

School of Electronics Engineering

Winter Semester 2023-24 Continuous Assessment Test – II

Programme Name & Branch: B. Tech (School of Computer Science Engineering)

SLOT: C2+TC2

Course Name & Code: Microprocessors and Microcontrollers BECE204L

Exam Duration: 90 Min.

Maximum Marks: 50

Q. No.	Questions	Max Marks	CO	BL
1	a) CS = 4000H and DS = 4500H. Find if there is any overlap between these two segments. If so, what is the size of the overlap.	5	CO2	BL2
	b) Find the errors in the following instructions (if so). i. MOV CS,5000H ii. SBB [AX], [2000H] iii. MUL AL, BL iv. AL =83H; CL=29H; ADD AL, CL; DAA; After execution (AL)=05, carry flag (CY)=0; v. OR AX, 0098H contents of AX = 3F0FH, after execution AX = 3090H.	5	CO2	BL2
2	Write an 8086 ALP to find (compute) the values of the function $f(x) = x^2 + 3x + 2$ in the range $x=1$ to $x=10$ and store them in the memory location from 5000H onwards.	10	CO2	BL4
3	Write an 8051 ALP to multiply two numbers without using MUL AB instruction and assume that the product does not exceeds 8-bits. Display the digits of the product on the seven segment displays connected to P0 and P1.	10	CO4	BL4
4	Write an 8051 (AT89C51) ALP to generate a periodic waveform simultaneously as follows: i) 0.1ms ON & 0.1ms OFF ii) 0.2ms ON & 0.2ms OFF using timer. Don't access TL0/1 register in the ALP. Provide necessary timer calculations.	10	CO4	BL4
5	Write 8051 (AT89C51) ALP for the following logic. The existing values of TCON=01H and IE = 0FFH. IF (P3.3 ==1) SEND THE SEQUENCE 0,1,2,3,5,6,7,8,9 REPEATLY IN P0. ELSE SEND THE SEQUENCE 9,8,7,6,5,4,3,2,1 REPEATLY IN P1.	10	CO4	BL4

Key

Q1

a) CS = 4000H and DS = 4500H. Find if there is any overlap between these two segments. If so, what is the size of the overlap.

Code segment range = 40000H to 4FFFFH and data segment range = 45000H to 54FFFH
Overlap size = 4FFFF - 45000 = AFFFH or 43 KB

b) Find the errors in the following instructions (if so).

i. MOV CS,5000H ---- MOV CS, AX

ii. SBB [AX], [2000H] ---- SBB AX, [2000H]

iii. MUL AL, BL ---- MUL BL

iv. AL =83H; ---- AL = 12, CY = 1

CL=29H;

ADD AL, CL;

DAA;

After execution (AL)=05, carry flag (CY)=0;

v. OR AX, 0098H contents of AX = 3F0FH, after ---- AX =3F9FH
execution AX = 3090H.

Q2

Write an 8086 ALP to find (compute) the values of the function $f(x) = x^2 + 3x + 2$ in the range $x=1$ to $x=10$ and store them in the memory location from 5000H onwards.

ASSUME CS:CODE, DS:DATA

DATA SEGMENT

NUMLIST DB 01H, 02H, 03H, 04H, 05H, 06H, 07H, 08H, 09H, 0AH

NEXT DB 0FF00H DUP (00H) // REMAINING VALUES WILL BE ZEROS

COUNT EQU 0AH

DATA ENDS

CODE SEGMENT

START:

MOV AX, DATA ; get the segment address of DATA segment in DS register

MOV DS, AX

MOV CX, COUNT ; COUNT is the number of data has to be added

```

MOV SI, OFFSET NUMLIST ; get the offset address of NUMLIST

MOV DI, 5000H

MOV AX, 0000H

MOV BX, 0000H

LP: MOV BL, [SI]

MOV AL, BL

ADD AL, 03H

MUL BL

ADD AL, 02H

MOV [DI], AL

INC DI

INC SI

DEC CX

JNZ LP

MOV AH, 00H

INT 21H

CODE ENDS

END START

```

RET

Q3

Write an 8051 ALP to multiply two numbers without using MUL AB instruction and assume that the product does not exceeds 8-bits. Display the digits of the product on the seven segment displays connected to P0 and P1.

```

ORG 0000H
; 7 SEGMENT LOOKUP TABLE
MOV 30H, #03FH
MOV 31H, #06H
MOV 32H, #5BH
MOV 33H, #04FH

```

```
MOV 34H, #066H
MOV 35H, #06DH
MOV 36H, #07DH
MOV 37H, #07FH
MOV 38H, #07FH
MOV 39H, #067H
```

```
MOV R2, #04H ; INPUT-1
MOV R3, #0CH ; INPUT-2
MOV A, #00H
L: ADD A, R3
DJNZ R2, L
MOV R2, A
```

```
MOV B, #100D
DIV AB
MOV A, B
MOV B, #10D
DIV AB
MOV R6, A
MOV R7, B
```

```
MOV A, #30H
ADD A, R6
MOV R0, A
MOV A, @R0
MOV P0, A
```

```
MOV A, #30H
ADD A, R7
MOV R0, A
MOV A, @R0
MOV P1, A
```

```
S:SJMP S
```

```
END
```

Q4

Write an 8051 (AT89C51) ALP to generate a periodic waveform simultaneously as follows: i) 0.1ms ON & 0.1ms OFF ii) 0.2ms ON & 0.2ms OFF using timer. Don't access TL0/1 register in the ALP. Provide necessary timer calculations.

i)

Delay = 0.1ms

Number of count = $0.1\text{ms}/1.085\mu\text{s} = 92.16 = 92$

TH0 = $255 - 92 = 163$ or 0A3H

ii)

Delay = 0.2ms
Number of count = $0.2\text{ms}/1.085\mu\text{s} = 184.32 = 184$
TH0 = $255 - 184 = 71$ or 47H

```
ORG 0000H  
LJMP MAIN
```

```
ORG 000BH ;Timer 0 interrupt vector table  
CPL P2.1 ;toggle P2.1 pin  
RETI
```

```
ORG 001BH ;Timer 1 interrupt vector table  
CPL P2.2 ;toggle P2.1 pin  
RETI
```

```
ORG 0050H ;after vector table space  
MAIN: MOV TMOD,#22H ;Timer 0, mode 2  
MOV TH0,#043H ;TH0=A4H for -92  
MOV TH1,#0A3H ;TH0=A4H for -92  
MOV IE,#8AH ;IE=10001010 (bin) enable  
;Timer 0  
SETB TR0 ;Start Timer 0  
SETB TR1  
BACK: SJMP BACK ;get data from P0  
END
```

Q5

Write 8051 (AT89C51) ALP for the following logic. The existing values of TCON=01H and IE = 0FFH.

```
ORG 0000H  
LJMP MAIN ;by-pass interrupt  
;vector table  
;--ISR for INT1 to turn on LED  
ORG 0013H ;INT1 ISR  
MOV A, #0AH  
JA:MOV P1, A  
ACALL DELAY  
DEC A  
CJNE A, #00H, JA
```

```
RETI ;return from ISR  
;--MAIN program for initialization  
ORG 30H  
MAIN: MOV IE,#0FFH  
MOV TCON, 01H;enable external INT 1  
HERE: MOV A, #01H  
J:MOV P0, A  
ACALL DELAY  
INC A
```

```
CJNE A, #0BH, J  
SJMP HERE
```

```
DELAY:
```

```
MOV R5,#50
```

```
H3: MOV R4,#255
```

```
H2: MOV R3,#255
```

```
H1: DJNZ R3,H1
```

```
DJNZ R4,H2
```

```
DJNZ R5,H3
```

```
RET
```

```
END
```