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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2015/2016**

COURSE NAME : CONSTRUCTION ENGINEERING
COURSE CODE : BFC 21002
PROGRAMME : BACHELOR OF CIVIL
ENGINEERING WITH HONOURS
EXAMINATION DATE : DECEMBER 2015 / JANUARY 2016
DURATION : 2 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

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

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Q1 Raft foundation is categorized as a shallow foundation. It is a thick concrete slab reinforced with steel which covers the entire contact area of the structure like a thick floor. Sometimes area covered by raft may be greater than the contact area depending on the bearing capacity of the soil underneath. The principle of any raft foundation is to spread the load over the entire area of the site.

(a) State **FIVE (5)** situations in which raft foundation is suitable as a foundation.
(5 marks)

(b) Sketch and briefly explain **THREE (3)** types of raft foundation below.

- (i) Flate –plate
- (ii) Thickened flat-plate
- (iii) Waffle- plate

(15 marks)

(c) List down **FIVE (5)** differences between raft foundation and spread foundation.
(5 marks)

Q2 (a) Superstructure is that part of the structure which is above ground level, and which serves the purpose of its intended use and it's also most important component to the building constructions. The primary elements of superstructures are wall, floor, column, beam and roof. Explain the **FIVE (5)** steps in determining material for superstructure.

(10 marks)

(b) In building construction, utilities are important to support the operation of the building upon completion. Therefore, a good scheduling of work activities must be planned without compromising worker safety. Discover the hazard and safety precaution needs in underground construction work in installing utilities (water & sewer, electrical & telecommunication and etc.) with the aid of sketch.

(15 marks)

Q3 (a) Formwork systems used for concrete frame construction have continued to develop significantly since the early 1990s. Different formwork systems provide a wide range of concrete construction solutions that can be chosen to suit the needs of a particular development. Propose clearly **SIX (6)** factors to be considered as successful function of formwork.

(12 marks)

(b) Formwork is a structure, usually temporary, used to contain poured concrete and to mould it to the required dimensions and support until it is able to support itself. Discuss with the aid of diagram, of the formwork below.

- (i) Column formwork
- (ii) Beam formwork

(13 marks)

Q4 (a) Building construction requires concrete work and the selection of machinery is important in concrete works to ensure optimum efficiency and to avoid delays. Recommend **TWO (2)** criteria that need to be taken into account in the selection of machinery for concrete activities.

(4 marks)

(b) Ready mixed concrete is a mixture of paste and aggregates: the paste, composed of Portland cement and water, coats the surface of the fine and coarse aggregates. It is supplied to construction sites using the concrete mixer truck. Explain **THREE (3)** methods on how concrete is mixed in this truck.

(6 marks)

(c) Utility works is important to support the main construction works of the building in the realization of the use of the building. Therefore, the utility works should be carried out properly as outlined in the procedures and standards. State **FOUR (4)** procedures required for utilities construction and connection from start to end.

(8 marks)

(d) There are two types of reinforced concrete ground floor (depending on the ground condition), namely suspended floor slab and non- suspended floor slab. Sketch and label the followings :

- (i) Suspended floor slab
- (ii) Non- suspended floor slab

(5 marks)

(e) In supervising construction works, outlines the control measures that should be taken to prevent accidents caused by the concrete handling work.

(2 marks)

- END OF QUESTIONS -