

## 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.



THIS QUESTION PAPER CONSISTS OF FOUR (4) PAGES

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- 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)

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)

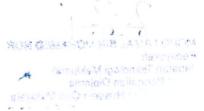
Q8 (a) An instruction set has following format:

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:

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

(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)



-END OF QUESTIONS-

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