



**BACHELOR OF SOFTWARE ENGINEERING (HONOURS) (APPLICATION
DEVELOPMENT)**

**FINAL EXAMINATION
FEBRUARY 2024**

Course: OEC3120 (Computer Architecture and Organisation) Time: 9.00AM – 12.00NOON
(3 hours)

Lecturer: Mohd Shahdi Bin Ahmad

Date: 20 April 2024

Instructions:

Answer **ALL** questions in the Answer Booklet provided.

The maximum number of marks is 100.

This question paper consists of **2** printed pages.
(excluding front cover)

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

- 1
 - a. Define the computer organization and architecture. **(4 MARKS)**
 - b. Pipelining hazards can disrupt the smooth flow of instructions.
 - I. Explain the pipelining in a computer processor. **(2 MARKS)**
 - II. Illustrate the pipelining of 5 Instructions. **(10 MARKS)**
 - c. Define the memory unit and arithmetic logic unit components in the Von Neumann model. **(9 MARKS)**

- 2

You wanted to test drive a brand-new car at the showroom. To start the engine, step on the brake AND press the push button, OR use the car key.

Following are the indicators of the signals:
 B = Brake
 P = Push Button
 C = Car key
 S = Engine start

 - a. Draw a truth table based on the given conditions to determine when the engine starts. **(8 MARKS)**
 - b. From the truth table in question 2(a), produce a Boolean expression to represent the engine starts. **(3 MARKS)**
 - c. Draw the logic circuit that can carry out the expression in question 2(b). **(6 MARKS)**
 - d. If the procedure to start the engine requires stepping on the brake, pressing the push button, and using the key, what is the Boolean expression to represent the engine starting? **(3 MARKS)**
 - e. Draw the logic circuit that can carry out the expression in question 2(d). **(2 MARKS)**
 - f. Write a Boolean expression if the procedure to start the engine requires pressing the button OR using the key. **(3 MARKS)**

- 3 Produce the truth table and logic circuit for the Boolean expression below:
- I. $F = A.B' + BC'D + CD'$ **(24 MARKS)**

 - II. Define the result of the expression True AND False. **(1 MARK)**
- 4 a. Show the expression $F = (A + B) * (C + D)$ in the following instructions:
- I. One address instruction **(6 MARKS)**

 - II. Two address instruction **(6 MARKS)**

 - III. Three address instruction **(3 MARKS)**
- b. Show the expression $F = (A + B) * (C)$ in the following instructions:
- I. One address instruction **(5 MARKS)**

 - II. Two address instruction **(5 MARKS)**

-END OF QUESTION PAPER-