



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ARCHITECTURE & BUILT ENVIRONMENT

UNIVERSITY EXAMINATION FOR:

BACHELOR OF ARCHITECTURAL STUDIES/BACHELOR OF
ARCHITECTURE

ECV 4202: MATERIAL SCIENCE I

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: SEPTEMBER 2018

TIME: 2HOURS

DATE: Sep2018

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

- a) Define creep as used in concrete technology. (2 marks)
- b) Explain how the six factors mentioned below affect the rate of creep in concrete.
 - i. Strength of concrete (2 marks)
 - ii. Cement type (2 marks)
 - iii. Proportions of mix (2 marks)
 - iv. Aggregate (2 marks)
 - v. Curing (2 marks)
 - vi. Age (2 marks)
- c) State and explain eight major factors that influence the crushing strength of concrete. (16 marks)

Question Two

- a) Define and explain the following properties of hardened mortar.
 - i. Bond (2 marks)
 - ii. Durability (2 marks)
 - iii. Compressive strength (2 marks)
 - iv. Flexural strength (2 marks)
 - v. Mix proportions (2 marks)
- b) State and explain five major properties of fresh mortar. (10 marks)

Question Three

- a) Explain the four requirements mentioned below that need to be satisfied in the design of a concrete mix.
 - i. Compressive Strength (2 marks)
 - ii. Workability (2 marks)
 - iii. Durability (2 marks)
 - iv. Finish (2 marks)
- b) Explain the five steps used for designing concrete mixes (10 marks)
- c) State the two major objectives in designing a concrete mix. (2 marks)

Question Four

- a) Explain how the following types of bricks are manufactured.
 - i. Adobe brick (2 marks)
 - ii. Kiln-burned brick (2 marks)
 - iii. Sand-lime brick (2 marks)
 - iv. Concrete brick (2 marks)
 - v. Building brick (2 marks)
- b) With the aid of sketches identify and explain five types of brick bonds. (10 marks)

Question Five

Identify and explain with the aid of sketches how four tests on workability of concrete are conducted. (20 marks)