

CONFIDENTIAL



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2017/2018**

COURSE NAME : FUNDAMENTALS OF COMPUTER ARCHITECTURE
COURSE CODE : DAT 10403
PROGRAMME CODE : DAT
EXAMINATION DATE : JUNE / JULY 2018
DURATION : 2 HOURS 30 MINUTES
INSTRUCTION : ANSWERS ALL QUESTIONS.

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THIS QUESTION PAPER CONSISTS OF FOUR (4) PAGES

- Q1** (a) Distinguish between computer architecture and computer organization with example. (4 marks)
- (b) (i) Sketch Von Neumann machine architecture design. (4 marks)
- (ii) Explain each attribute sketched in **Q1(b)(i)**. (2 marks)
- Q2** (a) Differentiate between Peripheral Component Interconnect (PCI) and Peripheral Component Interconnect Express (PCI-e). (4 marks)
- (b) (i) Illustrate the basic instruction cycle of machine. (2 marks)
- (ii) Explain each component illustrated in **Q2(b)(i)**. (4 marks)
- Q3** (a) Discuss **two (2)** consequences of Moore's Law. (4 marks)
- (b) A program runs in 10 seconds in computer A which has a processor with 2 Ghz clock rate. A student wants to build a new computer which runs the same program within 6 seconds and having clock cycle 1.5 times higher than in computer A. Identify the value of clock rate. (6 marks)
- Q4** (a) Define the following term:
- (i) Leftmost Significant Digit
- (ii) Nibble
- (iii) Moore's Law
- (iv) Binary System (4 marks)
- (b) Given the following decimal problem:
- $$y = 5 \times 12 + 6$$
- Convert y into the following numbering system:
- (i) Binary number (base-2). (3 marks)
- (ii) Hexadecimal number (base-16). (3 marks)

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Q5 (a) Given the following decimal number:

$$A = -15$$

$$B = +9$$

Represent A and B in 8 bits binary sequence by using the following number representation. Show all of your workings.

(i) Sign-Magnitude (2 marks)

(ii) Twos Complement (3 marks)

(b) Based on **Q4(a)**, resolve the following binary arithmetic operation by using 8 bits twos complement number representation. Show all of your workings.

(i) A+B (2 marks)

(ii) A-B (3 marks)

Q6 (a) (i) List **three (3)** methods to control input and output (I/O). (3 marks)

(ii) Explain each method listed in **Q6(a)(i)**. (3 marks)

(b) Name **two (2)** categories of external devices with example. (4 marks)

Q7 (a) Sketch memory hierarchy with example for each level. (6 marks)

(b) List **two (2)** differences between Static RAM and Dynamic RAM. (4 marks)

Q8 (a) An instruction set has following format:

LABEL *OPCODE* *OPERANDS*; *COMMENTS*

Define *OPCODE* and *OPERAND*.

(2 marks)

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(b) Given the following registers in the Arithmetic and Logic Unit (ALU):

R1	1	0	1	0	0	0	1	0
R2	1	1	1	0	0	1	1	0

Determine output of register after execute the following instruction:

- (i) RL R1 (1 mark)
- (ii) RR R2 (1 mark)
- (iii) ORL R2,R1 (2 marks)

(c) Write the instruction sets code for the following statement.

- (i) Data in 20H is copied to register R2.
- (ii) Data in R4 is added to Accumulator (A).
- (iii) Rotate Right A.
- (iv) Divide content of A with R2. (4 marks)

Q9 (a) Given the following Boolean expression:

$$Y = A.B + \bar{A}.C + B.C$$

- (i) Simplify Y. (5 marks)
- (ii) Based on **Q9(a)(i)**, draw the logic gates diagram. (5 marks)
- (iii) Construct the truth table based on logical gates in **Q(9)(ii)**. (4 marks)

(b) Compare digital and analog signal in terms of signal, wave and technology. (6 marks)

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-END OF QUESTIONS-

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