



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2016/2017**

COURSE NAME : FUNDAMENTALS OF
COMPUTER ARCHITECTURE
COURSE CODE : DAT 10403
PROGRAMME : DAT
EXAMINATION DATE : JUNE 2017
DURATION : 2 HOURS 30 MINUTES
INSTRUCTION : ANSWER ALL QUESTIONS.

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THIS QUESTION PAPER CONSISTS OF EIGHT (8) PAGES

PART A

- Q1 Choose the TRUE statement about Input/Output (I/O) Module.
- A. It is simply a set of mechanical connectors that wire a device into the system bus.
 - B. It contains logic for performing a communication function between the peripheral and the bus.
 - C. It is a set of modules that connected the processor and the memory.
 - D. It acts as interfaces to the system bus or central switch and controls one or more memory modules.
- Q2 The following is an external or peripheral device EXCEPT _____.
- A. human readable
 - B. machine readable
 - C. communication
 - D. control signal
- Q3 Programmed I/O (PIO) refers to _____.
- A. CPU issuing commands to the I/O module then proceeds with its normal work until interrupted by I/O device on completion of its work
 - B. repeatedly checking the status of the I/O module
 - C. commanding then waits for I/O operations to be completed
 - D. data transfers initiated by a CPU under driver software control to access registers or memory on a device
- Q4 Direct Memory Access (DMA) means _____.
- A. device would interrupts the CPU when new data has arrived and is ready to be retrieved by the system processor
 - B. CPU will issues commands to the I/O module then proceeds with its normal work until interrupted by I/O device on completion of its work
 - C. controlling the exchange of data between main memory and the I/O device
 - D. CPU grants I/O module authority to read from or write to memory without involvement
- Q5 Identify which of the following is NOT being categorized as internal memory?
- A. Register
 - B. Disk
 - C. Cache
 - D. Main memory



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Q6 The capacity for internal memory is typically expressed in terms of _____.

- A. Bit
- B. bytes
- C. words
- D. bytes and words

Q7 “Access must be made in a specific linear sequence.”

Identify the correct method in accessing data from memory according to the statement above.

- A. Direct access
- B. Associative access
- C. Sequential access
- D. Random access

Q8 Memory organized into units of data called as _____.

- A. records
- B. files
- C. words
- D. bytes

Q9 Main memory and some cache systems uses which type of data accessing method?

- A. Sequential access
- B. Direct access
- C. Random access
- D. Associative access

Q10 From a user’s point of view, the two most important characteristics of memory are _____.

- A. capacity and performance
- B. access method and capacity
- C. performance and physical characteristics
- D. capacity and location

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Q11 Which of the following statement on physical characteristics of data storage is TRUE?

- i. In a volatile memory, information decays naturally or is lost when electrical power is switched off.
- ii. In a nonvolatile memory, information once recorded remains without deterioration until deliberately changed; no electrical power is needed to retain information.
- iii. Non-erasable memory cannot be altered, except by destroying the storage unit.
- iv. Volatile memory does not requires the stored information to be periodically re-read and re-written.

- A. i and ii
- B. i, ii and iii
- C. i, iii and iv
- D. All of the above

Q12 A "memory hierarchy" in computer storage distinguishes each level in the "hierarchy" by _____.

- A. capacity
- B. speed
- C. response time
- D. performance

Q13 As one goes down the hierarchy, the following occur EXCEPT _____.

- A. increasing capacity
- B. increasing cost per bit
- C. increasing access time
- D. decreasing frequency of access of the memory by the processor

Q14 Which of the variables below can be considered for the design constraint on a computer's memory?

- i. Capacity
- ii. Speed
- iii. Size
- iv. Price

- A. i, ii and iii
- B. i and ii
- C. i, ii and iv
- D. iii and iv

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- Q15 The trade-off among the three key characteristics of memory are _____.
- A. cost, unit of transfer and location
 - B. performance, size and cost
 - C. access time, cost and organization
 - D. capacity, access time and cost
- Q16 _____ acts as a buffer between the CPU and main memory.
- A. Cache memory
 - B. Register
 - C. Accumulator
 - D. RAM
- Q17 Diskette drives fall into the magnetic storage category because _____.
- A. they use magnetic fields
 - B. they were made from magnetic elements
 - C. they record data as magnetic fields
 - D. they read data as magnetic fields
- Q18 Processor's instruction sets can be defined as _____.
- A. the collection of I/O modules that connect the processor with the memory
 - B. the collection of different instructions that will be read by the memory
 - C. the collection of different instructions that the processor can execute
 - D. the collection of instructions that is needed by the bus system to transfer data
- Q19 Computer language that can be directly understood by a computer without any language translator is called _____.
- A. Assembly Language
 - B. Machine Language
 - C. High Level Language
 - D. C Programming Language
- Q20 Computer arithmetic is commonly performed on two very different types of numbers, which are _____.
- A. integer and floating point
 - B. binary and decimal
 - C. Boolean and char
 - D. floating point and double

(20 marks)

PART B

Q21 (a) Construct an instruction set for the following arithmetic opcodes.

- (i) ADD
- (ii) SUB
- (iii) MPY
- (iv) DIV

(8 marks)

(b) Determine the content of Accumulator (A) after the following instruction is executed.

0	1	1	0	0	0	1	1
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- (i) RL A
- (ii) RR A

(2 marks)

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

- (i) Data in 55H is moved to Accumulator (A).
- (ii) Content in A is copied to Port 1.

(4 marks)

(d) Distinguish between Assembly Language, Machine Language and High Level Language.

(6 marks)

Q22 (a) Determine the twos complement representation for the following numbers using 8-bit binary sequence. Show ALL your workings.

- (i) +18
- (ii) -11



(8 marks)

(b) Determine the Sign-Magnitude representation for the following numbers using 8-bit binary sequence. Show ALL your workings.

- (i) +4
- (ii) -4

(4 marks)

(c) Convert the binary number 11011_2 to the following numbering system. Show ALL your workings.

- (i) Decimal
- (ii) Hexadecimal
- (iii) Octal

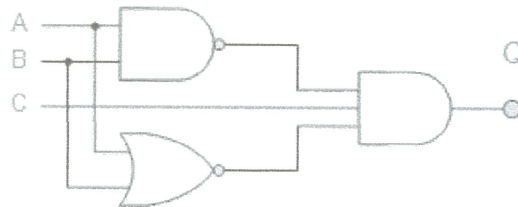
(6 marks)

(d) State TWO (2) disadvantages of Sign-Magnitude representation.

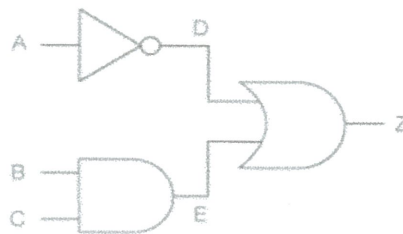
(2 marks)

Q23 (a) Construct truth table for the following figures.

(i)



(ii)



(8 marks)

(b) Illustrate the logic gate diagram based on the truth table.

(i)

A	B	Q
0	0	0
0	1	1
1	0	1
1	1	1

(ii)

A	B	Q
0	0	1
0	1	1
1	0	1
1	1	0

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(iii)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

(9 marks)

(c) Differentiate between Analog and Digital technologies in terms of waves, memory and flexibility.

(3 marks)

Q24 (a) Distinguish between computer architecture and computer organization.

(4 marks)

(b) At each level of computer hierarchical, the designer concerned with structure and function. One of the basic functions is data movement.

Explain the data movement operation with illustration.

(6 marks)

(c) Program execution consists of repeating the process of instruction fetch and instruction execution. The processing required for a single instruction is called an instruction cycle.

Draw the basic instruction cycle in program execution.

(4 marks)

(d) A computer consists of a three components or modules which are processor, memory and input output.

Explain these three modules with illustration.

(6 marks)

- END OF QUESTIONS -

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