



**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER I  
SESSION 2013/2014**

COURSE NAME : CONCRETE TECHNOLOGY  
COURSE CODE : BFS40603  
PROGRAMME : 4 BFF  
EXAMINATION DATE : DECEMBER 2013/JANUARY 2014  
DURATION : 3 HOURS  
INSTRUCTIONS : ANSWER ANY **FOUR (4)**  
QUESTIONS ONLY

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

- Q1**
- (a) Explain briefly the chemical reactions in concrete leading to the formation of ettringite.  
(5 marks)
  - (b) Sketch graphs on strength development and permeability with the effect of pozzolanic materials under different curing conditions to illustrate the principles and practice of concrete design for durability.  
(10 marks)
  - (c) Propose a project to study the transport mechanisms in concrete. Illustrate with appropriate sketches on concrete technology foresight.  
(10 marks)
- Q2**
- (a) Explain the synthesis of biomass aggregate and supplementary materials to produce a high performance sustainable concrete.  
(5 marks)
  - (b) Describe the tests for carbonation and permeability of concrete. Illustrate with mathematical relationship and graph.  
(10 marks)
  - (c) Outline a project to study the long term effect of alternative aggregates in concrete.  
(10 marks)
- Q3**
- (a) Specify mix proportion and particle size distribution of aggregate for porous concrete.  
(5 marks)
  - (b) Sketch graphs and explain the effect of void ratio on strength development and permeability.  
(10 marks)
  - (c) Explain the design and use of porous concrete in pavement. Illustrate with appropriate figures the effect of additives on the workability and strength of porous concrete.  
(10 marks)

- Q4** (a) Describe briefly the design and use of foamed concrete as a sustainable material for stabilization of soft soil.  
(5 marks)
- (b) Explain briefly with a sketch of the calibration chart and apparatus on a dynamic probe test to assess the surface hardness of foamed concrete.  
(10 marks)
- (c) Propose a design and application of foamed concrete for the mitigation of coastal erosion.  
(10 marks)
- Q5** (a) Explain briefly the development of a high early strength concrete for rehabilitation of damaged concrete deck.  
(5 marks)
- (b) Describe a renewable material combined with concrete pontoon for the sustainable development of a marina in Malaysia.  
(10 marks)
- (c) Explain the potential technical, environmental and economical advantages of geopolymer concrete for the precast concrete industry.  
(10 marks)
- Q6** (a) Describe briefly the design of cementless concrete containing biomass aggregate for durable performance in acidic environment.  
(5 marks)
- (b) Explain with a sample calculation and illustration on the properties of concrete components for use as soft soil subbase system.  
(10 marks)
- (c) Propose a project to develop a carbon sequestration media with appropriate illustrations and assumptions on its mathematical modeling.  
(10 marks)

- END OF QUESTION -