



**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER I  
SESSION 2014/2015**

COURSE NAME : CIVIL ENGINEERING MATERIALS  
COURSE CODE : BFC10502  
PROGRAMME : 1 BFF  
EXAMINATION DATE : DECEMBER 2014/JANUARY 2015  
DURATION : 2 HOURS  
INSTRUCTIONS : ANSWER **FOUR (4)** QUESTIONS ONLY

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

- Q1**
- (a) Write equations on cement chemistry and sketch infographics on cement production.  
(5 marks)
  - (b) Sketch and label the Vicat apparatus, tabulate materials used and present typical test results with a sketch of the graph.  
(10 marks)
  - (c) Describe the development of a biomass silica blended cement for waterproofing applications.  
(10 marks)
- Q2**
- (a) Estimate the global demand of aggregate based on annual concrete production.  
(5 marks)
  - (b) Illustrate a field adjustment calculation on fine aggregate content of  $800 \text{ kg/m}^3$  and water content of  $160 \text{ kg/m}^3$  if the free water on fine aggregate is 3%.  
(10 marks)
  - (c) Explain the synthesis of biomass aggregate for self-compacting concrete.  
(10 marks)
- Q3**
- (a) Describe the slump test to determine concrete workability.  
(5 marks)
  - (b) Explain the slump flow method to determine workability of self-compacting concrete.  
(10 marks)
  - (c) Describe the DOE mix design method for grade 60 normal concrete.  
(10 marks)

- Q4** (a) State technology benchmarking on the production of lightweight masonry block for affordable home. (5 marks)
- (b) Describe the installation of affordable quality home with interlocking masonry system. (10 marks)
- (c) Specify the engineering properties of the masonry block related to density, strength, shrinkage, water absorption, fire resistance, thermal insulation and sound transmission loss for a university apartment project. (10 marks)
- Q5** (a) Explain briefly the seasoning and dimensional stability of timber. (5 marks)
- (b) Describe briefly the use of timber in construction. (10 marks)
- (c) Explain the sustainability issues of timber construction. (10 marks)
- Q6** (a) Sketch stress-strain curve and state values of tensile strength of mild steel, bamboo and CFRP. (5 marks)
- (b) Explain briefly the use of geotextile combined with controlled low density material in the construction of road on soft soil. (10 marks)
- (c) Propose the use of the soft soil subbase system for road on peat with case studies. (10 marks)

- END OF QUESTION -