TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECE 2206 : CIVIL ENGINEERING MATERILAS I

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE: 15 Dec 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

-Drawing instruments.

This paper consists of five questions.

Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

QUESTION ONE

(a) Using a sketch illustrate the dry process of cement manufacture. (6 marks)
(b) Explain three broad classifications of hydraulic Cements. (6mks)
(c) Explain the role of tricalcium silicate, diclacium silicate, and tricalcium alluminate and tetracalcium alluminoferrite in the hydration process of cement. (4 marks)
(d) Describe the standard test for the determination of:-
    i) Soundness of cement
    ii) Compressive strength of cement as per current Kenya standard. (8 marks)

(e) (i). Briefly explain carbonation shrinkage.
    (ii). Give three factors influencing the rate of carbonation. (6 marks)

QUESTION TWO

(a) Describe briefly three main brick work and Block work mortars. (6 marks)
(b) Kenya standard Ks 1725 groups cements into five main types. Discuss them. (8 mks)
(c) Discuss the significance of cement quality control tests, such as fineness, setting time and soundness tests. (6 marks)

QUESTION THREE

(a) List and describe **FOUR** common types of concrete admixtures under the heading given in the table below: (12 marks)

	Type of admixture	**Effect on concrete**	**Typical materials**	**Advantages**	**Disadvantages**
(i) (ii) (iii) (iv)					

(b) Bulking of sand is not recommended in mixing of concrete. Cleary explain this statement: (2 marks)
(c) Differentiate between absolute specific gravity and apparent specific gravity. (2 marks)

(d) Outline four functions of mortar for use in masonry work. (4 marks)

QUESTION FOUR

(a) Explain the factors that influence the choice of concrete mixers. (4marks)
(b) Describe four types of Batch mixers. (8marks)
(c) Explain three ways of delivering ready mixed concrete. (6marks)
(d) Describe the specification required for ready mixed concrete. (2 marks)

QUESTION FIVE

(a) Given a concrete mix ratio 1:0:.8:2.4:0.4 of Cement: Fine aggregate: Coarse aggregate: Water, calculate the weights of material required to produce $1m^3$ of compacted concrete using:
   (i) Volumetric method
   (ii) The density method
   (iii) (NB: SG Cement = 3.15, SG Aggr = 2.65 and density of plain concrete is $2300Kg/m^3$) (7 marks)

(b) Explain the factors governing the selection of mix proportions in a design mix.

(4 marks)

(c) Briefly describe THREE methods of determining concrete workability namely:
   (i) Slump test.
   (ii) Compacting factor test
   (iii) Vebe (V – B) test (9 marks)