KOLEJ YAYASAN PELAJARAN JOHOR
FINAL EXAMINATION / *PEPERIKSAAN AKHIR*

COURSE NAME	**:**	**MICROCONTROLLER**
COURSE CODE	**:**	**DKE 3033**
SESSION	**:**	**NOVEMBER 2020**
DURATION	**:**	**2 HOURS 30 MINUTES**

INSTRUCTION TO CANDIDATES /
ARAHAN KEPADA CALON

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

2. Candidates are not allowed to bring any material to examination room except with the permission from the invigilator. The Instruction Set 8051 was provided separately with question paper /
    Calon tidak dibenarkan untuk membawa sebarang bahan/nota ke bilik peperiksaan tanpa arahan/kebenaran daripada pengawas. Set Arahan 8051 dilampirkan berasingan dengan kertas soalan peperiksaan

3. Please check to make sure that this examination pack consist of: /
    Pastikan kertas soalan peperiksaan ini mengandungi:

    i.   Question Paper /
         Kertas Soalan
    ii. Answer Booklet /
         Buku Jawapan

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

This examination paper consists of **7** printed pages including front page
*Kertas soalan ini mengandungi **7** 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.

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

                                              (3 marks/ 3 *markah*)

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

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

                              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**.

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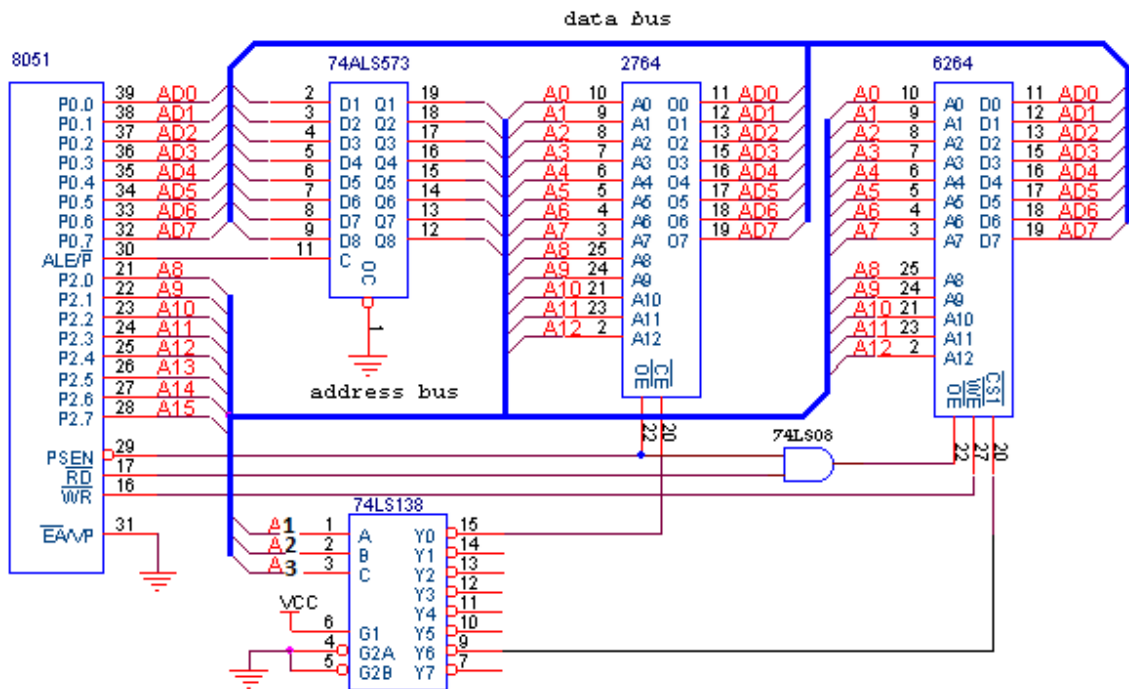
Figure 1/ *Rajah 1*

(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 configuration.

   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.

(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.

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

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.

(12 marks/ 12 *markah*)

QUESTION 3/ *SOALAN 3*

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

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

   (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%.

   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%.

   (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.

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

   ### Program 3/ 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
   ```

   (10 marks/ 10 *markah*)

QUESTION 4/ *SOALAN 4*

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

   Bina arahan-arahan untuk menghidupkan sampukan sesiri, sampukan Pemasa 0 dan sampukan luaran 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.

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

                              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)

   *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.*

Table 4/ *Jadual 4*

| S4	S3	S2	S1	LEDS
0 (closed) (Tutup)	0 (closed) (Tutup)	0 (closed) (Tutup)	1 (opened) (Buka)	4 LEDs lit(ON)/ *4 LED menyala(ON)*
0 (closed) (Tutup)	0 (closed) (Tutup)	1 (opened) (Buka)	0 (closed) (Tutup)	A single LED will lit and move from right to left/ *Satu LED menyala dan bergerak dari kanan ke kiri*
0 (closed) (Tutup)	1 (opened) (Buka)	0 (closed) (Tutup)	0 (closed) (Tutup)	4 LEDs will blink continuously/ *4 LED berkelip secara berterusan*
Other Conditions/ *Keadaan-keadaan Lain*				All LEDs will blink continuously/ *Semua LED berkelip secara berterusan*
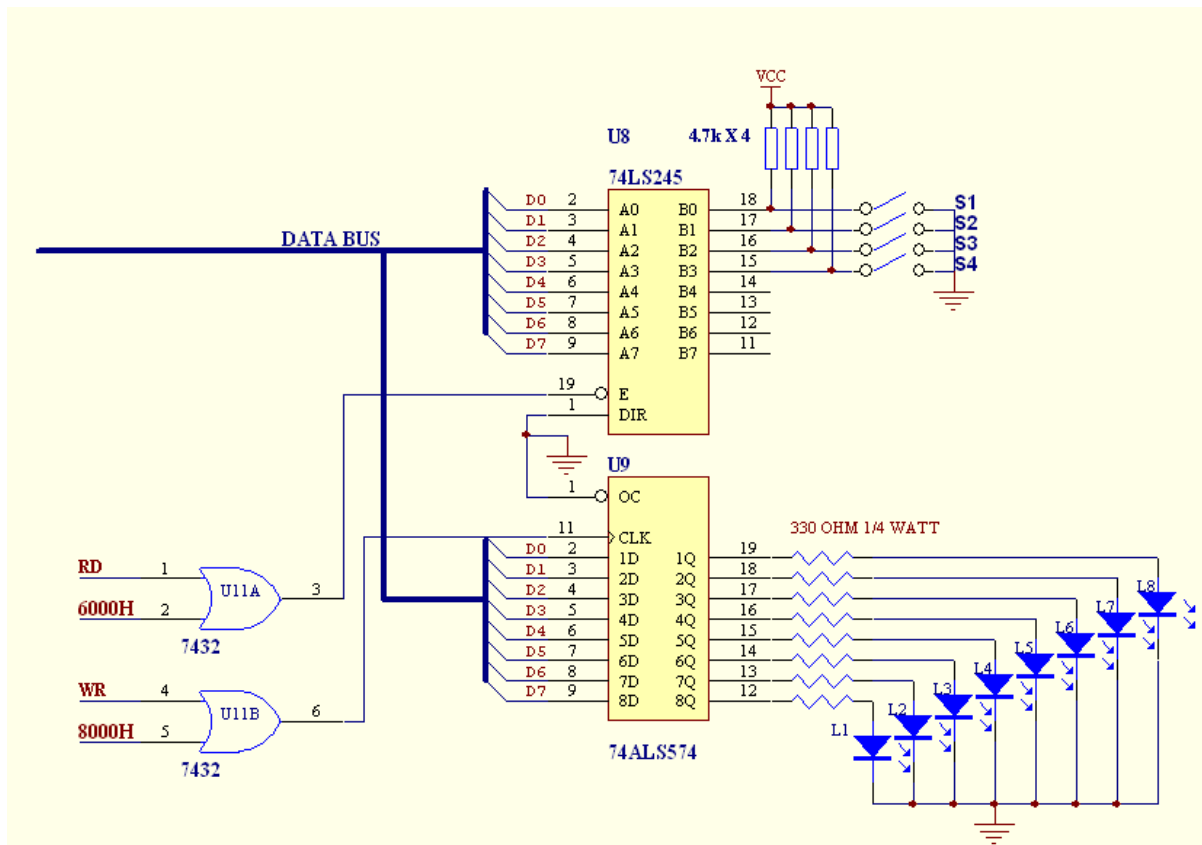
Figure 4/ *Rajah 4*

(13 marks/13 *markah*)

[100 MARKS/100 MARKAH]

END OF QUESTION PAPER/ *KERTAS SOALAN TAMAT*