TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

DIPLOMA IN ARCHITECTURE (DA 12M)

EAR 2305: MATERIALS SCIENCE II

END OF SEMESTER EXAMINATION
SERIES: APRIL 2014
TIME ALLOWED: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer booklet*

This paper consists of **FIVE** questions. Answer any **THREE** questions of the **FIVE** questions

All questions carry equal marks
Maximum marks for each part of a question are as shown
This paper consists of **TWO** printed pages

Question One

a) Define the term "concrete" **(3 marks)**

b) State FIVE advantages of concrete **(5 marks)**

c) State THREE characteristics and THREE uses of each of the following types of cement.
- **(i)** Blast furnace Portland cement
- **(ii)** Special rapid hardening Portland cement
- **(iii)** Sulphate resisting Portland cement
- **(iv)** Ordinary Portland cement **(12 marks)**

Question Two

a) State SIX factors that govern the choice of mode of transporting concrete. **(6 marks)**

b) With the aid of a sketch, explain how concreting is done under water. **(8 marks)**

c) Briefly explain how the following vibrators work and where they can be used:
- (i) Immersed vibrators
- (ii) Surface vibrators **(6 marks)**

Question Three

a) Briefly explain the following methods of curing:
- **(i)** Wet covering
- **(ii)** Spray on
- **(iii)** Sand curing **(3 marks)**

b) State FIVE functional requirement of formwork. **(5 marks)**

c) State THREE reasons joints are incorporated in concrete. **(3 marks)**

d) With the aid of a sketch, outline the compaction factor test of fresh concrete. **(9 marks)**

Question Four

a) Briefly describe the following types of mixer:
- (i) Tilting drum
- (ii) Pan type **(6 marks)**

b) With the aid of a sketch, explain the "**standard consistency test**" done on cement. **(14 marks)**

Question Five

a) State THREE functions of water in concreting. **(3 marks)**

b) With the aid of a sketch, explain the following:

(i) Contraction joint

(ii) Expansion joint **(10 marks)**

b) Briefly describe “creep” in concrete. **(5 marks)**