SECTION A : 80 MARKS
BAHAGIAN A : 80 MARKAH

INSTRUCTION:
This section consists of **FOUR (4)** structured questions. Answer **ALL** questions.

ARAHAN:
Bahagian ini mengandungi EMPAT (4) soalan berstruktur. Jawab SEMUA soalan.

QUESTION 1
SOALAN 1

CLO1
C1

(a)   State meanings of:

i.   Computer Organization

ii.   Firmware (BIOS System)

Nyatakan maksud bagi:

i.   Organisasi Komputer

ii.   Firmware (Sistem BIOS)

[4 marks]
[*4 markah*]

CLO1
C2

(b)   Explain **THREE (3)** comparisons between CISC (Complex Instruction Set Computers) architecture and RISC (Reduced Instruction Set Computers) architecture.

Terangkan TIGA (3) perbezaan di antara senibina CISC (Set Arahan Komputer Kompleks) dan senibina RISC (Set Arahan Komputer Dikurangkan).

[6 marks]
[*6 markah*]

CLO1
C3

(c)   Sketch a computer organization that contains CPU, memory, input/output and bus system in details including all parts in each component.

Lakarkan sebuah organisasi komputer yang merangkumi CPU, ingatan, masukan/keluaran dan sistem bas dengan terperinci termasuk semua bahagian di dalam setiap komponen.

[10 marks]
[*10 markah*]

QUESTION 2
SOALAN 2

CLO1
C1

(a) Define the function of:

   i.   Arithmetic Logic Unit (ALU)

   ii.   Register

Terangkan fungsi bagi:

   i.   *Unit Aritmetik dan Logik (ALU)*

   ii.   *Daftar*

[4 marks]
[*4 markah*]

CLO1
C2

(b) Explain **THREE (3)** steps for an instruction cycle execution of pipeline operation.

*Terangkan **TIGA (3)** langkah untuk perlaksanaan kitar arahan bagi operasi pipeline.*

[6 marks]
[*6 markah*]

CLO1
C3

(c) Calculate the equation below in binary number system by using 2's complement method. (Show all the calculations involved thoroughly.)

Kirakan persamaan di bawah dalam sistem nombor perduaan. Gunakan kaedah pelengkap 2 bagi operasi penolakan. (Tunjukkan semua pengiraan yang terlibat dengan lengkap.)

$$(199_{10} - 73_{10}) + (115_{10} - 82_{10}) =$$

[10 marks]
[*10 markah*]

QUESTION 3
SOALAN 3

CLO1
C1

(a) List **FOUR (4)** types of hard drive in the market.

[4 marks]
[*4 markah*]

CLO1
C3

(b) Draw page table to describe virtual memory implementation using paging technique based on Figure A3b. (Assuming logical memory divided into 10 pages and physical memory divided into 12 frames.)

Lukis jadual halaman bagi menggambarkan perlaksanaan teknik penghalaman berdasarkan Rajah A3b. (Anggap ingatan logikal dibahagikan kepada 10 halaman dan ingatan fizikal dibahagikan kepada 12 bingkai.
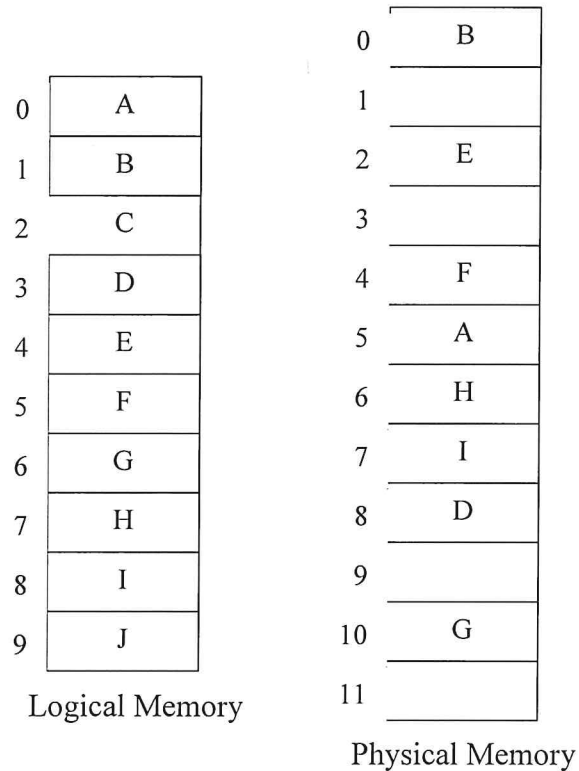

Figure A3b / *Rajah A3b*

[8 marks]
[*8 markah*]

CLO1
C3

(c) Attain the tag and line of main memory address for cache memory implementations using direct mapping with the information in Figure A3c.

Dapatkan tag dan baris bagi alamat ingatan utama untuk pelaksanaan ingatan sorok menggunakan pemetaan terus berpandukan maklumat di dalam Rajah A3c.

> Main memory capacity is 32MBytes.
> Cache memory capacity is 16KBytes.
> Word size is 3 bit.
>
> *Kapasiti ingatan utama ialah 32MBytes.*
> *Kapasiti ingatan sorok ialah 16KBytes.*
> *Saiz kata ialah 3 bit.*

Figure A3c / *Rajah A3c*

[8 marks]
[*8 markah*]

QUESTION 4
SOALAN 4

CLO1
C2

(a) Compare **TWO (2)** differences between isolated I/O and memory mapping I/O.

*Bandingkan **DUA (2)** perbezaan di antara I/O terasing dan Pemetaan Ingatan I/O.*

[5 marks]
[*5 markah*]

CLO1
C2

(b) Compare **TWO (2)** differences between asynchronous data transfer and synchronous data transfer.

*Bandingkan **DUA (2)** perbezaan di antara pemindahan data tak segerak dan pemindahan data segerak.*

[5 marks]
[*5 markah*]

CLO1
C3

(c) Demonstrate steps for data transfer from hard disk to main memory using Direct Memory Access (DMA) controller with diagram and explanation.

Demonstrasi langkah-langkah bagi penghantaran data daripada cakera keras kepada ingatan utama menggunakan kawalan Capaian Ingatan Terus (DMA) dengan menggunakan rajah dan penerangan.

[10 marks]
[*10 markah*]

SECTION B : 20 MARKS
BAHAGIAN B : 20 MARKAH

INSTRUCTION:
This section consists of **ONE (1)** essay question. Answer **ALL** questions.

ARAHAN:
Bahagian ini mengandungi SATU (1) soalan esei. Jawab SEMUA soalan.

QUESTION 1
SOALAN 1

CLO1
C5

Propose a design of 4-bit adder from 1-bit full adder circuit. Use truth table in Table B1 to start your design.

Cadangkan rekaan bagi penambah 4 bit daripada litar penambah penuh 1 bit. Gunakan jadual kebenaran di Jadual B1 untuk memulakan rekaan anda.

Table B1: Truth table for 1-bit full adder
Jadual B1: Jadual kebenaran untuk penambah penuh 1 bit

Input			Output	
A	B	C	S	Cout
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

[20 marks]
[*20 markah*]

SOALAN TAMAT