

SULIT



BAHAGIAN PEPERIKSAAN DAN PENILAIAN  
JABATAN PENDIDIKAN POLITEKNIK  
KEMENTERIAN PENDIDIKAN MALAYSIA

JABATAN KEJURUTERAAN ELEKTRIK

PEPERIKSAAN AKHIR  
SESI DISEMBER 2014

**EC303: COMPUTER ARCHITECTURE AND ORGANIZATION**

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TARIKH : 13 APRIL 2015  
MASA : 2.30 – 4.30 PETANG

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Kertas ini mengandungi **EMPAT BELAS (14)** halaman bercetak.

Bahagian A: Objektif (20 soalan)

Bahagian B: Subjektif (10 soalan)

Bahagian C: Esei (2 soalan)

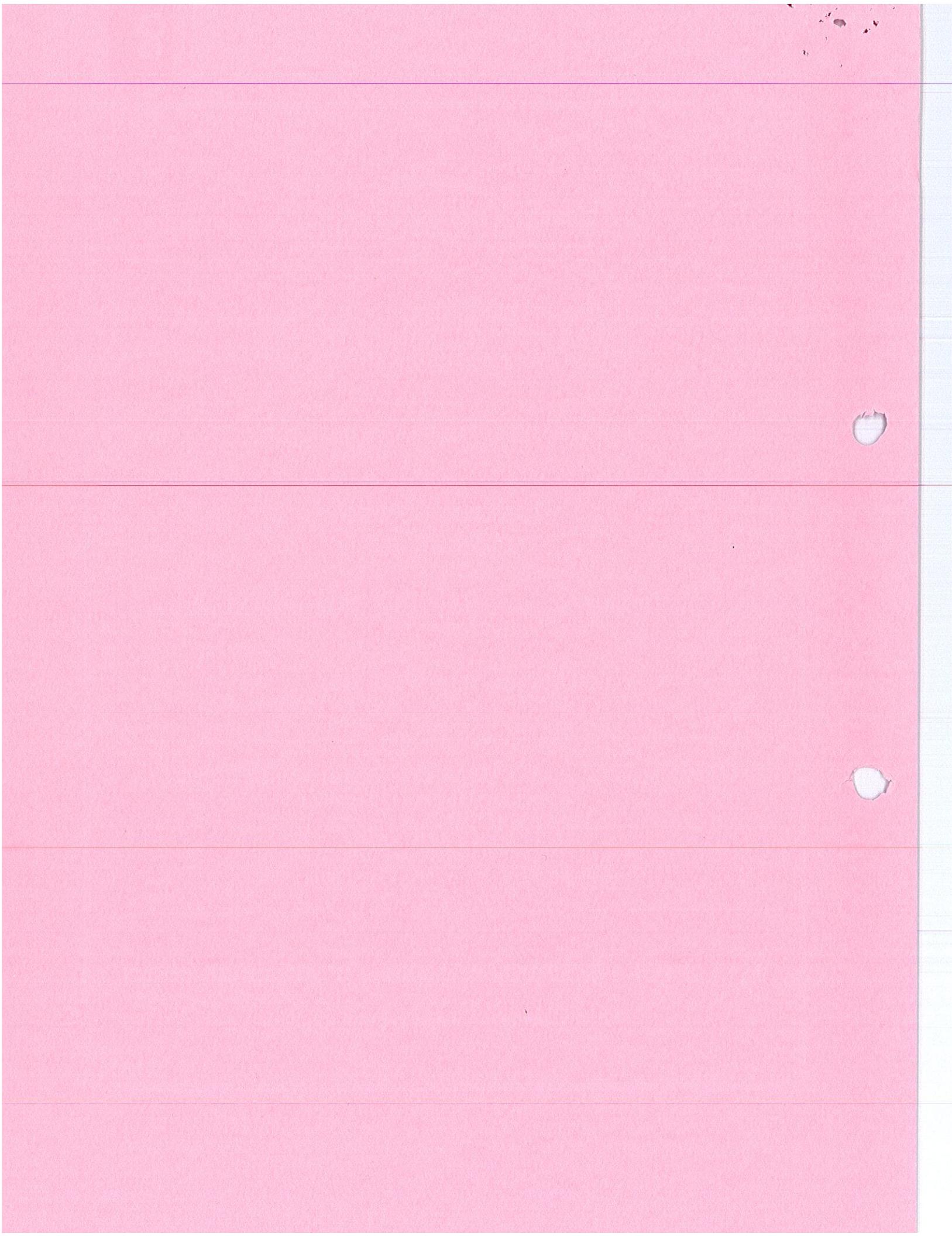
Dokumen sokongan yang disertakan : Tiada

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**JANGAN BUKA KERTAS SOALANINI SEHINGGA DIARAHKAN**

(CLO yang tertera hanya sebagai rujukan)

SULIT



**SECTION A : 20 MARKS**  
**BAHAGIAN A : 20 MARKAH**

**INSTRUCTION:**

This section consists of **TWENTY (20)** objective questions. Mark your answers in the OMR form provided.

**ARAHAN :**

Bahagian ini mengandungi **DUA PULUH (20)** soalan objektif. Tandakan jawapan anda di dalam borang OMR yang disediakan.

CLO1  
C1

1. Which programming languages are classified as low level languages?

*Bahasa pengaturcaraan manakah yang diklasifikasi sebagai bahasa aras rendah?*

A. Basic, Cobol, Fotran.  
*Basic, Cobol, Fotran.*

B. Prolog 2, Expert System.  
*Prolog 2, Expert System.*

C. Knowledge Based System.  
*Knowledge Based System.*

D. Assembly Languages.  
*Assembly Languages.*

CLO1  
C2

2. What is the meaning of a compiler?

*Apakah yang dimaksudkan dengan pengkompil?*

A. A compiler does a conversion line by line as the program is run  
*pengkompil melaksanakan tugas baris demi baris ketika arahan berjalan.*

B. A compiler converts the whole of a higher level program code into machine code into a single format.

*Pengkompil menukar arahan dalam bahasa tinggi kepada kod mesin mengikut format tertentu.*

C. A compiler is a general purpose language providing very efficient execution  
*Pengkompil adalah bahasa umum yang sangat efisen untuk melaksanakan arahan.*

D. None of the above  
*Tiada di atas.*

- CLO2 3. Two design entry methods that can be used to program a PLD are:

C1

*Dua kaedah yang digunakan untuk memprogram sebuah PLD ialah:*

- A. Simulate and Program.  
*Simulasi dan Program.*
- B. Graphic and Text.  
*Grafik dan Teks.*
- C. CLD and Flow.  
*CLD dan Aliran.*
- D. Hardware and Software.  
*Perkakasan dan Perisian.*

CLO2  
C2

4. *J-K flip-flop will be in toggle condition if*

*Flip-flop JK akan ke keadaan 'toggle' jika*

- A.  $J = 0, K = 0$   
 $J = 0, K = 0$
- B.  $J = 1, K = 1$   
 $J = 1, K = 1$
- C.  $J = 1, K = 0$   
 $J = 1, K = 0$
- D.  $J = 0, K = 1$   
 $J = 0, K = 1$

CLO2  
C2

5. Microprocessors in computers system, whether micro, mini or mainframe must have

*Mikropemproses yang terdapat didalam sistem komputer sama ada mikro, mini atau kerangka utama mestalah memiliki*

- A. ALU  
*ALU*
- B. Primary Storage  
*Storan utama*
- C. Control unit  
*Unit Kawalan*
- D. All of above  
*Semua diatas*

- CLO2 C2 6. What is the function of control unit in the CPU?  
*Apakah fungsi unit kawalan dalam CPU?*
- A. Interpret instructions and guides processing unit through program.  
*Mentafsir arahan dan memandu unit pemprosesan melalui program.*
- B. Stores data as contents.  
*Menyimpan data isi kandungan.*
- C. Perform arithmetic and logical operation.  
*Melaksanakan aritmetik dan operasi logik.*
- D. Conveys information from computer to external environment.  
*Mengeluarkan maklumat dari komputer kepada persekitaran luar.*
- CLO2 C2 7. Convert the decimal number 2345 into binary number system.  
*Tukarkan nombor desimal 2345 ke dalam bentuk nombor penduaan.*
- A. 1001 0010 1001  
1001 0010 1001
- B. 1001 0010 1001 0000  
1001 0010 1001 0000
- C. 1101 0010 1001  
1101 0010 1001
- D. 1001 0010 100  
1001 0010 100
- CLO2 C2 8. Which is NOT true about hexadecimal number system?  
*Manakah kenyataan **SALAH** mengenai nombor Heksadesimal ?*
- A. FFFF is one of the hexadecimal number system.  
*FFFF ialah nombor dalam bentuk heksadesimal.*
- B. The hexadecimal number system consists of A, B, C, D, E and F.  
*Nombor heksadesimal hanya mengandungi huruf A, B, C, D, E dan F.*
- C. Hexadimal number system is the same as decimal number system.  
*Sistem nombor heksadesimal sama seperti sistem nombor decimal.*
- D. A binary number “0101” is equal to “0005” in hexadecimal number.  
*Nombor penduaan “0101” berpadanan “0005” dalam heksadesimal .*

CLO2  
C2

9. The truth table for half adder is shown below in Table 1. The Boolean functions for the two outputs can be obtained from the truth table which are:

*Jadual kebenaran bagi penambah separuh ditunjukkan dalam Jadual 1 di bawah. Fungsi Boolean untuk kedua-dua output boleh didapati daripada jadual kebenaran iaitu:*

Table 1 / Jadual 1

INPUT		OUTPUT	
X	Y	C	S
0	0	0	0
0	1	0	1
1	0	0	1
1	1	1	1

A.  $S = X + Y$   
 $C = X \oplus Y$

B.  $S = X + Y$   
 $C = XY$

C.  $S = XY$   
 $C = X \oplus Y$

D.  $S = X \oplus Y$   
 $C = XY$

CLO2  
C2

10. The content of a 8-bit register is initially 1011 1101. The register is shifted two times to the right with the serial input. What is the content of the register after two times shifted?

*Kandungan sebuah daftar 8 bit ialah 1011 1101. Daftar tersebut dianjakkan dua kali ke kanan dengan masukan sesiri. Apakah kandungan daftar tersebut selepas dianjak dua kali?*

A. 1011 1101  
1011 1101

B. 0011 1101  
0011 1101

C. 1111 1111  
1111 1111

D. 0010 1111  
0010 1111

CLO2  
C2

11. Which of the following type of sequential logic circuit is mainly used for storage of digital data?

- A. Shift registers.  
*Daftar anjakan.*
- B. CPU.  
*CPU.*
- C. Storage.  
*Storan.*
- D. Input/Output.  
*Input / Output.*

CLO2  
C2

12. Half adder is implemented using \_\_\_\_\_ gates.

*Half Adder dilaksanakan menggunakan \_\_\_\_\_ get.*

- A. OR and NAND  
*ATAU dan TAK-DAN*
- B. OR, AND and NOT  
*ATAU, DAN dan TAK*
- C. NOR, OR and NOT  
*TAK-ATAU, ATAU dan TAK*
- D. NAND and NOT  
*TAK-DAN dan TAK*

CLO3  
C2

13. The specific function of main memory is to hold (store):

*Fungsi spesifik bagi memori utama ialah menyimpan*

- A. All data to be processed.  
*Semua data yang hendak diproses*
- B. Intermediate result of processing.  
*Hasil pertengahan pemprosesan.*
- C. Final result of processing.  
*Hasil akhir pemprosesan.*
- D. All of the above  
*Semua di atas.*

- CLO3  
C3      14. Movement of programs and data, between main memory and secondary storage, is performed automatically by the operating system.

*Pergerakan program dan data di antara memori dan simpanan kedua dilaksanakan secara automatik oleh sistem pengoperasian.*

This technique is called

*Teknik ini dipanggil*

- A. Pipeline  
*'Pipeline'*
- B. Virtual memory  
*Memori Maya*
- C. Paging  
*'Paging'*
- D. Multiplexer  
*'Pemultipleks'*



- CLO3  
C3      15. The average time required to reach a storage location in memory and to obtain its contents is called the \_\_\_\_\_.  
*Purata masa yang diperlukan untuk mencapai lokasi storan dalam ingatan dan mendapatkan maklumat dikenali sebagai \_\_\_\_\_.*

- A. seek time  
*masa dapatan.*
- B. turn around time  
*masa pusing semula*
- C. access time  
*masa mencapai*
- D. transfer time  
*masa pindah*



- CLO3 16. Identify the location of cache memory in Computer System

C2

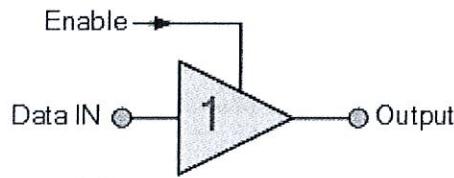
*Kenalpasti lokasi bagi memori cache di dalam sistem komputer*

- A. CPU and RAM  
*CPU dan RAM*
- B. RAM and ROM  
*RAM dan ROM*
- C. CPU and Hard Disk  
*CPU dan Cakera Keras*
- D. RAM and ALU  
*RAM dan ALU*

- CLO3 17. Referring to symbol below :

C3

*Merujuk simbol di bawah:*



**Diagram1: Tri-state Buffer**

Output for Diagram 1 is valid if:

*Keluaran bagi Rajah 1 akan sah apabila:*

- A. Data IN equal to '1'  
*'Data IN' sama dengan '1'*
- B. Output equal to '1'  
*'Output' sama dengan '1'*
- C. Enable equal to '1'  
*'Enable' sama dengan '1'*
- D. Enable equal to '0'  
*'Enable' sama dengan '0'*

CLO3 C3	<p>18. Which of the following techniques is used to transfer data from main memory to peripheral devices?</p> <p><i>Di antara berikut, teknik yang manakah digunakan untuk memindahkan data dari ingatan utama ke peranti persision ?</i></p> <p>A. Data transfer <i>Penghantaran Data</i></p> <p>B. Input transfer <i>Penghantaran Masukan</i></p> <p>C. DMA transfer <i>Penghantaran DMA</i></p> <p>D. Single transfer <i>Penghantaran Tunggal</i></p> <p>19. Choose the addressing technique that will separate the address space between memory and I/O device:</p> <p><i>Pilih teknik pengalamatan yang memisahkan ruang alamat diantara ingatan dan peranti I/O.</i></p> <p>A. Memory-mapped I/O <i>Ingatan-terpeta I/O</i></p> <p>B. Segmentation <i>Segmentasi</i></p> <p>C. memory register <i>Daftar Ingatan</i></p> <p>D. Paging <i>'Paging'</i></p> <p>20. Identify the component that acts as an intermediary between the device and the buses.</p> <p><i>Kenalpasti komponen yang menjadi perantara di antara peranti dengan bas</i></p> <p>A. Interface circuits                      B. Device drivers <i>Litar perantaramuka                      Pemandu peranti</i></p> <p>C. Buffers                                    D. None of the above <i>Penimbal                                    Tiada di atas</i></p>
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**SECTION B : 30 MARKS**  
**BAHAGIAN B : 30 MARKAH**

**INSTRUCTION:**

This section consists of **TEN (10)** structured questions. Answer **ALL** questions.

**ARAHAN:**

Bahagian ini mengandungi **SEPULUH (10)** soalan berstruktur. Jawab semua soalan.

CLO1

**QUESTION 1**

State **THREE(3)** reason why we need to study computer organization and architecture ?

**SOALAN 1**

Nyatakan **TIGA(3)** sebab mengapa kita perlu mempelajari organisasi dan senibina komputer ?

[3 marks]  
[3 markah]

CLO2

**QUESTION 2**

List **THREE (3)** types of PLDs.

**SOALAN 2**

Senaraikan **TIGA (3)** jenis PLDs .

[3 marks]  
[3 markah]

CLO2

**QUESTION 3**

In binary subtraction operation, calculate  $100000 - 11101$ .

**SOALAN 3**

Dalam operasi penolakan perduaan, kirakan  $100000 - 11101$ .

[3 marks]  
[3 markah]

CLO2

**QUESTION 4**

Explain how pipeline techniques improve CPU speed.

**SOALAN 4**

Terangkan bagaimana teknik ‘pipeline’ meningkatkan kelajuan CPU.

[3 marks]  
[3 markah]

CLO2

**QUESTION 5**

C2 Describe how integer is implemented in ALU.

**SOALAN 5***Terangkan bagaimana integer dilaksanakan di ALU.*[3 marks]  
[3 markah]

CLO2

**QUESTION 6**

C3 Sketch the block diagram of 4 - inputs multiplexer.

**SOALAN 6***Lakarkan gambarajah blok bagi pemultipleks 4 – masukan.*[3 marks]  
[3 markah]

CLO3

**QUESTION 7**

C3 Sketch a memory devices hierarchy.

**SOALAN 7***Lakarkan hirarki peranti memori.*[3 marks]  
[3 markah]

CLO3

**QUESTION 8**

C3

A memory chip has the capacity of  $5k \times 8$ , calculate:

- Numbers of address lines
- Capacity in bytes

**SOALAN 8***Satu cip memori berkapasiti  $5k \times 8$ , kirakan:*

- bilangan aliran alamat
- kapasiti bait

[3 marks]  
[3 markah]

CLO3

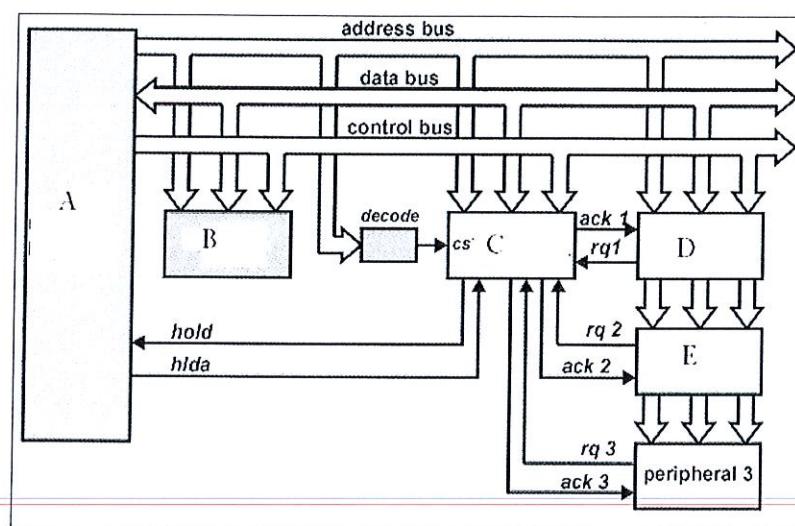
**QUESTION 9**

C3

Complete the block diagram A, B and C in the Figure B9.

**SOALAN 9**

Lengkapkan rajah blok A,B dan C di dalam Rajah B9.



[3 marks]  
[3 markah]

CLO3

**QUESTION 10**

C3

Carry out **TWO (2)** reasons why USB 3.0 faster than USB 2.0 in data transferring.

**SOALAN 10**

Berikan **DUA (2)** sebab USB 3.0 lebih laju berbanding USB 2.0 di dalam pemindahan data.

[3 marks]  
[3 markah]

**SECTION C : 50 MARKS**  
**BAHAGIAN C : 50 MARKAH**

**INSTRUCTION:**

This section consists of **TWO (2)** essay questions. Answer **ALL** questions.

**ARAHAN:**

Bahagian ini mengandungi **DUA (2)** soalan eseai. Jawab **SEMUA** soalan.

**QUESTION 1**  
**SOALAN 1**

CLO2  
C1

- a) Define function of Arithmetic Logic Unit (ALU) in computer system.  
*Jelaskan fungsi 'Arithmetic Logic Unit' (ALU) dalam sistem komputer.*

[3 marks]  
[3 markah]

CLO2  
C3

- b) Illustrate the operation of BCD Adder for  $0101 + 0010$  using Full Adder and Half Adder Block  
*Lakarkan operasi penambahan BCD bagi  $0101 + 0010$  dengan menggunakan Blok 'Full Adder' dan 'Binary Adder'.*

[12 marks]  
[12 markah]

CLO2  
C1

- c) State **TWO (2)** differences between Half Adder and Full Adder  
*Nyatakan **DUA(2)** perbezaan antara 'Half Adder' dengan 'Full Adder'*

[4 marks]  
[4 markah]

CLO2  
C1

- d) Define Parallel Adder and sketch its block diagram  
*Jelaskan maksud 'Parallel Adder' dan lakarkan gambarajah bloknya .*

[6 marks]  
[6 markah]

**QUESTION 2**  
**SOALAN 2**

- CLO3  
C2 (a) Explain the needs of Virtual Memory in computer systems and give a suitable example of its application.

*Terangkan keperluan Memori Maya dalam sistem komputer dan berikan contoh penggunaan yang sesuai.*

[3 marks]  
[3 markah]

- CLO3  
C3 (b) Illustrate the given terms with aid of diagram :

*Gambarkan terma yang diberikan dengan bantuan gambarajah:*

- i. Linear Virtual Memory / Memori Maya Linear

[6marks]  
[6 markah]

- ii. Segmented Virtual Memory / Memori Maya Tersegmen

[7 marks]  
[7 markah]

- CLO3  
C3 (c) Complete the truth table in Table C2(c) for 2-to-4 decoder below.

*Lengkapkan jadual kebenaran bagi penyahkod 2-ke-4 di dalam jadual C2 (c) di bawah.*

Table C2(c) / Jadual C2(c)

Input		Output			
A0	A1				
0	0				
1	0				
0	1				
1	1				

[9 marks]  
[9 markah]

**SOALAN TAMAT**

