



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**SCHOOL OF ENGINEERING AND TECHNOLOGY**  
**UNIVERSITY EXAMINATIONS FOR THE DEGREE IN SCIENCE IN**  
**CONSTRUCTION MANAGEMENT**  
**2<sup>ND</sup> YEAR 1<sup>ST</sup> SEMESTER 2017/2018 ACADEMIC YEAR**  
**CENTRE: MAIN CAMPUS**

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**COURSE CODE: TCM3213.**

**COURSE TITLE: MATERIAL SCIENCE II**

**EXAM VENUE: WS**

**STREAM: BSc CONSTRUCTION MGT**

**DATE: 19/12/2017**

**EXAM SESSION: 9.00 – 11.00 AM**

**DURATION: 2 HOURS**

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**Instructions**

- 1. Answer question 1 (Compulsory) and ANY other two questions**
- 2. Candidates are advised not to write on question paper**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**

## QUESTION ONE

- a) Distinguish between soft wood and hard wood and state any THREE advantages of use of softwoods in construction.  
(6 marks)
- b) State any FOUR reasons why use of timber in construction industry is popular in many parts of the world.  
(6 Marks)
- c) State any FOUR reasons for use of steel reinforcement in concrete construction.  
(6 Marks)
- d) State any FOUR property changes in metals attributed to alloying elements.  
(6 Marks)
- e) Define bituminous materials and TWO major characteristics of bituminous materials.  
(6 Marks)

## QUESTION TWO

- a) In reference to mechanical strength properties of timber, explain orthotropic nature of timber  
(3 Marks )
- b) Explain how the following factors affect the strength of timber
- i. Moisture and temperature of the environment
  - ii. Grain angle
  - iii. Size, location and distribution of knots
- (9 Marks )
- c) Explain any FOUR reasons why wood products are becoming popular in construction industry and also mention any FOUR wood products popularly used in Kenya:  
(8 Marks)

## QUESTION THREE

- a) Distinguish the manufacturing process of wrought iron and steel and state any TWO applications of each in construction industry.  
(8 marks)
- b) Distinguish between Galvanic and Mechanical aided corrosion and explain any TWO methods of controlling corrosion in construction industry.  
(6 Marks)
- c) State any THREE properties of copper which make it popular as a construction material and also state any THREE areas of its application in construction industry .  
(6 Marks)

#### **QUESTION FOUR**

a) Explain the following types of bitumen of cut-back asphalt

- i. Rapid curing
- ii. Medium curing
- iii. Slow curing

(6 Marks)

b) Explain the procedure and significance of the following quality control tests in bitumen

- i. Penetration test
- ii. Flash point test

(8 Marks )

c) State any FOUR bitumen safety handling procedures

(6 Marks)

#### **QUESTION FIVE**

(a) In reference to application in construction industry, state FOUR advantages and FOUR disadvantages of plastics.

(8 Marks)

(b) Explain the fundamental difference between thermoplastics and thermosetting plastics

( 6 Marks)

(c) State any FOUR tests commonly done for plastics.

( 6 Marks)