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TATI

UNIVERSITY COLLEGE TATI (UCTATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: BET 2083 / BMT 2083 / BET 2083 (FLX)
COURSE	: MICROCONTROLLER AND APPLICATION
SEMESTER/SESSION	: 2-2024/2025
DURATION	: 3 HOURS

Instructions:

1. This booklet contains **4** questions. Answer **All** questions.

2. All theory and calculation answers should be written in answer booklet.

3. All software answers should be in a folder labeled with matric number. Specify the question number in filename.

4. Write legibly and draw sketches wherever required.

5. If in doubt, raise up your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 5 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

a)   Compute the following number system and show the steps of numbering system converting:

   i. 1110101010 binary to hexadecimal   (2 marks)
   ii. 243 decimal to binary   (2 marks)
   iii. AF hexadecimal to decimal   (2 marks)

b)   List **five (5)** differences between microcontroller and general purpose microprocessor.

                                                       (5 marks)

c)   State the **size** and the **value range** of the following variable type.

   i. Unsigned char   (1 mark)
   ii. signed int   (1 mark)
   iii. Unsigned Long   (1 mark)
   iv. Bit   (1 mark)

d)   Calculate the amount of delay generated by timer 1 in the following program below. Assume the crystal frequency value is 16MHz.

```
#include <reg51.h>
sbit LED=P1^3;
void main()
{
TMOD=0X10;
TL1=0X92;
TH1=0XAF;
LED=~LED;
}
```

                                                       (10 marks)

QUESTION 2

a)   Describe **five (5)** factors which are considered for using microcontroller in specific application.

(5 marks)

b)   The program below contains **ten (10)** syntax errors.

i. Identify the ten (10) syntax errors.   (10 marks)

ii. Produce the correct syntax so the program can simulate correctly.

(10 marks)

```
#include<reg51.h>
#define LED = P1
void delay(unsignes int);
void main()
{
fr(;;)
{
unsigned char nunber[]={1,2,4,8,16,32,64,128}
unsigned char z;
for(z=0;z<8;z++)
{
LED=number[m];
dely(100);
}
}

void delay(unsigned int nilai)
{
        unigned int p,q;
        for(p=0;p<nilai;p++)
        for(q=0;q<1275;t++);
}
```

QUESTION 3

a)   State the basic structure of C language program for 8051 programming using keil Uvision 3.

(5 marks)

b)   An application that will give output at **8 LEDs** as following sequence:

1. Single LED turn on from down to up and repeat 10 times.
2. A pair LED turn on from up to down and repeat 3 times.
3. Two set LED (4 LED / set) blink alternately 8 times.
4. All LED blink 15 times.

For wiring, use **P3** as the output LED connection for the solution.

i.   Draw a wiring connection between LED and AT89C51. Use Figure 1 as reference for AT89C51 pin out.

(8 marks)

ii.   Produce a program for this application by combining all program on Question 3b. Used the sufficient delay between sequences.
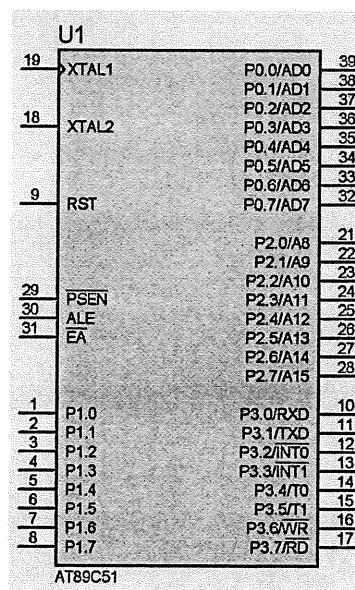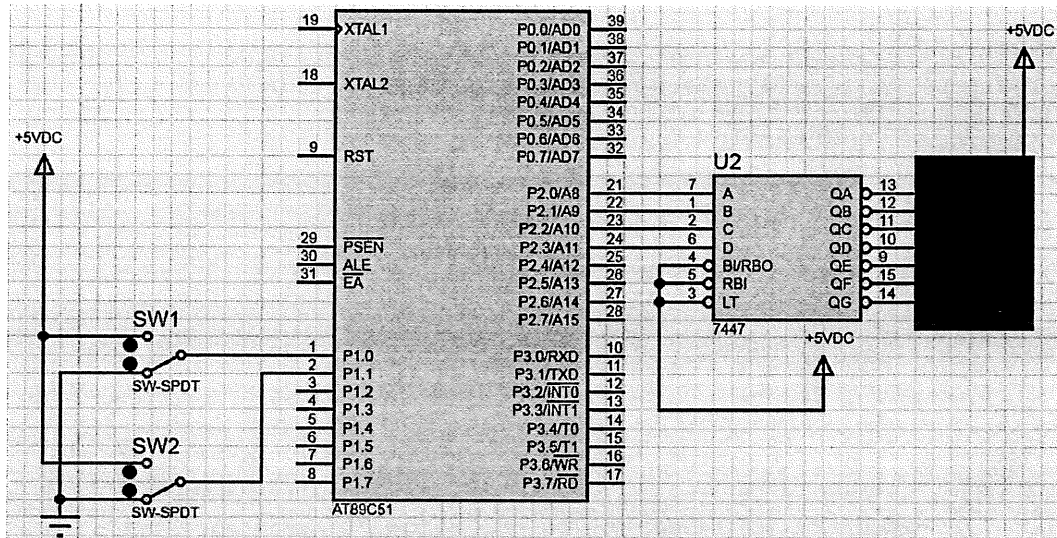
(12 marks)

Figure 1: AT89C51 pin out

QUESTION 4

Given the following schematic circuit in Figure 2.

Figure 2: 7 Segment Connection

a) Produce a program to count up and count down of 7-segment according to the following condition below (Table 1) where in each number display have the sufficient delay:

(17 marks)

Table 1

Switch Condition	Description
SWI (Pressed)	Count up (1 to 9)
SW2 (pressed)	Count Down (9 to 1)
When SW1 and SW2 are released	Display "0" value with blinking 3 times

b) Modify program in question 4(a) to create function for "count up" and "count down" continuously without the switch function and each number display have the sufficient delay.

(8 marks)