



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**UNIVERSITY EXAMINATION FOR THE DEGREE IN SCIENCE IN  
CONSTRUCTION MANAGEMENT**

**2<sup>ND</sup> YEAR 1<sup>ST</sup> SEMESTER 2024/2025 ACADEMIC YEAR  
CENTRE: MAIN CAMPUS**

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**COURSE CODE: TCB 1205**

**COURSE TITLE: MATERIAL SCIENCE II**

**EXAM VENUE: STREAM: BSc. CONSTRUCTION MGT**

**DATE: 13 /1/2025 EXAM SESSION: 14-16.00 HRS**

**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) Compare and contrast THREE advantages and THREE disadvantages of timber as construction material. (6 Marks)
- b) State any THREE reasons why steel has found more application in construction in the industry recent past compared to iron. (6 Marks)
- c) Discuss any TWO general characteristics of bituminous materials. (6 Marks)
- d) State any SIX properties of plastics which makes them popular as a construction material. (6 Marks)
- e) State SIX factors you would consider when selecting a material for use in construction job. (6 marks)

### QUESTION TWO

- a) Discuss any FIVE factors which affect strength of timber. (10 Marks)
- b) State any FIVE reasons for seasoning of Timber. (5 Marks)
- c) State FIVE factors which may be considered as advantages of timber over steel in construction. (5 Marks)

### QUESTION THREE

- a) Mechanical properties of steel structures are known to deteriorate rapidly under elevated temperatures or fire hazards. Suggest any THREE methods that may be employed to mitigate fire hazards in steel construction. (6 Marks)
- b) State FIVE reasons of alloying in steel (5 Marks)
- c) Compare and contrast any THREE properties of aluminium and copper as building construction materials, explaining areas of applications (9 Marks)

### QUESTION FOUR

- a) Distinguish the following types of bituminous materials used in pavement construction
- i. straight-run asphalt
  - ii. cutback asphalts
  - iii. asphalt emulsions
- (9 Marks)
- b) i. Explain the procedure and significance of Penetration test in bitumen. (4 Marks)

ii. Two samples of bitumen yielded the following penetration results 30/40 and 80/100. Discuss the suitability of these samples in road application construction in either a hot or cold environment. (4 Marks)

c) State any two precautions concerning health, safety and environmental aspects of bituminous materials. (3 Marks)

#### QUESTION FIVE

(a) List SIX constituents of plastic product and state the function of each constituent in the general property of plastic. (12 Marks)

(b) Explain the fundamental difference between thermoplastics and thermosetting plastics. (5 Marks)

(c) State any THREE limitations of plastics as a building material. (3 Marks)

JUST OBSERVES ZERO TOLERANCE TO EXAMS CHEATING