



BONDO UNIVERSITY UNIVERSITY COLLEGE

**UNIVERSITY EXAMINATIONS
ACADEMIC YEAR**

2012/2013

**FIRST YEAR, FIRST SEMESTER EXAMINATIONS FOR THE
DEGREE OF BACHELOR OF SCIENCE IN CONSTRUCTION
MANAGEMENT**

**COURSE CODE: TCM 3112
COURSE TITLE: MATERIAL SCIENCE I
DATE**

TIME: 2 HOURS

INSTRUCTIONS

**This paper consists of 5 questions
Answer Question ONE and any other TWO Questions**

QUESTION ONE

- a) Why is a better understanding of Materials Science important for Construction Managers ?.
- (2 Marks)
- b) Explain the reason why contemporary material studies have embraced the concept of sustainability and health safety in material research.
- (6 Marks)
- c) Define the following mechanical properties of materials and comment on their relevance in construction materials.
- i. Hardness.
 - ii. Fatigue.
 - iii. Creep.
 - iv. Abrasion.

(12 Marks)

QUESTION TWO

- a) State the THREE property requirements of concrete in plastic state and explain factors which affect their value
- (10 Marks)
- b) State any TWO methods of specifying concrete mixes and their recommended applications

(10 Marks)

QUESTION THREE

- a) List any SIX properties of aggregate and explain how these properties affect properties of concrete.
- (10 marks)
- b) Calculate the quantity of each material to order for a 1:3:6 . 40mm concrete mix to produce 2m^3 of compacted concrete. Assume the following:
- Aggregates are fines and coarse aggregate batched by volume
 - Site wastage of cement is 3%
 - Site wastage of sand is 5%
 - Site wastage of coarse aggregates is 10%
 - Weight of cement per meter cube is 1440kg
 - Weight of cement per meter cube is 1400kg
 - Weight of cement per meter cube is 1300kg

(10 Marks)

QUESTION FOUR

- (a) Outline steps involved in cement manufacturing process.
- (8 Marks)
- (b) Explain the importance of the following physical properties of cement.

- i. Fineness
- ii. Setting time

(8 Marks)

(c) Briefly discuss environment impact of cement manufacture.

(4 Marks)

QUESTION FIVE

(a) Explain any FIVE properties required for bricks as a construction material.

(10 Marks)

(b) State the origin and suitability of the following rocks as building construction material.

- i. Granite
- ii. Sandstone
- iii. Limestone
- iv. Marble
- v. Slate

(10 Marks)