



TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ARCHITECTURE & BUILT ENVIRONMENT

UNIVERSITY EXAMINATION FOR:
BACHELOR OF ARCHITECTURAL STUDIES
EAR 4110: CONSTRUCTION MATERIALS I
END OF SEMESTER EXAMINATION

YEAR ONE SEMESTER II

SERIES: MAY 2025

TIME: 2 HOURS

DATE: Pick Date MAY 2025

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

QUESTION ONE (30 MARKS)-COMPULSORY

- The use of admixtures can be beneficial during concreting. Explain FOUR major reasons for using admixtures during concreting. (8 marks)
- The negative effects of global warming have increased the need for construction of buildings that have minimal carbon footprints. Explain FIVE strategies that may be adopted in buildings to optimize their energy efficiency. (10 marks)
- Describe SIX characteristics of good quality building stone. (12 marks)

QUESTION TWO (20 MARKS)

- a) Describe the following terminologies that are crucial in the determination of the energy efficiency of construction materials.
 - i. Embodied energy. (1 mark)
 - ii. Energy recovery. (2 marks)
 - iii. Operational energy. (2 marks)
- b) Sustainability can generally be defined as meeting the needs of the present generation without compromising the ability of future generations to meet their own needs. Explain the THREE major spheres of sustainability. (15 marks)

QUESTION THREE (20 MARKS)

- a) The use of lime in Mombasa has historically been popular. Outline FIVE properties of lime that have made it popular in Mombasa. (5 marks)
- b) Explain FIVE uses of lime in construction. (15 marks)

QUESTION FOUR (20 MARKS)

Good quality construction materials enable the construction of quality structures. Mr. Otieno has decided to mould earth bricks to aid in the construction of his new residential unit.

- a) With the aid of well annotated sketches, describe FOUR forms of bricks Mr. Otieno can mould for the construction of his house. (8 marks)
- b) Describe the effects of the following substances when in excess on the earth bricks.
 - i. Organic matter. (3 marks)
 - ii. Lime (3 marks)
 - iii. Alkalies (3 marks)
 - iv. Pebbles (3 marks)

QUESTION FIVE (20 MARKS)

Gypsum is a common construction material in most local interior design projects.

- a) Explain the processing of gypsum from its natural state to a finished product. (10 marks)
- b) Explain the properties of gypsum that make it inherently fire resistant. (10 marks)