



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

**MAIN CAMPUS**

**UNIVERSITY EXAMINATIONS**

**2021/2022 ACADEMIC YEAR**

**3<sup>RD</sup> YEAR SEMESTER TWO SPECIAL/SUPPLEMENTARY  
EXAMINATIONS**

**FOR THE DEGREE  
OF  
BACHELOR OF EDUCATION TECHNOLOGY IN CIVIL AND  
STRUCTURAL ENGINEERING**

**COURSE CODE: TEB 312**

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

**DATE: 4<sup>TH</sup> AUGUST 2022**

**TIME: 3 P.M – 5 P.M**

**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.

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 sub-floor? Differentiate between ground floor and suspended floors. [3 Marks]
- b) Differentiate between flooring and floor covering. [2 Marks]
- c) Explain the following terms as used in the floor construction. [3 Marks]
- I. Base course
  - II. Topping
  - III. Screeds
- d) What is an Arch? Highlight the main function of an Arch. [2 Marks]
- e) With the aid of a diagram, differentiate between a semi-circular arch and a segmental arch. [3 Marks]
- f) The county Govt of Kakamega intends to install water supply system to the slum areas within her jurisdiction. The water officers approach you to advice on the type of system to adopt. As an expert, you propose the adoption of **dead – end system**. Outline to the officers (using well – labelled diagram) why you chose on this kind of system, its advantages and disadvantages. [3 Marks]
- g) In an on-going construction site, a worker fell while descending a step ladder used to access a 30" counter and fractured his ankle. As a site safety officer on site, outline **THREE** step ladder safety tips that the workers need to be trained to consider while using ladders. [3 Marks]
- h) What is scaffolding? Highlight **THREE** uses of scaffolding in construction works. [4 Marks]
- i) Water works prefers collecting water for distribution from the intake structures which are in the valleys, pump it for treatment uphill and then distribute to the final users via gravity. With the aid of a well – labelled diagram, describe the gravity system of water distribution. [4 Marks]
- j) Outline **THREE** assumptions in Rankine's Theory of Lateral Earth Pressure. [3 Marks]

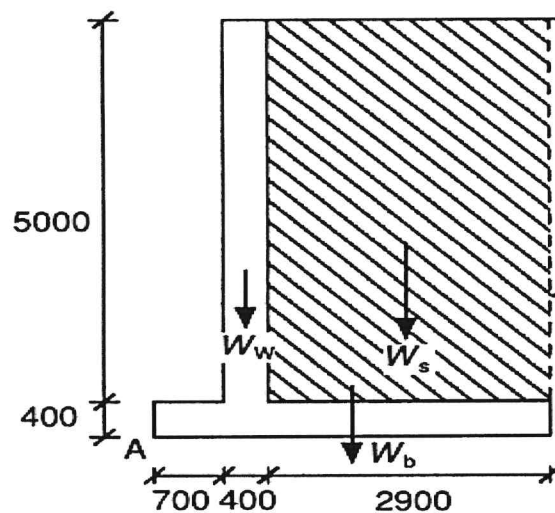
**Question TWO (20 marks)**

- a) Differentiate between a stretching course and a header as used in Masonry works. [2 Marks]
- b) During the external industrial attachment, the ETC 3<sup>rd</sup> year group attached to a building construction site came across "**bond, course and brick bats**" terminologies often used by the construction workers. As an expert in the masonry field, explicitly explain to the students on attachment the meaning of the terms as used in masonry construction works. [3 Marks]
- c) Differentiate between the following terms as used in Stone Masonry. [4 Marks]
- (i) Rubble masonry and ashlar masonry
  - (ii) Coursed rubble masonry and polygonal rubble masonry
  - (iii) Ashlar fine masonry and ashlar chamfered masonry
- d) With the aid of well labelled diagrams, differentiate between the following bonds as used in brick works. [4 Marks]
- (i) Stretching bond and English bond

- (ii) Heading bond and Flemish bond
- e) Outline **THREE** factors that enhances the strength of rubble masonry units. [3 Marks]
- f) What is a composite wall? Outline **THREE** reasons that would necessitate the adoption/choice of composite masonry for building purposes. [4 Marks]

**Question THREE (20 Marks)**

- a) What is a retaining wall? [1 Marks]
- b) Using diagrams briefly **describe** the following types of retaining walls. [6 Marks]
- Gravity walls
  - Cantilever walls
  - Counterfort walls
- c) The cantilever retaining wall shown below is backfilled with granular material having a unit weight,  $\rho$ , of  $20 \text{ kNm}^{-3}$  and an internal angle of friction,  $\phi$ , of  $30^\circ$ . Assuming that the allowable bearing pressure of the soil is  $120 \text{ kNm}^{-2}$ , the coefficient of friction is 0.4 and the unit weight of reinforced concrete is  $24 \text{ kNm}^{-3}$ . [13 Marks]
- Determine the factor of safety against sliding
  - Determine the factor of safety against overturning
  - Calculate the ground bearing pressure.



**Question FOUR (20 marks)**

- a) What is water distribution system? Briefly outline **TWO** purposes of water distribution system. **[3 Marks]**
- b) A new water distribution system is to be installed in Sichirai village to serve the residents with water from the KACWASCO. As a water specialist in the area, you are contracted to advice the KACWASCO on the best distribution system to serve the villagers. Outline to the KACWASCO any **FOUR** requirements that they need to put into consideration in order to install good distribution systems? **[4 Marks]**
- c) KACWASCO intends to construct a new storage reservoir to enhance their water supply services to the clients to certify one of their supply objectives highlighted in their service charter. The company has contacted you to advice on the sizing of the storage reservoir to meet their demand requirements. As a water expert, outline **THREE** storage parameters to be considered in order to obtained the total storage capacity of the distribution reservoirs. **[3 Marks]**
- d) What is water harvesting? Briefly explain what is meant by rainwater harvesting. **[3 Mks]**
- e) Describe **THREE** ways in which rainwater harvesting can be achieved. **[3 Marks]**
- f) What is watershed management? **[1 Marks]**
- g) Outline **THREE** objectives of watershed management. **[3 Marks]**