



**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER I  
SESSION 2023/2024**

- COURSE NAME : CONCRETE TECHNOLOGY
- COURSE CODE : BFS 40603
- PROGRAMME CODE : BFF
- EXAMINATION DATE : JANUARY/FEBRUARY 2024
- DURATION : 3 HOURS
- INSTRUCTIONS :
1. ANSWER ALL QUESTIONS
  2. THIS FINAL EXAMINATION IS CONDUCTED VIA
    - Open book
    - Closed book
  3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

- Q1** (a) Explain the relationship between porosity and permeability of concrete.  
(5 marks)
- (b) Define alkali-aggregate reaction (AAR) and discuss the effect of aggregate size on AAR.  
(8 marks)
- (c) Describe high density concrete. Elaborate properties of high-density concrete and list **FOUR (4)** its important applications.  
(12 marks)
- Q2** (a) Deterioration such as corrosion, abrasion and chemical attack can occur in sea-front structures such as jetties. Justify and discuss the precautions that can be taken to ensure good quality concrete for such structures.  
(10 marks)
- (b) Elaborate the mechanism by which mineral admixtures can improve the slump, segregation and flowability of concrete mixtures. In the amounts normally used, some mineral admixtures are water reducing whereas others are not. Discuss the subject with help of examples of those mineral admixtures.  
(15 marks)
- Q3** Severe deterioration and damage were evident in the reinforced concrete structure of a historical building. As a forensic engineer, your task is to conduct a restoration procedure to prevent further deteriorate of this historical building.
- (a) State and explain the method for preventing reinforcement corrosion.  
(8 marks)
- (b) With the aid of sketching, elaborate the procedure of grouting.  
(9 marks)
- (c) In addition to grouting, autogenous healing is a method use to repair cracks. Explain the process of applying autogenous healing to repair these building.  
(8 marks)

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- Q4** (a) List precautions can be taken to ensure good quality concrete in coastal structures.  
(3 marks)
- (b) Briefly explain **TWO (2)** categories of cracking that cause concrete deterioration.  
(4 marks)
- (c) Creep and shrinkage of concrete are significant properties that influence the behavior and durability of concrete structures. List and discuss factors that affecting creep and shrinkage.  
(8 marks)
- (d) List and elaborate **FIVE (5)** deterioration mechanisms that lead to concrete damage.  
(10 marks)

- END OF QUESTIONS -

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