

SULIT



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENDIDIKAN MALAYSIA**

JABATAN KEJURUTERAAN ELEKTRIK

PEPERIKSAAN AKHIR

SESI 1 2018/2019

BEU3063 : MICROPROCESSOR & MICROCONTROLLER

TARIKH : 31 DISEMBER 2018

MASA : 9.00 PAGI – 12.00 TENGAH HARI (3 JAM)

Kertas ini mengandungi **SEBELAS (11)** halaman bercetak.

Struktur (4 soalan)

Dokumen sokongan yang disertakan : Tiada

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

INSTRUCTION:

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

ARAHAN:

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

QUESTION 1**SOALAN 1**

CLO1
C2

a). Describe the function of arithmetic-logic unit (ALU) in a microprocessor?

Huraikan fungsi unit logik aritmetik (ALU) dalam mikropemproses?

[5 marks]

[5 markah]

CLO1
C3

i. Describe **THREE (3)** ways available to microprocessor designers to increase the processing power of the CPU.

Jelaskan TIGA (3) cara yang disediakan kepada pereka mikropemproses untuk meningkatkan kuasa pemprosesan CPU.

[3marks]

[3 markah]

CLO1
C3

ii. Solve the following statement in Figure 1 by using 68000 assembly language instruction :

*Tulis arahan 68000 bahasa himpunan pada pernyataan **Rajah 1** berikut:*

<p>Transfer 8 bit data from D1 to D2</p> <p>Transfer 16 bit data from D3 to address 3000H</p> <p>Add 32 bit data in D4 and D5</p> <p>Transfer data 01H in D2</p> <p>Multiply unsigned data in D6 with data at address \$9000</p>
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Figure 1

[5 marks]

[5 markah]

CLO1
C4

- b) Computer memory is any physical device capable of storing information temporarily or permanently. Differentiate between read-only memory (ROM) and a random-access memory (RAM).

Memori komputer adalah sebarang peranti fizikal yang mampu menyimpan maklumat secara sementara atau secara kekal. Bezakan antara ingatan baca sahaja (ROM) dan memori akses rawak (RAM).

[6 marks]

[6 markah]

CLO1
C5

- c) Sketch and label the block diagram input output interfacing between switch and LED which is controlled by Microprocessor.

Lakar dan labelkan gambarajah blok perantara output input di antara suis dan LED yang dikawal oleh Mikropemproses.

[6 marks]

[6 markah]

QUESTION 2

SOALAN 2

CLO1
C2

- a) i. Explain briefly the bus structure in 68000 microprocessors.

Terangkan secara ringkas mengenai struktur bus di 68000 mikropemproses.

[6 marks]

[6 markah]

CLO1
C2

- ii. Describe
- FOUR (4)**
- advantages of using assembly language compared to machine code

Jelaskan EMPAT (4) kelebihan menggunakan bahasa perhimpunan berbanding dengan kod mesin.

[4 marks]

[4 markah]

CLO1
C3

- b) i. Integrated Development Environment(IDE) is software used to edit assembly language development tools. Sketch a diagram for Assembly Language Program Development Tools in the microprocessor.

Persekitaran Pembangunan Bersepadu (IDE) adalah perisian yang digunakan untuk mengedit alat pembangunan bahasa pemasangan. Lakarkan gambarajah untuk Alat Pembangunan Program Bahasa Asas dalam mikropemproses

[3 marks]

[3 markah]

CLO1
C3

- ii. In computing, input/output (I/O) interface is required whenever the I/O device is driven by the processor. Devices are interfaced to a CPU using I/O ports.

List the function and examples of;

Dalam pengkomputeran, antara muka input / output (I/O) diperlukan apabila peranti I/O didorong oleh pemproses. Peranti dihubungkan ke CPU menggunakan port I/O.

Senaraikan fungsi dan contoh;

i. input devices / *peranti input*

ii. Output devices / *Peranti output*

[4 marks]

[4 markah]

CLO1
C4

- c) i. Briefly explain **THREE (3)** differences between synchronous serial data transfer and asynchronous serial data transfer.

Terangkan secara ringkas TIGA (3) perbezaan antara pemindahan data bersiri bergerak dan pemindahan data siri asynchronous.

[6 marks]

[6 markah]

CLO1
C4

- ii. Given; A3 = 1234 CDEF D5 = 8899 3344

Show the value of D5 for the following instruction;

- i. Move.W A3, D5
ii. Move.B A3, D5

Diberi; A3 = 1234 CDEF D5 = 8899 3344

Nyatakan nilai D5 untuk arahan berikut;

- i. *Move.W A3, D5*
ii. *Move.B A3, D5*

[2 marks]

[2 markah]

QUESTION 3

SOALAN 3

CLO2
C1

a) Write a short program using PIC18FXXX to:

- i. toggle all bits of PORTC
- ii. toggle only bit 0 of PORTB

Tulis program ringkas menggunakan PIC18FXXX untuk:

- i. toggle semua bit PORTC*
- ii. toggle hanya sedikit 0 PORTB*

[5 marks]

[5 markah]

CLO2
C2

b) Serializing data is a way of sending a byte of data one bit at a time through a single pin of a microcontroller. Explain **TWO (2)** ways of transferring a byte of data serialization.

Data 'serial' adalah cara menghantar byte data satu bit pada satu masa melalui pin tunggal pengawal mikro. terangkan DUA (2) cara memindahkan satu byte serahan data.

[4 marks]

[4 markah]

CLO2
C3

c) i. Calculate the value of the 10 bit (D0 -D9) output (binary number), if $V_{ref} = 2.56 V$ and $V_{in} = 1.7 V$.

Hitung nilai output 10 bit (D0-D9) (nombor binari), jika $V_{ref} = 2.56 V$ dan $V_{in} = 1.7 V$.

[3 marks]

[3 markah]

CLO2
C3

- ii. State the content of file registers RAM locations 12H and WREG after the following program has been executed:

Nyatakan kandungan pendaftaran fail lokasi RAM 12H dan WREG selepas program berikut dilaksanakan:

MOVLM 0

MOVWF 12H

MOVLW 12H

ADDWF 12H

ADDWF 12H

ADDWF 12H

ADDWF 12H

[3 marks]

[3 markah]

CLO2
C4

- d) i. A single microcontroller can serve several devices. There are two methods by which devices receive service from the microcontroller: interrupts or polling. Differentiate between interrupts and polling.

Pengawal mikro tunggal boleh mengendalikan beberapa peranti. Terdapat dua kaedah di mana peranti menerima servis daripada pengawal mikro: gangguan atau polling. Bandingkan di antara gangguan dan polling

[4 marks]

[4 markah]

- ii. Analyze and explain the operation of c18 language program for LED Flash as shown below;

Analisis dan jelaskan operasi program bahasa c18 untuk LED Flash seperti yang ditunjukkan di bawah;

Program:

```
// Name: SG
// pgm2.c
#include <p18F2520.h>
void main (void)
{
  TRISCbits.TRISC0 = 0;
  LATCbits.LATC0 = 1;
  LATCbits.LATC0 = 0;
}
```

[2 marks]

[2 markah]

CLO2
C5

- e) A personal computer (PC) has the following characteristic :

- CPU with 8-bit data bus and 16-bit address bit
- 12 Kb ROM
- 4 Kb for I/O port
- 16 Kb RAM

Categorize the address mapping map for the above computer system.

Komputer peribadi (PC) mempunyai ciri-ciri berikut:

- CPU dengan bus data 8-bit dan bit alamat 16-bit
- 12 Kb ROM
- 4 Kb untuk port I / O
- 16 Kb RAM

Kategorikan peta alamat untuk sistem komputer di atas.

[4 marks]

[4 markah]

QUESTION 4

SOALAN 4

CLO2
C1

- a) i. Buffers and latches on the CPU chip assigned binary addresses by decoding the address bus generally bidirectional internal data direction registers. Identify how CPU writes binary data from an output peripheral.

Buffers dan latches pada cip CPU yang diberikan alamat binari oleh penyahkodan bus alamat pada umumnya adalah pendaftar arahan data dalaman dwiarah. Kenalpasti secara bagaimana CPU menulis data binari daripada persisian output.

[3 marks]

[3 markah]

CLO2
C1

- ii. Draw and describe the development process of microcontroller programming for hardware controlling.

Lakar dan secara terangkan proses pembangunan pengturcaraan pengawal mikro untuk mengawal perkakasan.

[4 marks]

[4 markah]

CLO2
C2

- b) i. Explain the MOVWF and MOVF mnemonic instructions definition which are used in data movement operation.

Terangkan definisi arahan mnemonik MOVWF dan MOVF yang digunakan dalam operasi pergerakan data.

[4 marks]

[4 markah]

CLO2
C2

- ii) An LED is connected to each pin of Port D as in **Figure 2**. Write a program to turn on each LED from pin D0 to pin D7. Call a delay module before turning on the next LED.

Lampu LED disambungkan ke setiap pin Port D seperti dalam Rajah 2. Tuliskan program untuk menghidupkan setiap LED dari pin D0 ke pin D7. Pasang modul penangguhan sebelum menghidupkan LED seterusnya.

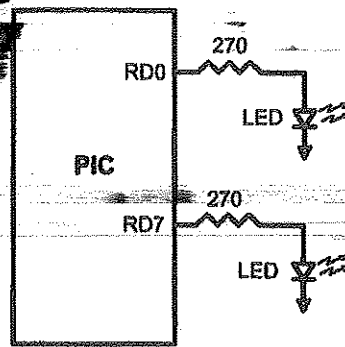


Figure 2

[4 marks]

[4 markah]

CLO2
C3

- c) Sketch the schematic diagram for PIC18F458 Connection to Temperature Sensor.

Lakarkan gambarajah skematik untuk PIC18F458 Sambungan ke Sensor Suhu.

[4 marks]

[4 markah]

CLO2
C5

- d) The Assembly language program below illustrates the steps for ADC conversion. This program gets data from channel 0 (RA0) of ADC and displays the results on PORTC and PORTD. This is done quarter of second. Write the assembly language using the mnemonic instruction for i, ii & iii.

Program bahasa Assembly di bawah menggambarkan langkah-langkah untuk penukaran ADC. Program ini mendapat data dari channel 0 (RA0) ADC dan memaparkan hasil pada PORTC dan PORTD. Ini dilakukan suku kedua. Tulis bahasa perhimpunan dengan menggunakan arahan mnemonic untuk i, ii & iii.

```
ORG 0000H
i..... ;make PORTC an output
CLRF TRISD ;make PORTD an output
BSF TRISA,0 ;make RA0 an input for analog input
MOVLW 0x81 ;Fosc/64, channel 0, A/D is on
MOVWF ADCON0
MOVLW 0xCE ;right justified, Fosc/64, AN0 = analog
MOVWF ADCON1
OVER CALL DELAY ;wait for Tacq (sample and hold time)
BSF ADCON0,GO ;start conversion
ii..... ;keep polling end-of-conversion
BRA BACK ;wait for end of conversion
MOVFF ADRESL,PORTC ;give the low byte to PORTC
iii..... ;give the high byte to PORTD
CALL QSEC_DELAY
BRA OVER ;keep repeating it
END
```

[6 marks]

[6 markah]

SOALAN TAMAT