



**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER I  
SESSION 2015/2016**

COURSE NAME : CIVIL ENGINEERING  
MATERIALS

COURSE CODE : BFC 10502

PROGRAMME : BACHELOR OF CIVIL  
ENGINEERING WITH HONOURS

EXAMINATION DATE : DECEMBER 2015/ JANUARY 2016

DURATION : 2 HOURS

INSTRUCTION : ANSWER **FOUR (4)** QUESTIONS  
ONLY

THIS PAPER CONSISTS OF **FOUR (4)** PAGES

- Q1** (a) List **FOUR (4)** main chemical compounds of Portland cement. (4 marks)
- (b) Define the role of gypsum in the production of Portland cement. (3 marks)
- (c) Define the following terms:  
(i) Setting time  
(ii) Initial setting  
(iii) Final setting time  
(iv) Hardening (12 marks)
- (d) List **THREE (3)** types of standard Portland cement. Provide the use or application for each type. (6 marks)
- Q2** (a) Discuss the importance of determining the shape and surface texture of aggregate to be used in construction. (4 marks)
- (b) The amount of water absorbed by aggregate is an important factor designing Portland cement concrete. With the help of illustration, demonstrate the following condition state for aggregate;  
(i) Bone dry  
(ii) Air dry  
(iii) Saturated surface-dry (SSD)  
(iv) Moist (12 marks)
- (c) According to your answer in **Q2(b)**, which condition is important in concrete mixing. State the reason. (3 marks)
- (d) Two main sources of aggregates are from sea/river shore gravel and quarry. Describe **ONE (1)** advantage and **ONE (1)** disadvantage of using aggregates from both sources. (6 marks)
- Q3** (a) State **FIVE (5)** differences between concrete design using DOE and ACI method. (10 marks)
- (b) Cracking, spalling and staining are types of concrete deterioration. Describe each of them. (6 marks)

- (c) What is the difference between non-destructive and destructive testing methods? (6 marks)
- (d) List **THREE (3)** admixtures usually used in concrete. (3 marks)
- Q4** (a) List **FIVE (5)** types of brick depending on its raw material. (5 marks)
- (b) Most brick is used in walls compared to other construction materials. Describe **FIVE (5)** advantages of using brick. (10 marks)
- (c) Mortar is a mixture of cementitious material, aggregate and water used in construction. List **TWO (2)** functions of mortar and list the properties of good mortar. (6 marks)
- (d) You are assigned to renovate ready-made house. Scope of the work is to build a temporary storage for construction equipment. Propose **TWO (2)** brick bonding arrangements for that purpose. (4 marks)
- Q5** (a) List and explain **FIVE (5)** factors that affecting strength of timber. (10 marks)
- (b) The percentage of radial, tangential, longitudinal and volume shrinkage and swelling are the properties can be obtained from the wood samples. Write the formula to calculate the percentage of shrinkage and swelling of wood samples. (5 marks)
- (c) Cambium and pitch are physical features in wood formation. Illustrate and explain about these two features. (5 marks)
- (d) Provide **FIVE (5)** methods for timber treatment and curing. (5 marks)

- Q6** (a) List **FOUR (4)** classification of steel. (4 marks)
- (b) There are various types of steel. List **SIX (6)** characteristics of high carbon steel. (6 marks)
- (c) Describe **FIVE (5)** shapes of steel that are commonly used in structural applications. (10 marks)
- (e) State **FIVE (5)** advantages of steel in construction. (5 marks)

**-END OF QUESTION-**