

SULIT



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK
KEMENTERIAN PENDIDIKAN TINGGI**

JABATAN KEJURUTERAAN ELEKTRIK

PEPERIKSAAN AKHIR

SESI JUN 2015

EC304 : MICROPROCESSOR FUNDAMENTAL

TARIKH : 02 NOVEMBER 2015

TEMPOH : 11.15 AM - 1.15 PM (2 JAM)

Kertas ini mengandungi **SEMBILAN BELAS (19)** halaman bercetak.

Bahagian A: Objektif (20 soalan)

Bahagian B: Struktur (10 soalan)

Bahagian C: Esei (2 soalan)

Dokumen sokongan yang disertakan : Tiada

JANGAN BUKA KERTAS SOALAN INI 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. Identify **THREE (3)** basic components of microprocessor-based systems.

Pilih **TIGA (3)** komponen asas dari sistem berasaskan mikropemproses.

- A. Arithmetic logic unit (ALU), memory and input / output
Aritmetik logic unit (ALU), ingatan dan masukan/keluaran
- B. Control unit, register and arithmetic logic unit (ALU)
Unit kawalan, pendaftar dan aritmetik logic unit (ALU)
- C. Microprocessor, memory and input / output
Mikropemproses, ingatan dan masukan/keluaran
- D. Control unit, register and memory
Unit kawalan, pendaftar dan ingatan

CLO1
C3

2. 7 gigabyte is equivalent to :

7 gigabait adalah setara dengan :

- A. 7 x 1024 Byte
7 x 1024 Bait
- B. 7 x 1024 Kilobyte
7 x 1024 KiloBait
- C. 7 x 1024 Megabyte
7 x 1024 MegaBait
- D. 7 x 1024 Terabyte
7 x 1024 TeraBait

CLO1
C2

3. Which of the following are the **THREE (3)** basic sections of a microprocessor unit?

Antara berikut yang mana adalah TIGA (3) bahagian asas unit pemproses mikro?

- A. Operand, register, and arithmetic / logic unit (ALU)
Kendalian, daftar dan unit arithmatik / logic (ALU)
- B. Control and timing, register, and arithmetic/logic unit (ALU)
Kawalan dan masa, daftar, dan unit aritmetik / logik (ALU)
- C. Control and timing, register, and memory
Kawalan dan masa, daftar, dan memori
- D. Arithmetic/logic unit (ALU), memory, and input/output
Aritmetik / unit logik (ALU), memori, dan input / output

CLO1
C1

4. Microprocessor is the _____ of the computer and it perform all the computational tasks

Mikropemproses ialah _____ komputer dan ia melaksanakan semua tugas pengiraan

- A. main
utama
- B. heart
jantung
- C. important
penting
- D. simple
mudah

CLO3
C1

5. The process of finding and correcting error within a program is called :

Proses mencari dan memperbetulkan kesalahan di dalam aturcara dikenali sebagai:

- A. assembling
'assembling'
- B. compiling
'compiling'
- C. debugging
'debugging'
- D. linking
'linking'

CLO3
C4

6. Choose only **ONE (1)** question. (Either Motorola **OR** Intel)

Pilih SATU(1) soalan sahaja. (Sama ada Motorola ATAU Intel)

Motorola:	The instruction "SUB,W D0,\$2000" will subtract the data word held in : <i>Arahan "SUB.W D0,\$2000" bermaksud menolak 'word' data berada dalam :</i>
Intel:	The instruction "SUB [2000],BX" will subtract the data word held in : <i>Arahan "SUB [2000],BX" bermaksud menolak 'word' data berada dalam :</i>

Motorola

Intel

- A. D0 from location 00002000_H.
D0 dari lokasi 00002000_H.
- B. D0 from location 20000000_H.
D0 dari lokasi 20000000_H.
- C. location 00002000_H from D0
lokasi 00002000_H dari D0
- D. location 20000000_H from D0
lokasi 20000000_H dari D0

- A. register BX from location 00002000_H.
daftar BX dari lokasi 00002000_H.
- B. register BX from location 20000000_H.
daftar BX dari lokasi 20000000_H.
- C. location 00002000_H from register BX
lokasi 00002000_H dari daftar BX.
- D. location 20000000_H from register BX.
lokasi 20000000_H dari daftar BX.

CLO3
C4

7. The Assembly Language program in table A5 below will execute :

Aturcara bahasa himpunan di dalam Jadual A5 akan melaksanakan :

Table A5/Jadual A5

Motorola	Intel
MOVE.W \$2000,D0	MOV BX,[2000]
ADD.W \$2100,D0	ADD BX,[2100]
MOVE.W D0,\$2200	MOV [2200],BX

- A. add the values 2000_H and 2100_H, placing the result in location 2200_H
 Tambahkan nilai 2000_H dan 2100_H, letakkan hasil di lokasi 2200_H
- B. add the contents of locations 2000_H and 2100_H, placing the result in location 2200_H
 tambahkan kandungan dalam lokasi 2000_H dan 2100_H, letakkan hasil di lokasi 2200_H
- C. copy the contents of D0/BX into locations 2000_H, 2100_H and 2200_H
 salin kandungan daftar data 0 kepada lokasi 2000_H, 2100_H dan 2200_H
- D. copy the contents of D0/BX into locations 2000_H and 2100_H, then load D0/BX from location 2200_H
 salin kandungan daftar data 0 kepada lokasi 00002000_H dan 00002100_H, seterusnya pindahkan daftar data 0 dari lokasi 00002200_H

CLO3
C2

8. The type of BRANCH which allow the microprocessor to make decisions are called :

Cabang yang membenarkan mikropemproses untuk melakukan pertimbangan dikenali sebagai :

- | | |
|---|---|
| A. conditional branch
cabang bersyarat | C. indirect branch
cabang tidak terus |
| B. direct branch
cabang terus | D. unconditional branch
cabang tidak bersyarat |

CLO3
C4

9. Choose only **ONE** (1) question. (Either Motorola **OR** Intel).

Pilih **SATU(1)**soalan sahaja (sama ada Motorola **ATAU** Intel).

Motorola:	After the 68000 has added together the words FFFF _H and 0001 _H , the Zero (Z) and Carry (C) Flags will display : Selepas 68000 menambah data 'words' FFFF _H dan 0001 _H , bendera Zero (Z) and Carry (C) akan menunjukkan :
Intel:	After the 8086 has added together the words FFFF _H and 0001 _H , the Zero (Z) and Carry (C) Flags will display : Selepas 8086 menambah data 'words' FFFF _H dan 0001 _H , bendera Zero (Z) and Carry (C) akan menunjukkan :

Motorola
A. C=0, Z=0

B. C=0, Z=1

C. C=1, Z=0

D. C=1, Z=1

Intel
A. CF=0, ZF=0

B. CF=0, ZF=1

C. CF=1, ZF=0

D. CF=1, ZF=1

CLO3
C2

10. A sequence of instructions which appear once but may be used several times is called a :

Urutan arahan yang dipaparkan sekali tapi boleh digunakan beberapa kali dikenali sebagai :

A. return
'return'

B. stack
tindan

C. main program
aturcara utama

D. subroutine
subrutin

CLO3
C2

11. The last stack location used is defined by the contents of the :

Kandungan lokasi tindanan yang terakhir ditunjukkan melalui :

- A. flag register
daftar bendera
- B. program counter register
daftar pembilang aturcara
- C. stack pointer register
daftar pembilang tindan
- D. alternative register
'alternative register'

CLO3
C4

12. Choose only ONE (1) question (either Motorola OR Intel).

Pilih SATU(1)soalan sahaja (sama ada Motorola ATAU Intel).

Motorola:	Determine the content of D4 after MC68000 executes instruction AND.B D0,D4 if D0=\$AAAA0012 and D4=\$FFFFFFE0. <i>Nyatakan kandungan D4 selepas MC68000 melaksanakan arahan AND.B D0,D4 jika D0=\$AAAA0012 dan D4=\$FFFFFFE0.</i>
Intel:	Determine the content of BX after 8086 executes instruction AND BH,CL if BX=1234h and CL=FE00h. <i>Nyatakan kandungan BX selepas 8086 melaksanakan arahan AND BH,CL jika BX=1234h dan D4=FE00h.</i>

- Motorola
- A. AAAA 1200
- B. FFFF 1200
- C. FFFF FE00
- D. AAAA FE00

- Intel
- A. FE12
- B. 1200
- C. 0034
- D. FE34

CLO2
C1

13. During a program execution, where are the program instructions and data stored in a microcomputer?

Di manakah data dan arahan program disimpan dalam mikrokomputer sewaktu pelaksanaan program?

- A. ALU/Dalam ALU
- B. MPU/Dalam MPU
- C. RAM/Dalam RAM
- D. data bus/Dalam bus data

CLO2
C2

14. Dynamic RAM storage cells are accessed using a technique called:

Sel-sel penyimpanan dalam Dinamik RAM boleh dicapai dengan menggunakan teknik yang dikenali sebagai:

- A. address decoding/alamat penyahkod
- B. address multiplexing/alamat multipleks
- C. address demultiplexing/alamat demultipleks
- D. address strobing/alamat strob.

CLO2
C4

15. What is the organization of a memory chip that has 16 address pins and 8 data pins?

Apakah organisasi peranti ingatan yang mempunyai 16 pin alamat dan 8 pin data?

- A. 64K x 4
- B. 64K x 8
- C. 8K x 64
- D. 64k x 64

CLO2
C2

16. The read-only memory that stores data permanently in the system and does not change when power supply is disconnected is often called as:

Ingatan baca sahaja yang menyimpan data, kekal dalam sistem dan kandungannya tidak berubah apabila bekalan diputuskan dikenali sebagai:

- A. permanent memory/ingatan kekal
- B. volatile memory/ ingatan meruap
- C. erasable memory/ingatan mudah padam
- D. non-volatile memori/ingatan tidak meruap

CLO4
C2

17. Which of the following is
- FALSE**
- regarding serial data transfer?

*Antara berikut, yang manakah **TIDAK BENAR** untuk pemindahan data siri?*

- A. Data is transferred in a single line, in a sequential manner
Data dipindahkan dalam satu talian, secara berturutan
- B. Preferred choice for long distance data transfer as it is cheaper
Pilihan yang dipilih data jarak jauh memindahkan kerana ia lebih murah
- C. Data is sent through asynchronous or synchronous transfer
Data di hantar melalui pemindahan tidak segerak atau segerak
- D. Faster rate of data transfer
Kadar pemindahan data lebih cepat

CLO4
C1

18. Two types of series interface chips commonly used are the _____ Asynchronous Receiver Transmitter (UART) and the Asynchronous Communication Interface Adapter (ACIA).

Dua jenis cip antara muka siri biasa digunakan adalah yang _____ Asynchronous Receiver Transmitter (UART) dan Asynchronous Communication Interface Adapter (ACIA).

- A. Unidirectional
Satu hala
- B. Unichip
Satu Cip
- C. Universal
Pelbagai
- D. Used
Berguna

CLO4
C3

19. "In this transfer of data, there is an exchange of control signal between the microprocessor and slower peripheral". The above statement is best suited for:

" Dalam pemindahan data ini, terdapat pertukaran isyarat kawalan antara mikropemproses dan perisian berkelajuan perlahan". Kenyataan di atas adalah paling sesuai untuk:

- A. hand-shaking
jabat tangan
- B. direct memory access (DMA)
capaian ingatan terus
- C. interrupt
sampukan
- D. programmed I/O (polling).
I/O program

CLO4
C2

20. Which method of data transfer bypasses the CPU ?

Manakah satu kaedah penghantaran data tanpa melalui CPU ?

- A. Software Interrupt
Sampukan perisian
- B. Hand-Shaking
Jabat Tangan
- C. Programmed I/O (polling).
I/O deprogram
- D. Direct Memory Access (DMA)
Capaian Ingatan Terus

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
C4

QUESTION 1

Differentiate between a microprocessor and microprocessor-based system.

SOALAN 1

Perbezaan di antara pemproses mikro dan sistem berasaskan pemproses mikro.

[3 marks]

[3 markah]

CLO1
C1

QUESTION 2

Give THREE (3) differences between microprocessor and microcontroller?

SOALAN 2

Berikan TIGA (3) perbezaan antara mikropemproses dan mikropengawal?

[3 marks]

[3 markah]

For question 3-6, Choose only ONE (1) microprocessor (either Motorola OR Intel).

Bagi Soalan 3-6, Pilih SATU(1)mikropemproses sahaja (sama ada Motorola ATAU Intel).

CLO3
C4

QUESTION 3

Apply 68000 OR 8086 assembly language to build a program using the statements given in Table B3 :

SOALAN 3

Dengan menggunakan bahasa himpunan 68000 ATAU 8086, bina aturcara dengan menggunakan kenyataan-kenyataan yang diberikan di dalam Jadual B3 :

Table B3/Jadual B3

Motorola	Intel
i) start program at address 1000. <i>mulakan aturcara pada alamat 1000.</i>	i) start program at address 1000. <i>mulakan aturcara pada alamat 1000.</i>
ii) transfer 8 bit data from register D0 to D1. <i>pindahkan 8 bit data dari daftar D0 ke D1.</i>	ii) transfer 8 bit data from accumulator to BL. <i>pindahkan 8 bit data dari akumulator ke BL.</i>
iii) divide unsigned data D1 with D0 and stored data at data register D1. <i>bahagikan data D1 'unsigned' dengan D0 dan simpan pada daftar data D1.</i>	iii) divide unsigned words in accumulator by byte in BL and store result at accumulator <i>bahagikan 'unsigned words' dalam akumulator dengan byte dalam BL dan simpan di akumulator</i>
iv) end program. <i>tamatkan aturcara.</i>	iv) end program. <i>tamatkan aturcara.</i>

[3 marks]

[3 markah]

CLO3
C4

QUESTION 4

Identify the values of register in MC68000/Intel 8086 after executes the instructions below.

SOALAN 4

Dapatkan nilai daftar dalam MC68000/Intel 8086 selepas melaksanakan arahan di bawah.

Motorola:	Register	Address	Memory
D1	44556677	00002300	1122
			3344
D2	8899AABB		5566
			7788
A1	00002302		99AA
Intel:	Register	Address	Memory
AX	6677	00002300	1122
			3344
BX	2302		5566
			7788
CX	AABB		99AA

Motorola
a) **MOVE.W #2304,D1**
D1 :

b) **MOVE.B (A1),D2**
D1 :
A1 :

Intel
a) **MOV AX,2304h**
AX :

b) **MOV AX,[BX]**
AX :
BX :

[3 marks]

[3 markah]

CLO3
C4

QUESTION 5

Identify the status of flag register (SR) after microprocessor executes instruction in Table B5.

SOALAN 5

Dapatkan status daftar bendera (SR) selepas mikropemproses melaksanakan arahan di dalam Jadual B5.

Table B5/Jadual B5

Motorola	Intel
- The initial data D2=667788FF <i>Data awal D2 = 667788FF</i> - MC68000 executes instruction ADDI.W #FFFF,D2. <i>MC68000 melaksanakan arahan ADDI.W #FFFF,D2</i>	- The initial data AX=88FF <i>Data awal AX = 88FF</i> 8086 executes instruction ADD AX,FFFFh. <i>8086 melaksanakan arahan ADD AX,FFFFh</i>

Motorola
a) N :
b) Z :
c) C :

Intel
a) SF :
b) ZF :
c) CF :

[3 marks]

[3 markah]

CLO3
C4

QUESTION 6

Motorola: Determine the value of **D1** after executing instruction **AND.W D0,D1** where **D0=3795AC57** and **D1=B6D34B9D**. Show your calculation.
*Nyatakan nilai **D1** selepas melaksanakan arahan **AND.W D0,D1** dimana **D0=3795AC57** dan **D1=B6D34B9D**. Tunjukkan pengiraan anda.*

OR

Intel: Determine the value of **BX** after executing instruction **AND BX,CX** where **CX=AC57** and **BX=4B9D**. Show your calculation.
*Nyatakan nilai **BX** selepas melaksanakan arahan **AND BX,CX** dimana **CX=AC57** dan **BX=4B9D**. Tunjukkan pengiraan anda.*

[3 marks]

[3 markah]

CLO2
C1

QUESTION 7

Give **THREE (3)** significant differences between DRAM and SRAM?

SOALAN 7

Beri **TIGA (3)** perbezaan ketara di antara ingatan DRAM dan SRAM?

[3 marks]

[3 markah]

CLO2
C4

QUESTION 8

A microprocessor system contains a 32K x 8 capacity of RAM. Identify the range of address in hexadecimal.

SOALAN 8

Satu sistem mikropemproses mengandungi 32K x 8 kapasiti RAM. Kenalpasti julat alamat dalam heksadesimal.

[3 marks]

[3 markah]

CLO4
C2

QUESTION 9

There are two techniques of sending data. One of the techniques is parallel sending data. Explain **THREE (3)** features to identify this technique.

SOALAN 9

Terdapat dua jenis teknik pemindahan data. Satu daripada teknik pemindahan data adalah secara selari. Terangkan **TIGA (3)** ciri bagi mengenal pasti teknik ini.

[3 marks]

[3 markah]

CLO4
C2

QUESTION 10

Name and describe **TWO (2)** types of interrupt.

SOALAN 10

Senarai dan terangkan **DUA (2)** jenis sampukan.

[3 marks]

[3 markah]

SECTION C : 50 MARKS

BAHAGIAN C : 50 MARKAH

INSTRUCTION:

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

ARAHAN :

Bahagian ini mengandungi DUA (2) soalan esei. Jawab SEMUA soalan.

QUESTION 1

SOALAN 1

CLO3
C4

- (a) The function of assembler is to translate the assembly program into object code before it can be executed. Differentiate between single line assembler and cross-assembler.

Penghimpun berfungsi untuk menterjemahkan Bahasa Penghimpun kepada kod objek sebelum dilaksanakan. Bezakan antara "single line assembler" dan "cross-assembler".

[4 marks]

[4 markah]

CLO3
C4

- (b) The microprocessor contains several group of instructions designed to write source code. Explain briefly the groups of instruction below with the related example.

Mikropemproses mengandungi beberapa kumpulan suruhan yang direkabentuk bagi menulis aturcara. Terangkan dengan ringkas kumpulan suruhan di bawah dengan contoh yang sesuai.

- Arithmetic Instruction
Suruhan arithmetik
- Data transfer/movement
Pindahan/pergerakan data

- Logical Instruction
Suruhan Logik

[9 marks]

[9 markah]

- (c) Referring to Table C1, answer the questions below:

Table C1/ Jadual C1: The description of program

Motorola	Intel
1. Transfer 8 bit data of \$000000AB into register D1 <i>8 bit data \$000000AB ke dalam pendaftar D1</i>	1. Transfer 8 bit data of ABH into accumulator A <i>8 bit data ABH ke dalam akumulatur A</i>
2. Transfer 16 bit data of \$00005678 into register D3 <i>16 bit data \$00005678 ke dalam pendaftar D3</i>	2. Transfer 16 bit data of 5678H into accumulator C <i>16 bit data 5678H ke dalam akumulatur C</i>
3. Transfer 8 bit data of D3 into register D2 <i>8 bit data D3 ke dalam D2</i>	3. Transfer 16 bit data C to accumulator B <i>16 bit data C ke akumulatur B</i>

CLO3
C4

- Transform each statement on table C1 to assembly language instruction.
Tukarkan setiap pernyataan pada Jadual C1 kepada arahan bahasa himpunan.

[6 marks]

[6 markah]

CLO3
C4

- Identify the new values of the destination after the instructions in c(i) are executed:
Kenalpasti nilai destinasi yang terbaru selepas arahan pada soalan c(i) dilaksanakan.

[6 marks]

[6 markah]

QUESTION 2

SOALAN 2

CLO2
C2

- (a) Describe the characteristic of ROM (Read Only Memory).

Jelaskan ciri bagi ROM (ingatan baca sahaja)

[3 marks]

[3 markah]

CLO2
C3

- (b) If given a memory chip with the capacity of 2k x 4, calculate the number of chips required to design a memory of 16k x 8.

Sekiranya diberi satu cip memori berkapasiti 2k x 4, hitungkan bilangan cip diperlukan untuk merekabentuk memori berkapasiti 16k x 8.

[3 marks]

[3 markah]

CLO2
C4

- (c) Based on the capacity and the start address given, complete table C2 and develop a memory map if the memory system has 16 address lines and 8 data lines.

Dengan kapasiti dan alamat permulaan yang diberi, lengkapkan jadual C2 dan bina sistem memori jika satu mikropemproses mempunyai 16 talian alamat dan 8 talian data telah disambungkan ke sistem ingatan tersebut.

Table C2/ Jadual C2

Device Peranti	Size Saiz	Address Assignment Penempatan Alamat	
		Start Permulaan	Ending Akhir
Microprocessor <i>Mikropemproses</i>	64K byte	\$0000	\$FFFF
RAM <i>Ingatan Capaian Rawak</i>	12K byte	\$B000	
ROM <i>Ingatan Baca Sahaja</i>	4K byte	\$0000	
Input/ Output <i>Masukan/ Keluaran</i>	8K byte	\$E000	
Unused <i>Tidak Diguna</i>		\$1000	

[19 marks]

[19 markah]

SOALAN TAMAT