UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UCTATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: BET 2083/BMT 2083
COURSE	: MICROCONTROLLER AND APPLICATION
SEMESTER/SESSION	: 2 – 2021/2022 & 2 – 2022/2023
DURATION	: 3 HOURS

Instructions:

1. This booklet contains **4** questions. Answer **ALL** questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. 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 6 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

a) Compute the binary numbers into decimal numbers.

(i) 1000100_2 (2 marks)

(ii) 1011110011_2 (2 marks)

(iii) 101111110011_2 (2 marks)

b) Compute the decimal numbers into hexadecimal numbers.

(i) 1039_{10} (2 marks)

(ii) 1347810_{10} (2 marks)

c) Compute the addition/subtraction of hexadecimal numbers.

(i) 117A1B - 2A54E (2 marks)

(ii) 117A1B + 2A54E (2 marks)

d) List four (**4**) differences between microcontroller and microprocessor. (4 marks)

(Justify the answer including a diagram)

e) Describes the function RAM and ROM used in microcontroller 8051. (4 marks)

f) State six (**6**) criteria are choosing a microcontroller in the application. (6 marks)

QUESTION 2

a) Illustrate the schematic diagram to use eight (**8**) LEDs controlled by an 8051 microcontroller, including the basic circuit and all necessary labelling.

(6 marks)

b) Produce a program to make two (**2**) patterns of LED blinking **continuously** following the pattern in Table 1 and based on Question 2 a). (12 marks)

Table 1

Pattern	LED Moving Direction
1	
2	

QUESTION 3

a) Illustrate the schematic diagram using Microcontroller AT89C51 with pushbutton S1 and seven-segment (common cathode).

(8 marks)

b) Produce a program to count up and down the number based on Question 3 a). When S1 is pressed, the seven-segment will count up from 0 to 9 and when S1 is released, the seven-segment will count down from 9 to 0.

(15 marks)

c) Produce a coding to turn ON/OFF lamp (output) using an **AND gate** function. Two pushbuttons S1 and S2 are used (inputs). When S1 and S2 are pressed, the lamp will turn ON and when both pushbuttons are released, the lamp will turn OFF.

(6 marks)

QUESTION 4

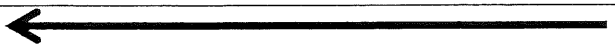
a) Illustrate the schematic diagram with components consisting of eight (8) LEDs and a pushbutton, including the basic circuit and all necessary labelling.

(8 marks)

b) Produce a looping program using **function** programming based on the pattern in Table 2 and based on Question 4 a). The patterns will be executed when the pushbutton has been pressed. When the pattern is complete, no pattern will blink until the next pushbutton is pressed.

(17 marks)

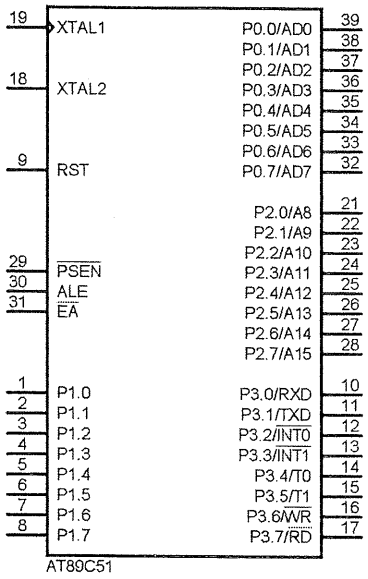
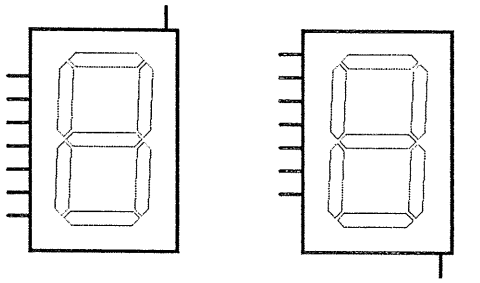
Table 2

Pattern	LED Moving Direction	Looping times
1		3x
2		5x
3		10x
4		10x

----------End of question----------

APPENDIX

SCHEMATIC SYMBOLS

8051 Chip	
7-Segment	
Electronic Parts