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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

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

COURSE NAME : MECHANICAL SCIENCES

COURSE CODE : BEF25903

PROGRAMME CODE : BEV

EXAMINATION DATE : FEBRUARY 2023

DURATION : 2 HOURS

INSTRUCTION :
1. ANSWER ALL QUESTIONS
2. THIS FINAL EXAMINATION IS 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 **TWO (2)** PAGES

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- Q1** (a) Compare the atomic structure and properties of metals, polymers, and ceramics as the fundamental types of material. (6 marks)
- (b) You are working on a new weatherproof casing for an environmental sensor device. Select the suitable type of material that should be used for the casing. Justify your reasons from mechanical and electrical aspects. (9 marks)
- Q2** (a) Describe the product design and development process with explanation and example for each step. (10 marks)
- (b) A PCB manufacturing company you are working for is planning to manufacture its latest microprocessor chip design beginning in January 2024. As the Head of Manufacturing Operations, explain your plan for the manufacturing operations. Explain at least in **THREE (3)** different aspects of discussion. (15 marks)
- Q3** (a) Explain the laws of thermodynamics. (5 marks)
- (b) A 90 W power transistor is to be cooled by attaching it to a heat sink. Calculate the maximum thermal resistance value of the heat sink if the transistor is not allowed to exceed 90°C. Assume the ambient air temperature is 35°C. (5 marks)
- Q4** For each of the topics below, give **ONE (1)** example application on how mechanical sciences is inter-related to electrical engineering discipline in ensuring the success of the application. Support the example with appropriate explanation.
- (i) Product design (5 marks)
- (ii) Manufacture (5 marks)

-END OF QUESTIONS -