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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2021/2022**

COURSE NAME : IC PACKAGING
COURSE CODE : BEJ 43503/ BED 41103
PROGRAMME CODE : BEJ
EXAMINATION DATE : JANUARY/ FEBRUARY 2022
DURATION : 4 HOURS
INSTRUCTION : 1. ANSWER ALL QUESTIONS.

2. THIS FINAL EXAMINATION IS A
**ONLINE ASSESSMENT AND
CONDUCTED VIA OPEN BOOK.**

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

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- Q1** (a) (i) Briefly explain the microsystem and microelectronics packaging. (7 marks)
- (ii) Imagine you are one of the package design engineers and you have a functional ICs that will be ready soon to be packaged. Explain at least **FIVE (5)** important criteria or requirements that should be taken or fulfilled before packaging the ICs. (10 marks)
- (b) Gordon Moore predicts that the transistors on a chip double every 24 months. This increased product functionality because of more transistors on the single ICs. Discuss **FOUR (4)** complexity and challenges in perspective of packaging to support Moore's law. (8 marks)
- Q2** (a) Die Attach (also known as Die Mount or Die Bond) is the process of attaching the silicon chip to the die pad or die cavity of the support structure (e.g., the leadframe) of the semiconductor package.
- (i) Explain the process of the Epoxy attach method. (5 marks)
- (ii) List **THREE (3)** the common failure mechanisms related to Die Attach process. (3 marks)
- (b) (i) Explain and sketch the structure of IC dual-in-line package and label the part of die, wire bonding, bond pad and lead frame. (10 marks)
- (ii) Analyse the differences between the methods of Thermo-compression and Thermo-sonic wire bonding. (6 marks)
- Q3** (a) Analyse the similarities and differences of requirements between sealing and encapsulation. (10 marks)
- (b) (i) Compare Printing Wiring Board (PWB) and Printing Circuit Board (PCB). (9 marks)
- (ii) Analyse the main factors affecting the performance of PWB. (6 marks)

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- Q4** (a) Packaging is needed in all ICs, which are classified into Through-Hole Technology (THT) and Surface Mount Technology (SMT). Both packages have their own unique packaging process flow.
- (i) Explain **THREE (3)** primary requirements that should be taken into consideration before the IC assembly process. (6 marks)
 - (ii) Analyse **FOUR (4)** advantages of Surface Mounting Technology (SMT). (8 marks)
 - (iii) Analyse **TWO (2)** differences between **THT** and **SMT**. (4 marks)
- (b) As mold engineer, you are required to design flowchart for the manufacture of a multilayer rigid PWB. (7 marks)

- END OF QUESTIONS -

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