



TECHNICAL UNIVERSITY OF MOMBASA  
**Faculty of Engineering &  
Technology**

DEPARTMENT OF BUILDING & CIVIL ENGINEERING  
UNIVERSITY EXAMINATION FOR DECREE IN:  
**BACHELOR OF SCIENCE IN CIVIL ENGINEERING (BSCE)**

ECE 2206: CIVIL ENGINEERING MATERIALS I

**END OF SEMESTER EXAMINATION**

SERIES: APRIL 2015

**TIME ALLOWED: 2 HOURS**

**Instructions to Candidates:**

You should have the following for this examination

- *Answer Booklet*
- *Pocket Calculator*

This paper consists of **FIVE** questions. Answer question **ONE (COMPULSORY)** and any other **TWO** questions

Maximum marks for each part of a question are as shown

Use neat, large and well labeled diagrams where required

This paper consists of **TWO** printed pages

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**Question One (Compulsory)**

- a) (i) Explain the main reason for adding gypsum in the manufacture of cement.
- (ii) State TWO considerations made when concreting under water
- (iii) State any TWO reasons for using prestressed concrete **(10 marks)**
- b) Explain any FIVE methods of transporting concrete **(10 marks)**
- c) Explain the following properties of aggregates:
- (i) Toughness
  - (ii) Hardness
  - (iii) Porosity and absorption

- (iv) Bulk density
  - (v) Surface texture
- (10 marks)**

### **Question Two**

- a) Briefly describe the following tests carried out on fresh concrete:
- (i) Slump test
  - (ii) Compacting factor test
  - (iii) V-B consistometer test
- (12 marks)**
- b) Explain the THREE types of curing methods giving an example in each case **(8 marks)**

### **Question Three**

- a) (i) Explain the main reasons for proper storage of cement.
- (ii) State THREE ways of storing cement **(10 marks)**
- b) (i) Differentiate between admixtures and additive
- (ii) State the functions of the FIVE types of admixtures **(10 marks)**

### **Question Four**

- a) State the main chemical constituents of Portland Cements and their contribution to the properties of cement **(8 marks)**
- b) Explain how the following factors affect the strength of concrete **(12 marks)**
- (i) Bleeding
  - (ii) Curing
  - (iii) Workability
  - (iv) Aggregate/cement ratio

### **Question Five**

- a) (i) Describe FOUR types of Portland Cements and state ONE use for each **(8 marks)**
- (ii) Explain the effect of fineness of cement on its properties **(6 marks)**
- b) State the SIX factors that may lead to segregation of fresh concrete **(6 marks)**