



# MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)

University Examinations 2015/2016

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

SECOND SEMESTER EXAMINATION FOR DEGREE IN BACHELOR OF SCIENCE  
IN CIVIL ENGINEERING

ECV 210: CIVIL ENGINEERING MATERIALS II

Date: 27/4/2016

Time: 11:00 – 1:00 PM

---

## INSTRUCTIONS

- *This paper comprises five questions*
- *Answer question number one and any other two questions*
- *All the optional questions carry equal marks*
- *Candidates to have relevant design manuals*

## QUESTION ONE

Name the following:

- a) A molten metal that catches fire in chlorine gas and gives off white fumes. (2 marks)
- b) A metal that forms two types of oxides and rusts in moisture; write the chemical formula of the oxide. (2 marks)
- c) A metal used in long distance cables wires (2 marks)
- d) Define the following metal properties
  - (i) Malleability (1 mark)
  - (ii) Hardness (1 mark)

- (iii) Fusibility (1 mark)
- (iv) Ductility (1 mark)
- e) Explain the difference between Wrought iron, Cast iron and Pig iron (5 marks)
- f) Name:
- (i) three (3) forms of cathode protection (3 marks)
- (ii) three (3) metals that can be used as sacrificial anodes (3 marks)
- g) Name three (3) physical properties of dried wood. (3 marks)
- h) Name two (2) methods used to make timber a fire resistant material (2 marks)
- i) Describe the term "polymer". (1 mark)
- j) Describe how a cured thermoplastic polymer reacts with heat (1 mark)
- k) Define Hot Isostatic Pressing (HIP) process as applies to manufacturing of ceramics (2 marks)

## QUESTION TWO

The two non-metals, carbon and hydrogen are important chemical reference points with regard to the method of metal extraction and reactivity towards acids. Explain. (20 marks)

## QUESTION THREE

- i) Define the term seasoning of wood. (2 marks)
- ii) List and explain 6 (six) advantages of wood seasoning process (18 marks)

## QUESTION FOUR

"Cross-linkers" are atoms or groups of atoms that will bind chains of polymers together. Explain what happens if the number of cross-linkers is increased. (20 marks)

## QUESTION FIVE

List and explain the seven ceramic processing steps (20 marks)