



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)
Faculty of Engineering and Technology

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR BACHELOR OF ENGINEERING IN BUILDING & CIVIL ENGINEERING

ECE 2205: CIVIL ENGINEERING MATERIALS II

END OF SEMESTER EXAMINATION

SERIES: APRIL 2012

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*
- *Drawing Instruments*

This paper consists of **FIVE** questions in **TWO** sections **I & II**

Attempt question **ONE (COMPULSORY)** plus any other **TWO** questions

Maximum marks for each part of a question are clearly shown

This paper consists of **TWO** printed pages

SECTION I (COMPULSORY)

Question 1 (30 marks)

- a) Define the following types of plastics giving an example in each case
- Thermoplastics
 - Thermoset plastics
- (6 marks)
- b) State **THREE** factors that affect the structural properties of ceramic products
- (6 marks)
- c) In the visual strength grading of timber outline:
- TWO** disadvantages of this technique
 - TWO** advantages of this technique
- (6 marks)
- d) For each of the following special steels state their special properties and areas of application
- Mild steel

- (ii) Stainless steel
 - (iii) Titanium steel
 - (iv) Manganese steel
- (8 marks)

e) Outline any **FOUR** tests carried out on bitumen (4 marks)

SECTION II (Attempt any TWO questions)

Question 2 (20 marks)

With the aid of a well labeled diagram, illustrate the blast furnace and describe its use in the process of iron production (20 marks)

Question 3 (20 marks)

- a) (i) Define the term “seasoning of timber”
(ii) State any **SIX** properties of wood that makes it a preferred building material (8 marks)
- b) With the aid of sketches, illustrate any **FOUR** types of timber sawing (12 marks)

Question 4 (20 marks)

- a) Define the term Heat treatment of steel (2 marks)
- b) Briefly describe the following types of heat treatment of steel
(i) Carburizing
(ii) Annealing
(iii) Nitriding
(iv) Surface hardening of steels (12 marks)
- c) Outline any **THREE** environmental issues associated with iron ore extraction (6 marks)

Question 5 (20 marks)

- a) Briefly describe the following types of damage of plastics
(i) Chain scissoring
(ii) Cross-linking
(iii) Loss of plasticizers
(iv) Stress cracking (12 marks)
- b) Outline **FOUR** main test groups used to ascertain the properties of granular materials (8 marks)