



TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF BUILDING & CIVIL ENGINEERING
UNIVERSITY EXAMINATION FOR:

BACHELOR OF TECHNOLOGY IN CIVIL ENGINEERING

TCV 4223: ENGINEERING MATERIALS II

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: MARCH 2025

TIME: 2 HOURS

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 (COMPULSORY) 20 Marks

- a) State **TWO** advantages of visual strength grading of timber (2 marks)
- b) Explain the following properties of fresh concrete: (4 marks)
- i. Shape and surface texture
 - ii. Cleanliness of the aggregate
- c) Differentiate between **TWO** types of concrete shrinkage i.e. autogenous and drying shrinkage (4 marks)
- d) Mention **TWO** functions of coarse aggregates in concrete (2 marks)
- e) Explain soundness of cement and state the test used (2 marks)



- f) Clearly explain **THREE** factors which are put into consideration when deciding the use of stones in construction. (3 marks)
- g) State **THREE** effects of reduced moisture content in timber (3 marks)

ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION TWO (20 marks)

- a) Describe kiln seasoning method highlighting any possible defects which could result from the process. What are the advantages and disadvantages of this method of seasoning (8 marks)
- b) Explain Cement-sand plus plasticizers type of mortar and state its main function when used in blockwork or brickwork. (6 marks)
- c) State **FOUR** points to be considered when mixing concrete (4 marks)
- d) Discuss the role of silica in clay used for brick making (2 marks)

QUESTION THREE (20 Marks)

- a) Using clear sketches, describe the macroscopic structure of wood (8 marks)
- b) State **FOUR** points to be considered when mixing concrete (4 marks)
- c) State significance of water in a concrete mix (4 marks)
- d) Describe the following types of aggregates
- i) gaseous aggregates
 - ii) fibres (4 marks)

QUESTION FOUR (20 Marks)

- a) Cement quality may be affected by various errors. Explain (6 marks)



- b) State **SIX** advantages of timber as a building material considering the current trend towards sustainable construction. (3 marks)
- c) i) state the effect of reduced moisture content in timber and outline how it is determined (4 marks)
- ii) Calculate the moisture content of a sample of timber with net weight of 18.75g and which weighs 15g after it was dried (3 marks)
- d) With the aid of sketches, explain the methods of conversion of timber (4 marks)
- i) Quarter sawing
 - ii) Tangential sawing
 - iii) Through and through sawing

QUESTION FIVE (20 Marks)

- a) Using a sketch explain the wet processes of cement manufacture (6 marks)
- b) It has often been proposed that workability of concrete should be defined by at least three separate properties i.e. Compatibility, mobility, and stability. Discuss these properties vis-a-vis the standard workability tests. (9 marks)
- c) List **FIVE** advantages of ready mix concrete over normal concrete (5marks)

