Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2018/2019

COURSE NAME	:	CIVIL ENGINEERING MATERIALS
COURSE CODE	:	BFC10502
PROGRAMME CODE	:	BFF
EXAMINATION DATE	:	JUNE / JULY 2019
DURATION	:	2 HOURS
INSTRUCTION	:	ANSWER **FOUR (4)** QUESTIONS ONLY

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

Q1 (a) A chalet renovation project is carried out 15 meter from the seashore. To ensure the chalet looks simple and competitive, the developer needs to plan for decorative works. Determine **THREE (3)** suitable types of cement for the project and explain your selection.

(9 marks)

(b) Cement is one of the main material in concrete mixing on site. Cement production in the factory has passed through several process to ensure its quality meets the standard requirement. Illustrate and elaborate **ONE (1)** test conducted on cement.

(10 marks)

(c) Aggregate is one of the main ingredients in concrete mixing and its properties play important roles in making good quality concrete. Identify and discuss **TWO (2)** aggregate classifications that can be used in construction works.

(6 marks)

Q2 (a) Given the following data:

Cement = 32 kg
Water = 16 kg
Fine aggregate = 47.5 kg
Coarse aggregate = 144.5 kg
Concrete density = 2400 kg/m^3

Calculate:

(i) total volume of concrete

(3 marks)

(ii) water cement ratio

(3 marks)

(iii) cement, water, fine aggregate and coarse aggregate content for volume of 0.08 m^3.

(4 marks)

(b) Discuss **THREE (3)** importances of the compressive strength test on concrete. Sketch a graph showing the relationship between compressive strength and water cement ratio for curing in 7 days and 28 days.

(10 marks)

(c) Justify **THREE (3)** techniques to produce lightweight concrete.

(5 marks)

Q3 (a) Masonry units can be classified into two main categories, which are hollow and solid. State **FOUR (4)** types of solid units and **TWO (2)** types of hollow units.

(6 marks)

(b) The design of brick bonding is important to ensure stability of brick wall. Explain English Bond and Flemish Bond aided with front view illustration.

(8 marks)

(c) Briefly describe the manufacturing process of brick aided with appropriate diagram.

(11 marks)

Q4 (a) Choose and sketch **FIVE (5)** type of natural wood defects from the following list :

(i) rindgall
(ii) upsets
(iii) knots
(iv) twisted fibres
(v) cup shake
(vi) heart shake
(vii) star shake

(10 marks)

(b) Describe fiber saturation point and explain the effect of moisture content on strength and durability of timber.

(9 marks)

(c) Discuss in detail the standard timber testing based on the listed properties :

(i) impact bending

(3 marks)

(ii) modulus of rupture

(3 marks)

Q5 (a) Steel and concrete are important materials commonly used in construction industry. Provide **FIVE (5)** differences between steel and concrete.

(5 marks)

(b) List **FOUR (4)** advantages and disadvantages of steel as structural material.

(4 marks)

(c) Explain the stress-strain behavior of steel with the aid of appropriate diagram.

(10 marks)

(d) Identify **SIX (6)** characteristics of high carbon steel.

(6 marks)

– END OF QUESTIONS –