



TECHNICAL UNIVERSITY OF MOMBASA
**Faculty of Engineering &
Technology**

DEPARTMENT OF BUILDING & CIVIL ENGINEERING
**UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN CIVIL ENGINEERING
(BSCE)**

ECE 2213: CIVIL ENGINEERING MATERIALS II

END OF SEMESTER EXAMINATION

SERIES: APRIL 2014

TIME ALLOWED: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- Answer booklet

This paper consists of **FIVE** questions.

Answer question **ONE (COMPULSORY)** and any other **TWO** questions

All questions carry equal marks

Maximum marks for each part of a question are as shown

This paper consists of **TWO** printed pages

Question One (COMPULSORY)

- a) Describe the following types of polymer concrete:
- (i) Polymer impregnated concrete
 - (ii) Polymer modified concrete **(6 marks)**
- b) Illustrate the notable characteristics of iron and its applications. **(5 marks)**
- c) Explain the following terms used in timber: **(9 marks)**
- (i) Fibre saturation point
 - (ii) Equilibrium moisture content
 - (iii) Partially seasoned timber

- d) Discuss the advantages and disadvantages of timber as a building material viz-a-viz the current trend towards sustainable construction. **(6 marks)**
- e) Explain reaction wood and its effect on the structural properties of wood. **(4 marks)**

Question Two

- a) Briefly discuss the following properties of steel.
- (i) Fatigue-efficiency
 - (ii) Weldability
 - (iii) Corrosion resistance
 - (iv) Basnshinger effect **(8 marks)**
- b) Describe the following plastic materials:
- (i) Vinyl ester
 - (ii) Polypropylene **(4 marks)**
- c) Explain the two groups of polymers and their applications. **(6 marks)**
- d) Discuss alloying as a way of increasing the yield strength of steel. **(2 marks)**

Question Three

- a) Describe kiln seasoning method highlighting any possible defects which could result from the process. **(6 marks)**
- b) Discuss the influence of carbon in ferrous metals. **(6 marks)**
- c) Describe the types of high performance steel in construction and their benefits when used in bridge construction. **(8 marks)**

Question Four

Explain the following as applied in metallurgy.

- a) Brittle and ductile fracture **(6 marks)**
- b) Elastic and plastic deformation of metals **(6 marks)**
- c) Crystalline structure metals **(8 marks)**

Question Five

- a) Describe two major compounds in wood viz cellulose and lignin **(6 marks)**
- b) What is timber grading and state TWO methods used for grading? **(5 marks)**
- c) With the aid of appropriate sketches, describe THREE methods of manufacturing plastics. **(9 marks)**