VIT
Vellore Institute of Technology

School of Electronics Engineering

Winter Semester 2023-24 Continuous Assessment Test – II

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

SLOT: C1+TC1

Course Name & Code: Microprocessors and Microcontrollers BECE204L

Exam Duration: 90 Min. **Maximum Marks:** 50

Q. No.	Questions	Max Marks	CO	BL
1	1. A) How the physical address is calculated and find it if segment address is 4000H and offset address is 3000H. Why are these two addresses required in 8086?	5	CO2	BL2
	B) Find the errors in the following instructions (if so). I. MOV DS,5000H II. ADD [AX], [4000H] III. ADD 0200H IV. INC 3000H V. CMP BX	5	CO2	BL2
2	Write an 8086 ALP programs to find the average of 64 numbers stored in the memory location 5000H with and without using DIV instruction. Assume that the sum does not exceed 16 bits.	10	CO2	BL4
3	Write an 8051 ALP to find (compute) the numbers which are divisible by both 3 and 7 in the range 1 to 99 and store them in memory. Interface two seven segment displays in P0 and P1 and display the stored numbers one after other.	10	CO2	BL4
4	Write an 8051 (AT89C51) ALP to generate a pulse waveform with frequency 2KHz using timer. Don't access TL0 or TL1 register in the ALP. Provide the necessary timer calculations.	10	CO 4	BL4

5	Write 8051 (AT89C51) ALP for the following logic. The existing values of TCON=01H and IE = 0FFH.
	IF (P3.2 ==1)
	GENERATE WAVEFORM WITH 50% DUTY CYCLE.
	ELSE
	GENERATE WAVEFORM WITH 33% DUTY CYCLE.
		10	CO4	BL4

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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
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

	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

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
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
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 or TL1 register in the ALP. Provide necessary timer calculations.	10

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

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SCHOOL OF ELECTRONICS ENGINEERING (SENSE)

Continuous Assessment Test – II

Winter Semester -2023-24

Programme Name & Branch : B.Tech ECE

Course Name & Code : BECE204L- Microprocessors and Microcontrollers

Slot: B1 Answer all the questions **Exam Duration: 50 Minutes**

S.No	Question	Marks
1	Assume a switch is connected to port P2.0, LED is connected to P1.1 and buzzer is connected to P2.2 of 8051 microcontroller. Write an assembly program for 8051 microcontroller to perform the following operations Input Switch (P2.0) | Output 0 | Buzzer is ON for 15ms 1 | LED is ON for 20ms	10
2	Pin P1.0 of 8051 is connected to a switch. If the switch is closed (logic 0), then write an 8051 assembly language program to transmit "CLOSED" serially at the baud rate of 19200. If the switch is open (logic 1), then serially transmit "OPEN" at the baud rate of 9600. Assume "CLOSED" is stored in ROM location 200H onwards and "OPEN" in 300H location onwards.	10
3	Write an assembly program using interrupt of 8051 microcontroller to simultaneously create 7 KHz and 500 Hz square waves on port pin P1.7 and P1.6.	10
4.	8051 microcontroller is connected to water level sensor through ADC0808 which gives 5V when the water tank is 100% full. Develop an assembly program with suitable interfacing diagram to interface ADC0808 with 8051 to compare the water level stored in accumulator(A) with threshold value "E6H". If A>E6H send a message 'HIGH LEVEL' through serial port at a baud rate of 2400. Assume 'HIGH LEVEL' is stored in ROM location 500H onwards.	10

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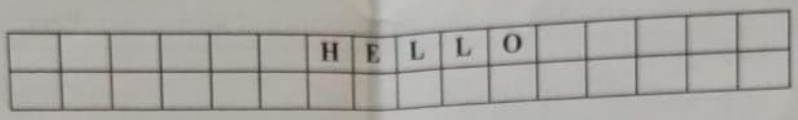
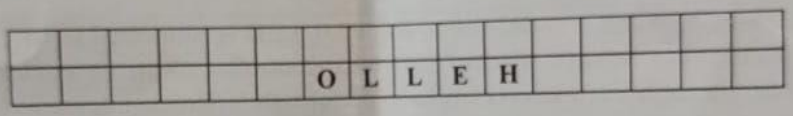
5.	Write an 8051 assembly program to interface 16x2 LCD display with suitable diagram. Assume the string "HELLO" stored in ROM location from 300H onwards. A switch is connected to port pin P2.7. If the switch input is 1, display the string in line 1 otherwise display the string in reverse order in line 2 as shown below. If switch P2.7=1 display  If switch P2.7=0 display 	10

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SCHOOL OF ELECTRONICS ENGINEERING (SENSE)

Continuous Assessment Test – II

Winter Semester -2023-24

Programme Name & Branch : B.Tech ECE

Course Name & Code : BECE204L- Microprocessors and Microcontrollers

Slot: B2 Answer all the questions Exam Duration:**50 Minutes**

S.No	Question	Marks
1	Write an 8051 assembly language program to generate wave of frequency 2 KHz and 40% duty cycle in P1.0 using Timer 1 for the delay creation. Assume XTAL = 20MHz.	10
2	The car parking area can accommodate a maximum of 300 cars. Assume that a sensor is connected to P3.4 of the 8051 microcontroller to sense the incoming car entering a parking area. If the count reaches 300(decimal), the microcontroller should send message "FULL" through serial port at a baud rate of 19200. Assume the message is stored in ROM location 400H onwards. Write a suitable 8051 assembly code to implement for the above scenario.	10
3	Write an assembly program using interrupt of 8051 microcontroller to simultaneously create 5 KHz and 700 Hz square waves on port pin P1.5 and P1.4.	10
4.	Write an 8051 assembly code with suitable diagram to interface common anode seven segment display, which should display alphabet A to C with an interval of 0.7 seconds between each alphabet. Assume the alphabet A to C codes are stored in ROM location 200H onwards. Use timer1 to generate time delay.	10
5.	8051 microcontroller is connected to linear temprature sensor through ADC0808 which gives 5V when the temperature of the water in boiler at industry is 100°C. Develop an assembly program with suitable interfacing diagram to interface ADC0808 with 8051 to compare the temperature stored in Accumulator(A) with threshold value T=50 °C. If A> 50 °C turn ON buzzer connected to port P0.7, to alarm for 70 ms using timer 0.	10

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Winter Semester 2023-24 Continuous Assessment Test – I

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
1	a) Compare i3, i5 and i7 processors in terms of cores, frequency, multi-threading, turbo boost, etc.	5

	b) Identify and rectify (if any) the errors of the following instructions
	
	ADD B, R5
	SETB P1
	MOVC PC, #0523
	PUSH R3
	MOVC @A+PC, A
		5

2	Calculate the amount of delay caused by the below ALP program. Assume the crystal frequency is given as 11.059 MHz and the number of machine cycles are provided in parentheses. DELAY: MOV R0, #10100111B (1) AGAIN: MOV R7, #19H (1) HERE: MOV R2, #02 (1) BACK: NOP (1) NOP (1) NOP (1) DJNZ R2, BACK (2) DJNZ R7, HERE (2) DJNZ R0, AGAIN (2) RET (2)	10
3	Write an 8051 ALP to add ten numbers saved in the code memory from the location 200H onwards and store the result in R6 and R5. Where R5 holds the lower 8-bits of the result.	10
4	Write an 8051 program to get the length (8-bit number) and breadth (8-bit number) of a rectangle from port P0 and P1 respectively. Calculate area and perimeter of the rectangle and send them through port P2 and P3 respectively. Note: assume values of the inputs are such that the outputs do not exceed 8-bits	10
5	Write an ALP for generating a clock pulse of frequency 2KHz on P1.2 by using Timer 0 Mode 1. Provide necessary calculation.	10

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Winter Semester 2023-24 Continuous Assessment Test – I

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

SLOT: C1+TC1

Course Name & Code: Microprocessors and Microcontrollers BECE204L

Exam Duration: 90 Min. **Maximum Marks: 50**

Q. No.	Questions	Max Marks
1	i) Neatly draw the block diagram of a microprocessor and briefly explain about all the blocks and their operations.	05

	ii) Identify and rectify (if any) the errors for the following instructions:
	DIV A,B
	MOV TH0, #355
	MOV A, @R3
	MOVC A, @A+PC
	MOV R7,R8
		05

2.	Write an 8051 assembly language program to transfer data from Rn where n=1, 2, 3 and 4 in register bank 1 to Rn where n = 3, 4, 5, and 6 in register bank 3 using stack operation.	10
3.	Assume "your name" (string) is stored in the code memory as hexadecimal numbers. Write an 8051 assembly language program to transfer "your name" from code memory to data memory. Assume the source and destination address as required.	10
4	Write an 8051 assembly language program to get 8-bit number (x) from port P0. If x is odd number compute y = x^2 +5 and if x is even number compute y = x/2 +2x. Transfer the value y to port P1. Note: The value of x is such that y does not exceed 8-bits.	10
5	Write an 8051 assembly language program to create a waveform with 33% duty cycle on P0.2 using timer. Assume the delay and provide necessary calculations.	10

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SCHOOL OF ELECTRONICS ENGINEERING (SENSE)

Continuous Assessment Test – I

Winter Semester -2023-24

Programme Name & Branch : B.Tech ECE

Course Name & Code : BECE204L- Microprocessors and Microcontrollers

Slot: B2 Answer all the questions Exam Duration:50 Minutes

S.No	Question	Mark
1	(a) Indicate the addressing modes for the following 8051 instructions (i) MOV R0,38H (ii) MOV A, R3 (iii) ADD A, @R0 (iv) MOVC A, @A+DPTR (v) MOV R3, #23	

	(b) List the status of the 8051 microcontroller flags CY, P and AC after execution of every instruction in the following assembly level program.
	ORG 0000H
	MOV A, #68H
	ADD A, #99H
	XRL A, #01H
	END
		5+5

2	Analyse the following 8051 assembly program and write the details of the stack pointer, source and destination address locations and the data transferred from source to the destination location after every instruction.
	ORG 0000H
	MOV SP, #40H
	MOV 10H, #50
	MOV 12H, #34H
	MOV 15H, #0A8H
	PUSH 15H
	PUSH 10H
	PUSH 12H
	POP 0
	POP 13
	POP 11
	END
		10

3	Store 5 bytes of BCD data in internal RAM locations starting at 40H, as shown below. Write an 8051-assembly level program to find the sum of all the numbers. The result must be in BCD. Store the lower bytes of the sum in R2 register and higher byte in R3 of Bank 2	10

40H=(71H)
41H=(91H)
42H=(65H)
43H=(59H)
44H=(97H)

4. If the XTAL frequency of 8051 is 12 MHz, examine the time taken to execute the following program. The machine cycle for each instruction is mentioned in the parentheses.

```
        MOV R5, #2          (1)
HERE1:  MOV R4, #180        (1)
HERE2:  MOV R3, #0FFH       (1)
HERE3:  DJNZ R3, HERE3      (2)
        DJNZ R4, HERE2      (2)
        DJNZ R5, HERE1      (2)
        RET                 (2)
```

(b) Identify if the following 8051 instruction have any error, if so give the correct instructions

(i) MOV @R2, A
(ii) INC DPTR
(iii) CPL R3
(iv) AND A, B
(v) DIV A,B

5. Assume an 8 bit data is found in B register and if that value is $(16)_{10}$ then develop an assembly level program to perform the product of 06*03 and generate 50% duty cycle on P1.1 else it has to perform division of 06/03 and generate 25% duty cycle on P1.1. 10

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Continuous Assessment Test - I

Winter Semester -2023-24

Programme Name & Branch : B.Tech ECE

Course Name & Code : BECE204L- Microprocessors and Microcontrollers

Slot: B1 | Answer all the questions | Exam Duration:50 Minutes

S.No		Question	Marks
1	a)	Assume A = 79H, R0 = 94H for each instruction given below, what is the content of A after the execution of each instruction. i. MOV A, R0 ii. SWAP A iii. XCH A, R0 iv. ADD A, R0 followed by DA A	
	b)	Which of the following are NOT valid instructions of 8051 microcontroller, if so correct that instruction. i. MOV @R0, @R1 ii. XOR A, R1 iii. MOVC A, @DPTR iv. MUL A, R1 v. MOV 0E0H, #20H	5+5
2		Write an assembly level program using 8051 to load 3 data (8-bit data) into Bank 0, initiate the stack at 36H location and then push all the 3 data into the stack from Bank 0 and retrieve the data from stack to registers R3, R4 and R6 of Bank 3.	10
3		Write an assembly level program using 8051 to store the following data into the following locations of RAM. Add the data and store the lower byte of the result in R6 and higher byte in R7 registers. 20H = (12H) 21H = (CDH) 22H = (FEH) 23H = (5BH) 24H = (70H)	10

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4. a) Determine the time delay generated in the following program if the crystal frequency is 16MHz. Machine cycle for respective instruction is mentioned in parentheses.

DELAY:

```
MOV R0, #200          (1)
AGAIN : MOV R1, #250  (1)
HERE  : NOP           (1)
        NOP           (1)
DJNZ R1, HERE         (2)
DJNZ R0, AGAIN        (2)
RET                   (2)
```

5+5

b) Describe binary addition using 8051 Microcontroller for the data 0FH and F0H and show the status of PSW.

5. Develop an 8051 assembly language program to get a byte of hex data from port P1, if the data is EVEN, then generate a square wave of 50 % duty cycle on P2.1 else if the data is ODD, then generate a waveform of 33.33 % duty cycle on P2.1. 10