

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY  
FACULTY OF ARCHITECTURE AND QUANTITY SURVEYING  
BACHELOR OF QUANTITY SURVEYING (HONOURS) DEGREE  
BACHELOR OF ARCHITECTURAL STUDIES  
PART 1 SECOND SEMESTER EXAMINATIONS – DECEMBER 2002**

**INTRODUCTION TO MATERIALS AND CONSTRUCTION 1 – AAR 1204**

**TIME:** 2 Hours

**TOTAL MARKS:** 100

**INSTRUCTIONS:**

Answer any two questions.

**QUESTION 1**

- a) (i) Explain briefly the wet process in cement manufacturing. (10 marks)
- (ii) Discuss the properties of concrete that enable it to be used as a construction material. (5 marks)
- b) Some of the chemical present in cement are:
- |                      |                                                                   |
|----------------------|-------------------------------------------------------------------|
| Dicalcium Silicate   | ( $2\text{CaO}\cdot\text{SiO}_2$ ) or $\text{C}_2\text{S}$ ,      |
| Tricalcium aluminate | $3\text{CaO}\cdot\text{Al}_2\text{O}_3$ or $\text{C}_3\text{A}$ , |
| Tricalcium silicate  | $3\text{CaO}\cdot\text{SiO}_2$ or $\text{C}_3\text{S}$            |

Explain briefly how these three chemicals influence the rate of hydration of cement and its consequent setting and hardening.

- c) Control of concrete used during construction is through workability and measuring its compressive strength among others. Describe briefly either how workability of concrete can be measured using the slump test method **OR** how compressive strength of concrete can be measured. (10 marks)
- d) (i) Write brief notes on clay manufacturing (6 marks)
- (ii) Why are bricks wetted before being bonded together with mortar? (1 mark)
- (e) Efflorescence is one of the properties of bricks. Explain what this term means and how it can be measured. (6 marks)

- (f) An oven-dried brick weighed 2,4 kg. The brick was soaked in water for 24 hours and its new mass became 2,95 kg. Calculate the % water of absorption of such a brick. (3 marks)
- (g) Discuss the purpose of indentations and perforations in bricks. (4 marks)

**Total: 50**

**QUESTION 2**

- a) (i) Explain in brief the air seasoning of timber and seasoning defects that might arise in the process. (11 marks)
- (ii) Discuss the preservation of timber and list 4 uses of timber in construction industry, stating reasons why it is suitable for the uses.
- (b) (i) List 3 types of asbestos (3 marks)
- (ii) Explain in brief the production of asbestos, its properties and health hazards associated with it. (8 marks)
- (i) Explain what you understand by chalking in painting. (3 marks)
- (ii) Write brief note on paint application on plastered walls. (4 marks)
- (c) (i) Explain the production of different classes of gypsum. (8 marks)
- (ii) Besides gypsum being used as a construction material, it is also added to cement. Explain why it is necessary to do so. (2 marks)

**Total: 50**

**QUESTION 3**

- (A) Write briefly on the production of mortar, its properties and handling at the site. (10 marks)
- (b) Building Stones come from igneous, sedimentary and metamorphic rocks. Briefly explain the formation of each of these classes. In each case give an example of the type of rock used for construction purposes stating where it is well suited. (10 marks)

- (c) (i) Bitumens include asphalt, refined Petroleum bitumen and Road tar. Explain what you understand by the term bitumen and how Road tar is produced. (10 marks)
- (ii) Differentiate between cut back bitumen and bitumen emulsion. (2 marks)
- (iii) List three uses of bitumen in construction industry, giving reasons. (6 marks)
- (d) Discuss in brief the uses of plastics in construction industry. (4 marks)
- (e) Outline in brief the material used during construction from the footing to the slab level (just before walling begins). (8 marks)

**Total: 50**