



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER 1
SESSION 2022/2023**

COURSE NAME : COMPOSITE
COURSE CODE : BDB 40703
PROGRAMME : BDD
EXAMINATION DATE : FEBRUARY 2023
DURATION : 3 HOURS
INSTRUCTION : 1. ANSWER **FIVE (5)** QUESTIONS
ONLY
2. THIS FINAL EXAMINATION IS
CONDUCTED VIA **CLOSED**
BOOK
3. STUDENTS ARE **PROHIBITED**
TO CONSULT THEIR OWN
MATERIAL OR ANY
EXTERNAL RESOURCE
DURING THE EXAMINATION
CONDUCTED VIA **CLOSED**
BOOK

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

- Q1** (a) The future of technological advancement in general, are dependent on composite materials. Interpret the important of composites in real world's application.
(5 marks)
- (b) Examine the properties of a manufactured composite material which depends on the individual properties of the constituents and their relative amounts, geometry, or distribution.
(5 marks)
- (c) Suggest the properties modification based on boundaries surfaces of composites.
(10 marks)
- Q2** (a) Differentiate the theoretical principal of superhydrophilic and superhydrophobic that shows no evidence of color or surface property changes such as sunburn, crack, dirt, oily deposition, and surface roughness.
(5 marks)
- (b) How would you categorize the bonding between reinforcement and matrix?
(5 marks)
- (c) Suggest the important of fiber terminology to any selected mechanical properties of composite.
(10 marks)
- Q3** (a) (i) Develop your own failure mode of composite foam panel by using schematic diagram upon applied load.
(5 marks)
- ii) Identify the main failure mode based on Q3 (a) (i).
(5 marks)

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- (b) Based on the flexural test configurations of 3-point bending test and 4-point bending test, suggest the suitable above method to be used for your specimens started with the samples preparation.

(10 marks)

- Q4** (a) Examine the metal constituent properties in the Fiber Metal Laminate (FML) which offers some plasticity that can be used in forming processes.

(5 marks)

- (b) The plastic behavior in hybrid materials is limited to the metal constituents, the fibers do not deform plastically. Justify that the imposed plastic deformation in fiber direction is limited by the failure strain of the fibers.

(5 marks)

- (c) Future developments of Fiber Metal Laminate (FML) should be aimed at the further development of the laminates and structures, and the development the manufacturing processes. Recommend the best property of FML to develop.

(10 marks)

- Q5** (a) Illustrate suitable construction for Ceramic Matrix Composites, CMC in engines, compared to metals with a minimum **FOUR (4)** types of reinforcing materials.

(5 Marks)

- (b) (i) Carbon fiber are the composites being used in the wind turbines applications. Support the statement by given that approximately 1/3 of this application is now made of carbon fiber composites”.

(5 marks)

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- (ii) Design and sketch the arrangement of fiber laminate for above mention composite components using your own ideas.

(10 marks)

- Q6**
- (a) Identify the factors that may affect composite properties based on particulate and fibrous' aspect ratio

(5 marks)

- (b) Identify the factors that may affect composite properties based on its physical characteristic.

(5 marks)

- (c) Determine the propagation characteristics of crack or delaminations of composites.

(5 marks)

- (d) Comment on the lagged development of CMCs behind MMCs and PMCs.

(5 marks)

-END OF QUESTIONS-

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