



UTHM

Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION SEMESTER II SESSION 2021/2022

COURSE NAME	:	CIVIL ENGINEERING MATERIAL
COURSE CODE	:	BFC 10502
PROGRAMME CODE	:	BFF
EXAMINATION DATE	:	JULY 2022
DURATION	:	2 HOURS
INSTRUCTION	:	<ol style="list-style-type: none">1. ANSWER ALL QUESTIONS2. THIS FINAL EXAMINATION IS AN ONLINE ASSESSMENT AND CONDUCTED VIA CLOSED BOOK.3. STUDENTS ARE PROHIBITED TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

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

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- Q1** (a) Portland cement is commonly used in mortar and concrete construction. Define the meaning of mortar and concrete. (4 marks)
- (b) State **THREE (3)** natural characteristics of aggregate that affect the quality of concrete. (6 marks)
- (c) Based on the sieve analysis result data given in **Table Q1**, you are required to plot the graph on **Figure Q1**, analyze and discuss the graph pattern. (15 marks)
- Q2** As an engineer in charge for concrete mixing plant, you need to prepare a concrete mix for a housing construction project.
- (a) Define concrete mix design. (2 marks)
- (b) Describe the sequence of step should be followed in use DoE method to mixing concrete. (8 marks)
- (c) List **FIVE (5)** factors that required for determining mix design proportion. (10 marks)
- (d) Give your opinion on the principal properties of 'good' concrete for this construction. (5 marks)
- Q3** A family at a rural area plans to build a single storey house using available natural resources which are clay and sand.
- (a) According to the above information, propose **ONE (1)** construction material that can be produced by the family. (3 marks)
- (b) State the function of the construction material suggested in **Q3 (a)** used for the house. (3 marks)
- (c) Discuss factors governing the strength of construction material suggested in **Q3 (a)** in terms of
- (i) Mortar strength (7 marks)

- (ii) Bonding and arrangement (7 marks)
- (d) Provide your opinion on the consequences if too much silica and too much alumina used in making construction material suggest in **Q3 (a)**. (5 marks)
- Q4** (a) Define steel in construction and list steel classification. (4 marks)
- (b) Differentiate between Bessemer process, Crucible process and Open Hearth process in steelmaking. (9 marks)
- (c) List **FOUR (4)** usage of steel in construction and briefly discuss any **TWO (2)** of the usage. (8 marks)
- (d) A construction company is facing a problem in concrete structure and they need to propose a solution to overcome the deficiencies in tensile and bending strength. In addition, the solution must result in a more ductile, tougher and can take shocks and vibration. Based on the given information, name the stated steel. (4 marks)

– END OF QUESTIONS –

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FINAL EXAMINATION

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TABLE Q1

Sieve Size (mm)	Weight Retained (g)
37.5	0
20.00	165
14.00	1307
10.00	463
5.00	62
Pan	3
TOTAL	2000

NAME: _____

MATRIC NO. _____

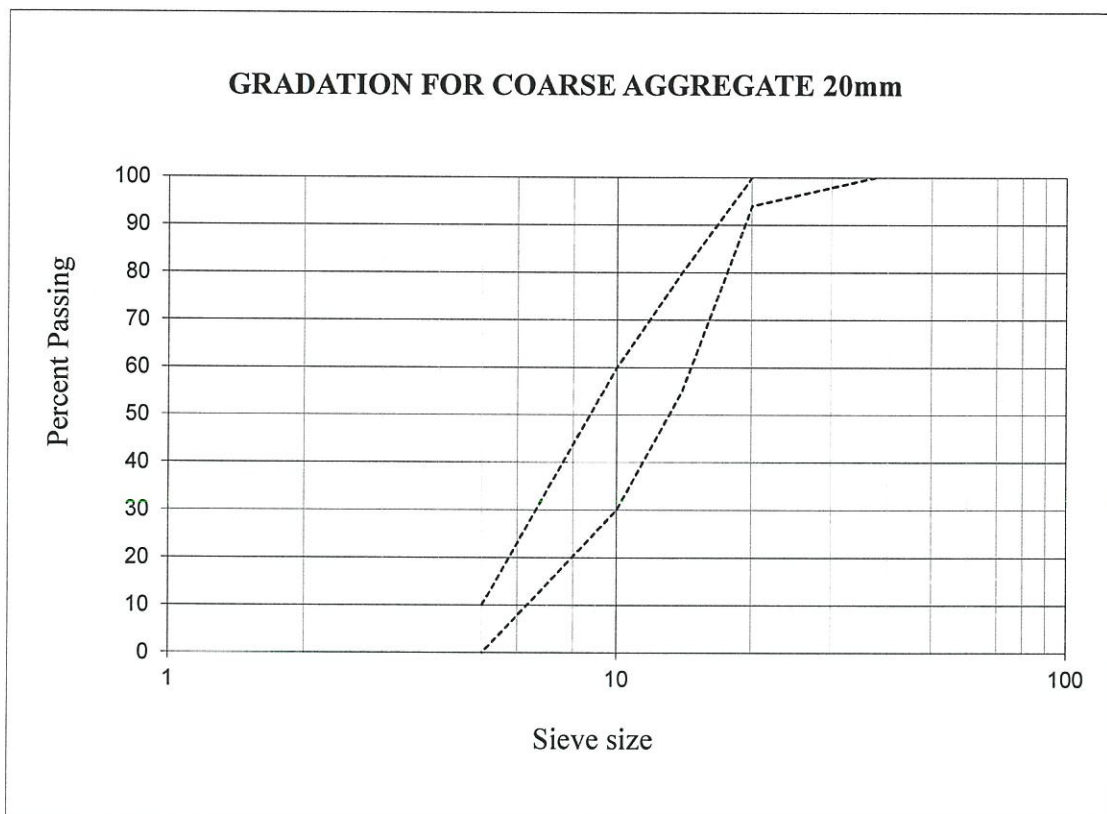


FIGURE Q1

