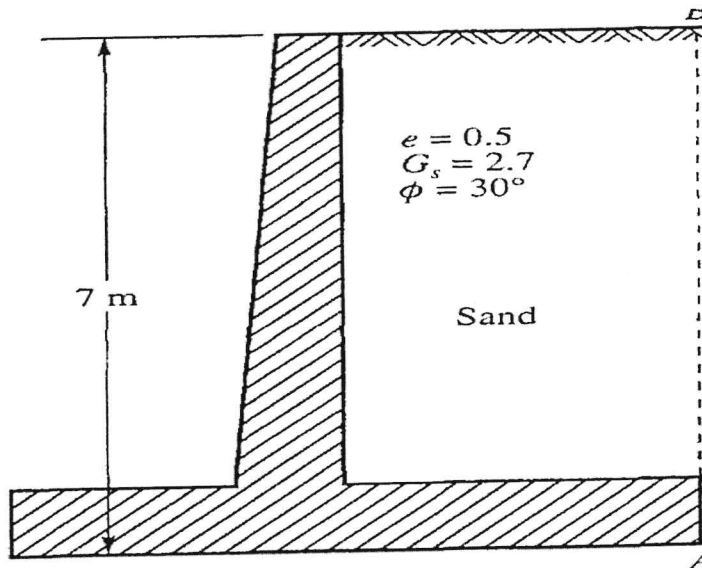
Question TWO (20 marks)

- a) Differentiate between a heading course and a stretcher as used in Masonry works. [2 Marks]
- b) During an external industrial attachment, the ETC 3rd year group attached to a building construction site in Kajiado town came across “**bond, header and bull nose**” terminologies often used by the construction workers. As the field attachment supervisor to the students and an expert in the masonry field, explicitly explain to the students the meaning of the terms as used in masonry construction works. [3 Marks]
- c) Differentiate between a stone and stone masonry as used in construction technology. [3 Marks]
- d) Differentiate between the following terms as used in Stone Masonry. [4 Marks]
- (i) Rubble masonry and ashlar masonry
 - (ii) Un-coursed rubble masonry and flint rubble masonry
 - (iii) Ashlar rough masonry and ashlar chamfered masonry

- e) Differentiate between the following bonds as used in brick works. [4 Marks]
 (i) Stretching bond and Dutch bond
 (ii) Heading bond and Raking bond
- f) Outline FOUR comparisons between brick and stone masonry for use in construction. [4 Marks]

Question THREE (20 Marks)

- a) What is a retaining wall? [1 Marks]
- b) Briefly describe THREE methods of failure of retaining walls that need to be considered during the design process. [3 Marks]
- c) Explain the following terms as used in lateral earth pressure of backfill. [3 Marks]
 (i) Pressure at rest
 (ii) Active earth pressure
 (iii) Passive earth pressure
- d) Outline THREE assumptions in Rankine's Theory of lateral earth pressure. [3 Marks]
- e) A cantilever retaining wall of 7m height shown below retains sand backfill material. The properties of the sand are: $e = 0.5$, $\phi = 30^\circ$ and $G_s = 2.7$ (also see the figure below). Using Rankine's theory, determine the active earth pressure at the base and the resultant active force when the backfill is.
 i. Dry [10 Marks]
 ii. Saturated
 iii. Submerged
 iv. Determine the total water pressure under the submerged condition.



Question FOUR (20 marks)

- a) What is water distribution system? Briefly outline any **FOUR** requirements of a good water distribution systems. **[3 Marks]**
- b) A new water treatment plant is to be constructed at River Isikhu by KACWASCO in order to provide 24/7 water supply to MMUST. The planning of the project involved water specialists from the CSE and estates department to ratify the need for MMUST to have its own uninterrupted water supply. As a water specialist representing the university, outline to the planners any **THREE** reasons that would necessitate MMUST having 24/7 water supply. **[3 Marks]**
- c) Based on the planning described in question 4b above, outline to the planning committee **THREE** main goals for drinking water treatment. **[3 Marks]**
- d) Differentiate between water harvesting and rainwater harvesting. **[2 Marks]**
- e) Describe any **THREE** goals of rainwater harvesting. **[3 Marks]**
- f) What is watershed management? Outline **FOUR** objectives of watershed management. **[3 Marks]**
- g) Describe how the following practices help improves the watershed management. **[3 Marks]**
- i. Vegetation cover
 - ii. Afforestation
 - iii. Contour trenches