TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR BACHELOR OF SCIENCE IN CIVIL ENGINEERING (BSCE 12SE)

ECE 2213: CIVIL ENGINEERING MATERIALS II

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

Question One

a) Using clear sketches, describe the macroscopic structures of wood. **(7 marks)**

b) Define the following terms used in metals:
(i) Tenacity
(ii) Ageing
(iii) Yield
(iv) Proof stress **(6 marks)**

c) List **FOUR** types of iron ores **(2 marks)**

d) Explain the stages involved in the extraction of pig iron. **(10 marks)**

e) With aid of a sketch, explain the following methods of conversion of timber:

(i) Through and through
(ii) Tangential sawing **(5 marks)**

Question Two

a) State:
(i) **FIVE** reasons for timber seasoning **(2.5 marks)**
(ii) **THREE** types of timber preservatives **(1.2 marks)**

b) Describe the following methods of heat treatment of carbon steel:
(i) Hardening
(ii) Tempering
(iii) Annealing
(iv) Normalizing **(8 marks)**

c) State **FOUR** properties of cast iron. **(2 marks)**

d) Explain the following classification of plastics:
(i) Thermosets
(ii) Thermoplastics **(4 marks)**

Question Three

a) Briefly describe any **FIVE** properties of wood that makes it good for construction. **(10 marks)**

b) Briefly describe the following types of iron and steel:
(i) Wrought iron
(ii) High carbon steel
(iii) Mild steel **(6 marks)**

c) State **TWO** advantages of visual strength grading of timber. **(4 marks)**

Question Four

a) With the aid of diagrams, illustrate the following forms of warping in timber. **(8 marks)**
(i) Cup
(ii) Spring
(iii) Bow
(iv) Twist

b) Briefly describe the following properties of polymers:
(i) Heat deflection temperature
(ii) Moisture absorption
(iii) Relative thermal index
(iv) Tensile modulus **(8 marks)**

c) Outline **TWO** major environmental impact associated with steel making process. **(4 marks)**

Question Five

a) Explain any **FOUR** factors that are responsible for deterioration of polymeric materials. **(8 marks)**

b) Sketch a typical stress strain curve for steel including the case of unloading and reloading and describe the different distinct parts. **(6 marks)**

c) Describe **THREE** causes of biodegradation defects in timber. **(6 marks)**