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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
(ONLINE)
SEMESTER II
SESSION 2019/2020**

COURSE NAME : BUILDING CONSTRUCTION 1
(MATERIAL AND CONSTRUCTION)

COURSE CODE : BFR 21203

PROGRAMME CODE : BFR

EXAMINATION DATE : JULY 2020

DURATION : 6 HOURS

INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

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- Q1** (a) Building using stone masonry method is obtained by taking rock from the earth and reducing it to the required shapes and sizes for the construction. Define the terminology with **TWO (2)** examples for each of the following types of rock commonly quarried to produce building stone :
- (i) Igneous rock (3 marks)
 - (ii) Sedimentary rock (3 marks)
- (b) Indicate with graphics **FIVE (5)** basic bonding and pattern of stone masonry. (5 marks)
- (c) A wythe is a vertical layer of masonry units. Specify with illustration the procedure for building brick walls of a single wythe of running bond. (6 marks)
- (d) Concrete masonry units are like bricks, moulded to shape and size, and their properties can be closely controlled. Most concrete masonry units, however, are much larger than bricks, and, like stone, they require slightly different techniques for laying. Outline the **EIGHT (8)** laying process for concrete masonry wall. (8 marks)
- Q2** (a) There are various types of structural steel sections. Steel beam, steel channels, steel angles and steel flats are among the technical specifications. List **FOUR (4)** applications of steel channel. (4 marks)
- (b) Metal decking is one of the steel flooring systems used for construction in which its corrugated physical nature helps to increase stiffness and spanning capability. Describe with representation of section and axonometric image for the **THREE (3)** types of metal decking used in steel floor construction. (9 marks)
- (c) Sketch with annotation the connection detail of the following constructions of steel beam and column:
- (i) Moment Connections (2 marks)
 - (ii) Shear Connections (2 marks)
 - (iii) Semi-Rigid Connections (2 marks)

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- (d) In steel roofing system, rigid frames are one of the examples used which normally consist of two columns and a beam or girder that are rigidly connected at their joints. Explain with illustration the characteristic of the following types of rigid frames:
- (i) Two-pin rigid frame (2 marks)
 - (ii) Three-pin rigid frame (2 marks)
 - (iii) Arch rib rigid frame (2 marks)

- Q3** (a) Timber can be used to suit various type of wall system in construction.
- (i) Name and sketch **SIX (6)** types of timber styles that can be used for wall lining construction. (6 marks)
 - (ii) Illustrate and list **FOUR (4)** types of basic timber joints usually used in building construction. (4 marks)
- (c) Malacca Malay House, Terengganu Malay House and Negeri Sembilan Malay House are among the traditional Malay Houses in Malaysia which roughly shared the same timber house components and flooring system. Demonstrate with fundamental graphics and annotations **TEN (10)** steps of basic construction of a standard Malay traditional timber house. (10 marks)
- (d) There is an increasing rarity in today's urbanised residential setting where the wooden kampong house is fast disappearing and along with it, the use of timber in building construction due to its structural and mechanical issues. As an architect who specialized in building conservation, discuss **FIVE (5)** causes that may lead to the statement mentioned. (5 marks)

- Q4** (a) Timber is one of the construction materials that is still common for longhouses construction in rural area of Sarawak. A longhouse is a terraced street of separate dwellings covered by one roof and each family who stay in the longhouse basically has their separate room.

- (i) Based on your review and understanding as a builder and designer, justify **FIVE (5)** advantages of using timber for this type of residential buildings. (5marks)
- (ii) The traditional timber longhouse today however is a threatened typology as some of them either have disappeared, are no longer constructed, are tourism attractions or are being maintained as cultural artifacts only. Based on this statement, discuss **FIVE (5)** reasons that lead to these phenomena with regards to construction issue. (5 marks)
- (b) Glued laminated timber or glulam are large structural members which are produced by joining many small strips of wood together with glue.
- (i) Interpret in detail **THREE (3)** major reasons to apply glulam in construction. (3 marks)
- (ii) Glued laminated timber column sections are mostly found in round, square and rectangular shapes. Draw a section cut for the following types of laminated timber column sections:
- a. Cruciform (1 mark)
- b. I-section (1 mark)
- c. Triform (1 marks)
- (iii) Identify **SIX (6)** advantages of glulam in timber building industry. (6 marks)
- (c) Malaysian hardwoods are classified into three different categories based on their density and natural durability. Based on the following species examples below, label the hardwood classification and timber density range at 15% moisture content for each of them.
- (i) Meranti (1 mark)
- (ii) Merbau (1 mark)
- (iii) Kempas (1 mark)

END OF QUESTIONS