



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2012/2013**

COURSE NAME : CONSTRUCTION MATERIALS AND TESTING

COURSE CODE : BPD 3093/BPD 30903

PROGRAMME : 3 BPC

EXAMINATION DATE : DECEMBER 2012/JANUARY 2013

DURATION : 3 HOURS

INSTRUCTION :

1. SECTION A
ANSWER ALL QUESTIONS
2. SECTION B
ANSWER TWO (2) FROM
THREE (3) QUESTIONS

THIS QUESTION PAPER CONSISTS OF FOUR (4) PAGES

SECTION A

Q1 Concrete is one of the most widely used building materials. It is a composite material, a mixture of cement, aggregates and water.

- (a) Describe briefly the role of aggregates in concrete. (6 marks)
- (b) List **FIVE (5)** advantages of using materials based on cement as building materials. (5 marks)
- (c) Briefly discuss any **TWO (2)** phenomena below in relation to concrete.
- (i) bleeding
 - (ii) segregation
 - (iii) cohesiveness
 - (iv) admixture
- (4 marks)
- (d) State the reasons as to why it is important to know the *initial setting time* and *final setting time* of cement mortar or concrete that is to be placed in moulds. (5 marks)

Q2 The timber industry within the modern construction industry is regaining its previous popularity, providing wood for a variety of products from paper to particleboard.

- (a) List down **FOUR (4)** attractive properties of timber and timber products. (4 marks)
- (b) All commercial timbers can be classified into two broad groups: *softwoods* and *hardwoods*.
Describe the **THREE (3)** categories of hardwood as defined by the forestry department of Malaysia. (6 marks)
- (c) Sketch and label **THREE (3)** types of common timber defects. (6 marks)
- (d) Describe **FOUR (4)** problems associated with timber as a building material. (4 marks)

SECTION B

Q3 The quality of the material for making bricks as well as the mould used are the main focus when it comes to providing guarantees as to the lifespan of a masonry construction.

- (a) Clay bricks are made from clay material using three main methods.
 - (i) State **THREE (3)** methods used in making clay bricks. (3 marks)
 - (ii) Describe the appropriate process used to make clay bricks from clay that has excessive natural water content. (4 marks)
- (b) (i) Describe the prime function of mortar in brickwork. (4 marks)
 - (ii) List down **FIVE (5)** requirements of a good mortar bond. (5 marks)
- (c) Engineering brick is used as structural material where strength and durability are important requirements.

State **THREE (3)** structural components that are built using engineering bricks. (6 marks)
- (d) Briefly explain the following **TWO (2)** aspects related to brickwork.
 - (i) The effect of water absorption on bricks. (4 marks)
 - (ii) The characteristics of a good brick. (4 marks)

- Q4** (a) Steel is a combination of iron and carbon (0.01 – 0.1 %).
Describe the effect of carbon on the microstructure and properties of steel.
(6 marks)
- (c) Wrought iron can be cold worked, forged, and welded. Describe briefly the action of:
- (i) forging;
- (ii) cold working.
(6 marks)
- (d) Reinforced cement concrete is a composite material made up of cement concrete and reinforcement.
Relate the role of reinforcing steel in reinforced concrete.
(8 marks)
- (e) Plastics are classified as thermoplastic and thermosetting.
List **TEN (10)** properties of plastics that makes it a suitable building material.
(10 marks)
- Q5** The concept of sustainable construction and the promotion of green buildings has become an important issue since the Earth Summit, in Rio de Janeiro, 1992.
- (a) List down **FIVE (5)** barriers that have been identified to be limiting the implementation of the concept of green building in the Malaysian construction industry.
(5 marks)
- (b) Explain **FIVE (5)** characteristics of green building materials.
(10 marks)
- (c) Mr. Bush wants to build a house that will have little negative impact on the environment and is looking for green building materials for the project.
Classify **FIVE (5)** suitable green building materials that can be used for building the house. Support your suggestions with reasonable justifications.
(15 marks)

- END OF QUESTIONS -