KOLEJ YAYASAN PELAJARAN JOHOR
ONLINE FINAL EXAMINATION

COURSE NAME	**:**	**MICROCONTROLLER**
COURSE CODE	**:**	**DKE 3033**
SESSION	**:**	**DECEMBER 2021**
DURATION	**:**	**2 HOURS 30 MINUTES**

INSTRUCTION TO CANDIDATES /
ARAHAN KEPADA CALON

1. This examination paper consists of **ONE (1)** part :/ PART A (100 Marks) /
   *Kertas soalan ini mengandungi **SATU (1)** bahagian:* *BAHAGIAN A (100 Markah)*

2. Answer ALL questions in the answer sheet which is A4 size paper (or other paper with the consent of the relevant lecturer). /
   Jawab SEMUA soalan di dalam kertas jawapan iaitu kertas bersaiz A4 (atau lain-lain kertas dengan persetujuan pensyarah berkaitan).

3. Write your details as follows in the upper left corner for each answer sheet: /
   Tulis butiran anda sepertimana berikut di penjuru atas kiri bagi setiap kertas jawapan:
   i. Student Full Name / *Nama Penuh Pelajar*
   ii. Identification Card (I/C) No. / *No. Kad Pengenalan*
   iii. Class Section / *Seksyen Kelas*
   iv. Course Code / *Kod Kursus*
   v. Course Name / *Nama Kursus*
   vi. Lecturer Name / *Nama Pensyarah*

4. Each answer sheet must have a page number written at the bottom right corner. /
   Setiap helai kertas jawapan mesti ditulis nombor muka surat di penjuru bawah kanan.

5. Answers should be neat and clear in handwritten form. /
   Jawapan hendaklah ditulis tangan, kemas dan jelas.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO /
JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

This examination paper consists of **8** printed pages including front page
*Kertas soalan ini mengandungi **8** muka surat termasuk kulit hadapan*

This part contains of **FOUR (4)** questions. Answer **FOUR (4)** question in the answer booklet.
*Bahagian ini mempunyai **EMPAT (4)** soalan. Jawab **EMPAT (4)** soalan di dalam buku jawapan.*

QUESTION 1/ *SOALAN 1*

a) List **three (3)** types of system bus in Microcontroller 8051.

(3 marks/ 3 *markah*)

b) Show the active register bank and address of R0 to R7 for the below instruction.

MOV PSW, # 0C8H

(10 marks/ 10 *markah*)

c) Show the range of the address for devices 2764 and 6265 below based on schematic in **Figure 1**.

(10 marks/ 10 *markah*)

*a) Senaraikan **tiga (3)** jenis bas sistem yang terdapat dalam Pengawal Mikro 8051.*

b) Tunjukkan daftar bank yang aktif dan alamat bagi R0 hingga R7untuk arahan di bawah.

MOV PSW, # 0C8H

*c) Tunjukkan julat alamat untuk peranti 2764 dan 6265 di bawah berdasarkan skematik dalam **Rajah 1**.*

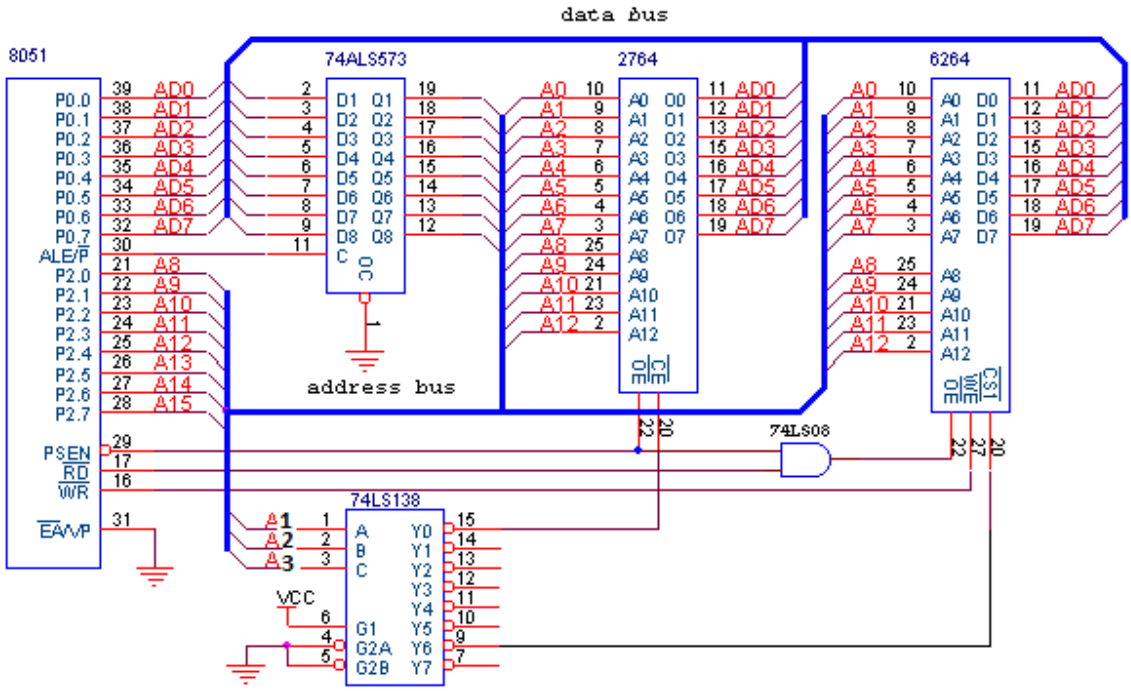

Figure 1/ *Rajah 1*

(12 marks/ 12 *markah*)

QUESTION 2/ *SOALAN 2*

a) A Reset is accomplished by holding the RST pin high for at least 2 machine cycles, while the oscillator is running. Sketch a power-on reset skematic circuirt for 8051 pin configurations.

(5 marks/5 *markah*)

b) There are **eight (8)** types of Addressing Mode in 8051 Microcontroller. List all the types of Addressing Mode in 8051.

(8 marks/ *8 markah*)

c) Build a 8051 program based on the following requirements:

i. Clear the accumulator.

ii. Add with the value of 77H.

iii. Subtract the value of 92 from the accumulator.

iv. Add the content of address 46H to the accumulator.

v. Compare the result of the accumulator with the contents of memory location 30H. If it is not equal, output the value of FFH through Port 2 and end the program. Otherwise, jump to the first instruction.

(12marks/ 12 *markah*)

a) Semasa pengayun sedang berfungsi, pin reset dicapai dengan menahan pin RST dalam keadaan tinggi sekurang-kurangnya untuk 2 kitaran mesin. Lakarkan litar skematik power-on reset pada pin RST untuk Pengawal Mikro 8051.

*b) Terdapat **lapan (8)** jenis Mod Pengalamatan dalam Mikrokontroller 8051. Senaraikan kesemua jenis Mod Pengalamatan yang terdapat dalam mikrokontroller 8051.*

c) Bina satu program berdasarkan keperluan berikut:

i. Bersihkan pengumpuk

ii. Tambah dengan nilai 77H.

iii. Tolak nilai 92H dari pengumpuk berkenaan.

iv. Tambah dengan kandungan alamat 46H kepada pengumpuk tersebut.

v. Bandingkan keputusan pada pengumpuk dengan kandungan alamat 30H. Jika tidak sama, keluarkan nilai FFH melalui Liang 2 dan program tamat. Sebaliknya, lompat ke arahan pertama.

QUESTION 3/ *SOALAN 3*

a) State **two (2)** types of Timer/Counter in 8051 Microcontroller.

(2 marks/ 2 *markah*)

b) Build an assembly language program to output a 100kHz square wave on pin 1 of port 1 (P1.1) using Timer 1. Assuming a 12MHz oscillator is used with the duty cycle is 50%.

(13 marks/ 13 *markah*)

c) Based on **Program 3** below, shows the delay subroutine in the program. Assuming a 11.059 MHz oscillator is used.

Program 3

```
DELAY:   MOV   TMOD,#10H
         MOV   R0,#200
ULANG:   MOV   TH1,#9EH
         MOV   TL1,#58H
         SETB  TR1
LOOP:    JNB   TF1,LOOP
         CLR   TR1
         CLR   TF1
         DJNZ  R0,ULANG
         RET
```

(10marks/ 10 *markah*)

*a) Nyatakan **dua (2)** jenis Pemasa/Pembilang dalam Pengawal Mikro 8051.*

b) Bina aturcara bahasa mesin untuk keluaran 100kHz, menggunakan gelombang segiempat pada pin 1, menggunakan liang keluaran 1 (P1.1) dan menggunakan Pemasa 1. Anggapkan pengayun yang digunakan ialah 12MHz dengan kitaran tugas ialah 50%.

c) *Berdasarkan **Aturcara 3** di bawah,tunjukkan subrutin lengah yang digunakan dalam aturcara tersebut. Anggap pengayun 11.059 MHz digunakan.*

Aturcara *3*

```
DELAY:  MOV   TMOD,#10H
        MOV   R0,#200
ULANG:  MOV   TH1,#9EH
        MOV   TL1,#58H
        SETB  TR1
LOOP:   JNB   TF1,LOOP
        CLR   TR1
        CLR   TF1
        DJNZ  R0,ULANG
        RET
```

QUESTION 4/ *SOALAN 4*

a) Build the instructions to enable the serial interrupt, Timer 0 interrupt and external interrupt 1 (INT1).

(2 marks/ 2 *markah*)

b) The following instruction is executed by an 8051 microcontroller. List the sequence in which the interrupts are serviced.

```
MOV  IP, #00001100B
```

(5 marks/ 5 *markah*)

c) Build the assembly language program that detects the condition (logic status) of switches and configures the LED lit pattern based on the **Table 4** and **Figure 4** below. If an external interrupt 1 (INT1) occurs by detecting a HIGH-to-LOW transition at P3.3, only one led will lit and blink 5 times. (C3)

Table 4

S4	S3	S2	S1	LEDS
0 (closed)	0 (closed)	0 (closed)	1 (opened)	4 LEDs lit(ON)
0 (closed)	0 (closed)	1 (opened)	0 (closed)	A single LED will lit and move from right to left
0 (closed)	1 (opened)	0 (closed)	0 (closed)	4 LEDs will blink continuously
Other Conditions				All LEDs will blink continuously

a) *Bina arahan-arahan untuk menghidupkan sampukan sesiri, sampukan Pemasa 0 dan sampukan luaran 1 (INT1).*

b) *Arahan berikut dilaksanakan oleh mikropengawal 8051. Senaraikan aturan jujukan dimana sampukan dilayan.*

MOV IP, #00001100B

c) *Bina aturcara bahasa himpunan yang mengesan keadaan (status logik)suis-suis berkenaan dan konfigurasi corak nyalaan LED berdasarkan* ***Jadual 4*** *dan* ***Rajah 4*** *di bawah. Jika sampukan luaran 1 (INT1) berlaku dengan pengesanan peralihan TINGGI-ke-RENDAH pada P3.3, hanya satu led menyala dan berkelip 5 kali.*

Jadual 4

S4	S3	S2	S1	LED
0 (Tutup)	0 (Tutup)	0 (Tutup)	1 (Buka)	*4 LED menyala(ON)*
0 (Tutup)	0 (Tutup)	1 (Buka)	0 (Tutup)	*Satu LED menyala dan bergerak dari kanan ke kiri*

0 (Tutup)	1 (Buka)	0 (Tutup)	0 (Tutup)	*4 LED berkelip secara berterusan*
Keadaan-keadaan Lain				*Semua LED berkelip secara berterusan*

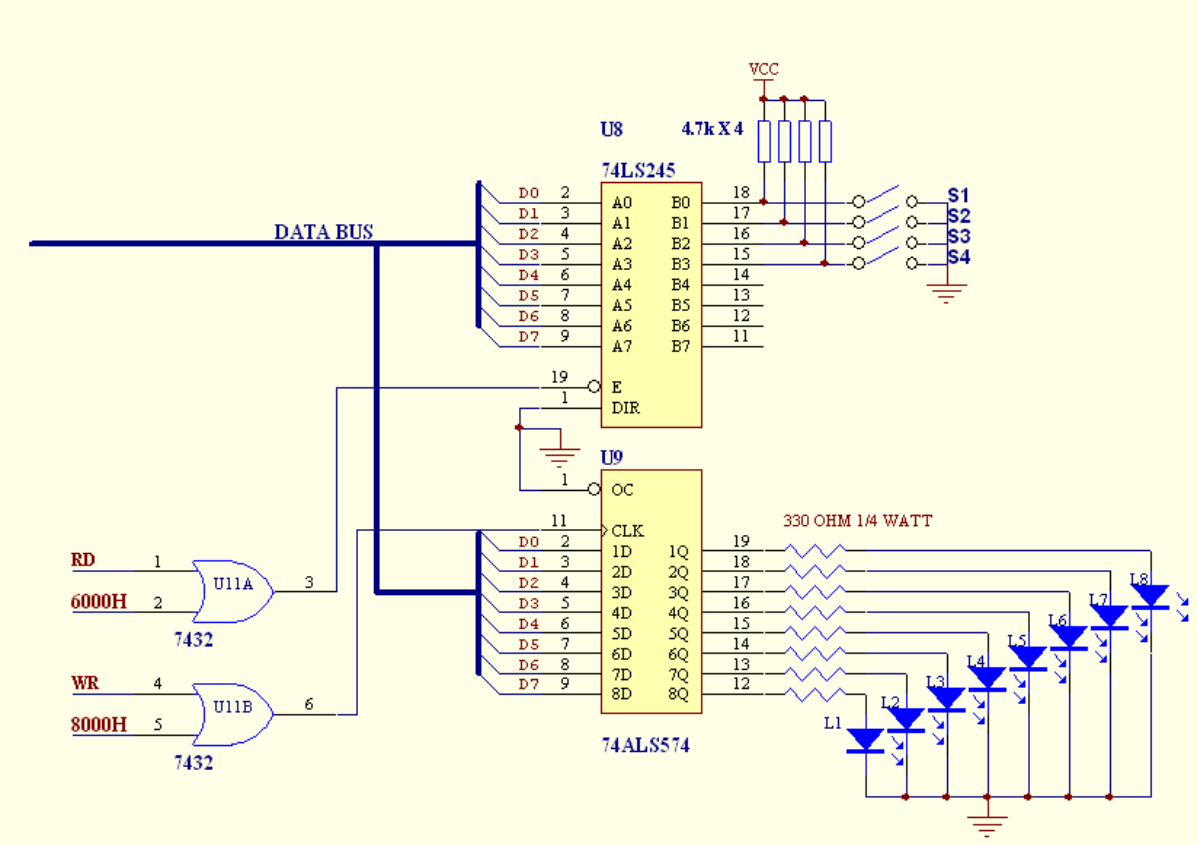

Figure 4/ *Rajah 4*

(18 marks/18 *markah*)

[100 MARKS/100 MARKAH]

END OF QUESTION PAPER/ *KERTAS SOALAN TAMAT*