**TECHNICAL UNIVERSITY OF MOMBASA**

# Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:
**BACHELOR OF SCIENCE IN CIVIL ENGINEERING**

ECE 2213: ENGINEERING MATERIALS II

**END OF SEMESTER EXAMINATION**
SERIES:  DECEMBER 2013
**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 **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **TWO** printed pages

**Question One (Compulsory)**

a) Calculate the moisture content of a sample of timber with net weight of 18.75 and which weighs 15g after it was dried                                                                     **(4 marks)**

b) (i) Define corrosion
   (ii) Briefly elaborate on the electrochemical process                                    **(10 marks)**

c) Briefly elaborate the following protective coatings:

(i) Electroplating
(ii) Nickel plating
(iii) Zinc plating                                                          **(6 marks)**

## Question Two

a) With a well labeled diagram discuss checking and other defects of timber during conversion.

**(10 marks)**

b) Using illustrations where necessary discuss:
   (i) Moulding by compression
   (ii) Transfer moulding                                                    **(10 marks)**

## Question Three

**a)** Using a well labeled and defined illustration, briefly discuss the actual parts of a tree through its section and structure                                                             **(10 marks)**

**b)** Describe with the aid of sketches:
   **(i)** The structure of a hardwood and a softwood
   **(ii)** The difference between heartwood and sapwood cells               **(10 marks)**

## Question Four

Briefly expound on the following physical properties of engineering materials:

(i) Coefficient of linear expansion
(ii) Specific heat capacity
(iii) Density
(iv) Melting point
(v) Thermal conductivity                                                     **(20 marks)**

## Question Five

**a)** Giving appropriate examples in each differentiate between ferrous and non-ferrous metals.

**(10 marks)**

**b)** Define seasoning and hence with well labeled diagrams discuss natural and artificial seasoning giving their advantages and disadvantages                                           **(10 marks)**