



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

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECE 2412: HIGHWAY ENGINEERING II

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2013

TIME ALLOWED: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

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

Maximum marks for each part of a question are as shown

This paper consists of **TWO** printed pages

Question One (Compulsory)

- a) Briefly explain any **SIX** unique properties of flexible pavements **(12 marks)**
- b) With the aid of diagrams illustrate the following rigid pavement joints: **(8 marks)**
- (i) Contraction joint
 - (ii) Warping joint
 - (iii) Construction joint
 - (iv) Longitudinal joint
- c) Briefly describe how the following defects are maintained for both rigid and flexible pavements:
- (i) Transverse cracking

- (ii) Water bleeding and pumping
 - (iii) Fatigue cracking
 - (iv) Rutting
 - (v) Polished aggregates
- (10 marks)**

Question Two

- a) Briefly describe FOUR factors that affect the performance of flexible pavements **(10 marks)**
- b) With the aid of a well labeled diagram, illustrate the Mechanistic – Empirical Design method of pavements **(10 marks)**

Question Three

Briefly explain the following types o stabilization techniques:

- (i) Bituminous stabilization
 - (ii) Lime stabilization
 - (iii) Cement stabilization
 - (iv) Mechanized stabilization
- (20 marks)**

Question Four

Discuss the types of failures that may occur in flexible road bed **(20 marks)**

Question Five

- a) Briefly explain factors to be considered when evaluating the site for laying rigid or flexible pavements **(12 marks)**
- b) Explain the following basic earth work operation:
 - (i) Clearing
 - (ii) Grubbing operations
 - (iii) Excavation operation
 - (iv) Finishing operation

(8 marks)