



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

DEPARTMENT OF BUILDING & CIVIL ENGINEERING
**UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN CIVIL ENGINEERING
(BSCE Y2 S2)**

ECE 2213: CIVIL ENGINEERING MATERIALS II
**SPECIAL/SUPPLEMENTARY EXAMINATION
SERIES: JULY 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

Maximum marks for each part of a question are as shown

This paper consists of **TWO** printed pages

Question One (COMPULSORY)

- a) With the aid of suitable sketches, describe the anatomy of timber. **(6 marks)**
- b) Outline the process of timber infestation, and the pressure method of timber preservation. **(12 marks)**
- c) Describe the following methods of protecting steel from corrosion:
- (i) Sherardizing
 - (ii) Cladding
 - (iii) Electroplating
 - (iv) Hot dipping **(6 marks)**

- d) Discuss the relative increase in the application of polymers materials relative to the traditional materials in civil engineering construction. **(6 marks)**

Question Two

- a) Explain the metal structure and it's significance in metallic bonding **(8 marks)**
- b) Outline the manufacture of pig iron and steel. **(6 marks)**
- c) Outline the composition and applications of carbon steels. **(6 marks)**

Question Three

- a) With the aid of typical examples distinguish between thermoplastic and thermosetting plastics. **(6 marks)**
- b) With the aid of suitable sketches, explain the following methods of forming plastics. **(8 marks)**
- (i) Extrusion
 - (ii) Injection
 - (iii) Moulding
 - (iv) Rotational moulding
- c) Outline the following constituents of polymer materials: **(6 marks)**
- (i) Plasticizers
 - (ii) Stabilizers
 - (iii) Fillers
 - (iv) Flame retardants

Question Four

- a) Explain the significance of the process of seasoning timber and state the probable defects which could arise from the process. **(8 marks)**
- b) Outline the process of timber decay and briefly describe the following methods of preservation: **(12 marks)**
- (i) Deluging, dipping and steeping
 - (ii) Diffusion
 - (iii) Hot and cold tank method

Question Five

- a) Briefly describe the following heat treatment processes of steel: **(12 marks)**
- (i) Hardening
 - (ii) Tempering
 - (iii) Normalizing
 - (iv) Annealing
- b) Outline the characteristics of the following types of steels: **(12 marks)**
- (i) Prestressing steels
 - (ii) Bridge wire
 - (iii) Railway steels
 - (iv) Grade 50/55 steel

