Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2015/2016

COURSE NAME	:	IC PACKAGING
COURSE CODE	:	BED 41103
PROGRAMME	:	BACHELOR OF ELECTRONIC ENGINEERING WITH HONOURS
EXAMINATION DATE	:	DECEMBER 2015 / JANUARY 2016
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

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

Q1 (a) Electronics products such as cell phone, fax machine, microwave oven, computer and calculator are based on Microsystem Technologies.

(i) Define Microsystems.

(2 marks)

(ii) Give **FOUR (4)** evolution waves in Microsystem Technologies.

(4 marks)

(b) Match **FOUR (4)** analogy between human body and electronic packaging as depicted in **FIGURE 1(b)**.

(4 marks)

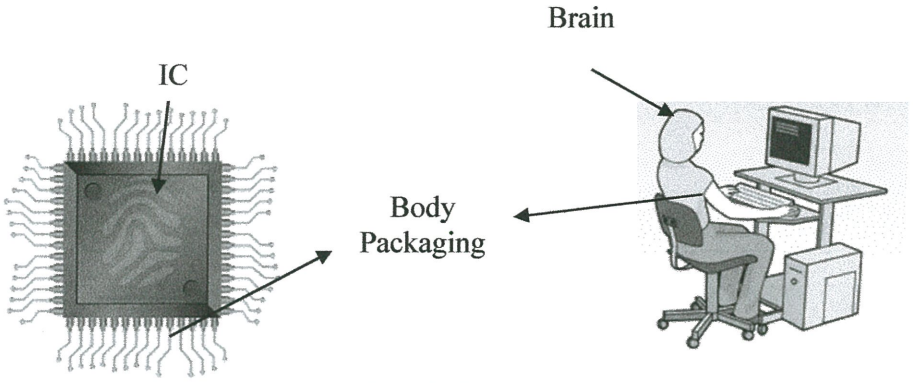

FIGURE 1(b)

(c) With the aid of a diagram, explain the simplified version of wafer to system assembly process. (4 marks)

(d) Packaging is needed in all IC, which are classified into Through-Hole Technology (THT) and Surface Mount Technology (SMT). Both packages have their own unique packaging process flow.

(i) Compare the mounting difference between THT and SMT.

(6 marks)

(ii) Illustrate and explain the flow of IC packaging process flow.

(5 marks)

Q2 (a) Microelectronic packaging was designed to establish interconnections with electrical components such as transistors, diodes, capacitor and resistors to form circuits. It is also needed to ensure the chips and interconnections are packaged in an efficient and reliable manner.

(i) Describe **ALL** packaging levels in microelectronic packaging

(3 marks)

(ii) Based on part **Q2(a)(i)**, investigate the package item, function and electrochemical process at every packaging level.

(10 marks)

(b) Chip-package interconnection technologies currently used in semiconductor industry include wire bond and tape automated bonding (TAB). With the aid of a diagram explain in detail of the process below:

(i) Wire Bond

(6 marks)

(ii) Tape automated bond (TAB)

(6 marks)

Q3 (a) Failure mechanisms in an electronic product are several. They are caused by thermo-mechanical, electrical, chemical and environmental mechanisms. Analyse **FIVE (5)** thermomechnical fundamentals.

(10 marks)

(b) The symptoms of failure in electronic devices are always observed at the system level. Understanding the mechanism that cause components failure are the key to make reliable microelectronic package.

(i) Classify **THREE (3)** failure mechanisms.

(6 marks)

(ii) Explain in detail the failure mechanisms in part **Q3(b)(i)**.

(9 marks)

Q4 Bonding pads on the entire surface of the chip and the flip-chip connection in ball grid array (BGA) package are expected to produce good results of size reduction.

(i) Design a diagram showing the flip-chip interconnection.
(5 marks)

(ii) Analyze **ALL** flip-chip bonding processes.
(10 marks)

(iii) Design the flip-chip assembly process.
(5 marks)

(iv) State the advantages of flip-chip interconnection.
(5 marks)

- END OF QUESTION -