VIT

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

Continuous Assessment Test 2 – March 2023

Programme	:	B.Tech. (CSE) & B.Tech. CSE with Specialization)	Semester	:	WS 2022-23
Course	:	Microprocessors and Microcontrollers	Code	:	BECE204L
			Class Nbr	:	CH2022235001481
Faculty	:	Dr. J. Florence Gnana Poovathy	Slot	:	F2 + TF2
Time	:	90 Minutes	Max. Marks	:	50

Answer ALL the questions

Q.No.	Sub	Questions	Marks
1.		Examine the content of Program Status Word (PSW) register of 8051 as shown below and illustrate the significance of each flag bit. 1 1 0 1 0 0 0 1	5

2.		Analyze the following code and perform the following:
		(i) What will be the value stored at 50H after the execution of entire program?
		(ii) Mention the values get stored in each register and in every iteration.
		Assume 8051 RAM memory locations 41H, 42H, 43H, 44H and 45H are stored with values 33H, 11H, 44H, 11H and 22H, respectively.
		MOV R0, #41H
		CLR C
		MOV R2, #05H
		MOV A, @R0
		MOV B, A
		L2: INC R0
		MOV A, @R0
		CJNE A, B, L1
		SJMP L3
		L1: JNC L3
		MOV B, A
		L3: DJNZ R2, L2
		MOV 50H, B
		END
			7
			8

3.		Consider an 8051 microcontroller system which takes numeric inputs between 1 and 26 from the user through the Port P2. The numeric value "1" is mapped to the character "A", "2" is mapped to "B" and likewise "26" is mapped to "Z". Process the received numeric input in such a way that you transfer the mapped character of it via serial communication with a baud rate of 9600. Assume the crystal frequency of the 8051 microcontroller is 25.8048 MHz. Write an 8051 assembly language program to implement the same. [Note: The ASCII code for A to Z starts from 41H (A) to 5AH (Z)]	15
4.		Assuming that XTAL = 33 MHz, (a) Find the frequency of the square wave generated on Port Pin P1.5 in the	

following program. **2.5**

(b) Modify the program to obtain the smallest frequency achievable, and the TH1 value to do that. **2.5**

```
    MOV TMOD, #20H
    MOV TH1,#0E5H
L2: SETB TR1
L1: JNB TF1, L1
    CPL P1.5
    CLR TF1
    CLR TR1
    SJMP L2
```

5. All VIT Chennai buses are equipped with standard GPS method to provide necessary information for the benefit of their users. The output of this GPS is interfaced with the 8051 microcontroller through Port P0. Write an 8051 assembly language program to display "**GET DOWN**" on the LCD, if the GPS coordinate is 0AH that is received by Port P0. **10**

Hint: Use DPTR for accessing the characters to be displayed.

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Reg. No.:

Name :

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Continuous Assessment Test II – October 2023

Programme	:	B.Tech (BCE/BPS/BAI/BRS)	Semester	:	FS 2023-24
Course	:	Microprocessors and Microcontrollers	Code	:	BECE204L
			Slot	:	E1+TE1
Faculty	:	REVATHI S, SUBHASHINI N, MUTHULAKSHMI S, MANOJ KUMAR R, BALA MURUGAN M S, SOURABH PAUL, S SELVENDRAN, LAKSHMI PRIYA, AUGUSTA SOPHY BEULET P, SIVASUBRAMANIAN A	ClassNbr:	:	CH2023240101166 CH2023240101169 CH2023240101178 CH2023240100941 CH2023240100943 CH2023240100947 CH2023240100951 CH2023240100954 CH2023240100959 CH2023240100963
Time	:	90 Minutes	Max. Marks	:	50

Answer ALL the questions

Note: All the programs should have the comments which describes the logic of the program

Q.No.	Questions	Marks
1.	Find the value of register R1 (XX) in the given 8051 ASM program such that it creates a delay of 5 seconds. Assume that the crystal frequency is 33 MHz.	5

Instruction	No. of Machine Cycle
MOV R1, #XX	1
Loop3: MOV R2, #255	1
Loop2: MOV R3, #255	1
Loop1: DJNZ R3, Loop1	2
DJNZ R2, Loop2	2
DJNZ R1, Loop3	2
RET	2

2.	Write an assembly language program in 8051 using timers to generate the following waveform as shown in Figure 1. Assume crystal frequency as 12 MHz	10

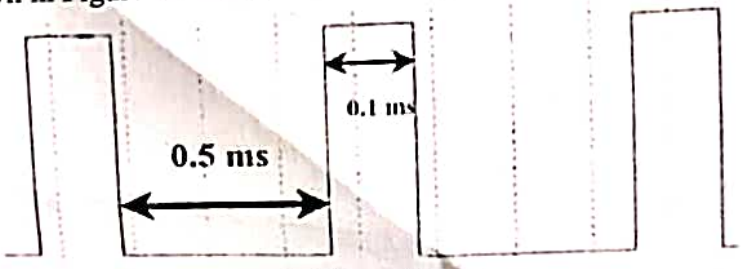

Figure 1: Timer Waveform

3.	Write an 8051 ASM program to generate the waveform as shown in Figure 2 using DAC.	10

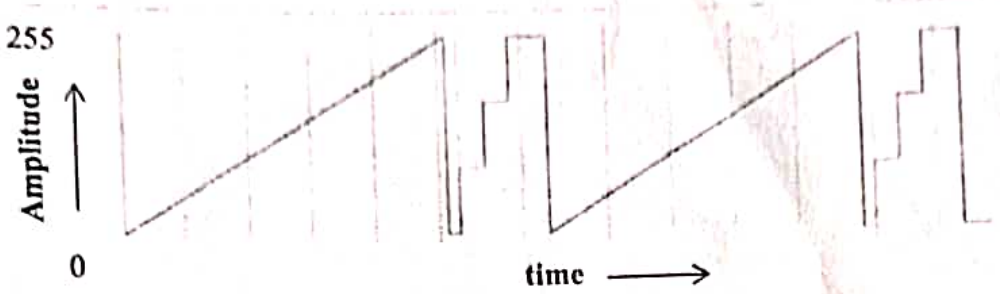

Figure 2: DAC Waveform

4. Assume that an array has 8 numbers stored starting from the location 40H as given below. A={50H,95H, 60H, 75H, F0H, 25H, 92H,98H}. Write an 8051 assembly language program to find the sum of all the numbers which are greater than 80H and store the result in the memory location 50H and carry (if any) in 51H. **10**

5. Design an 8051 microcontroller based system for VIT counselling hall. The system transmits the message 'WELCOME TO VIT' serially continuously with a baudrate of 9600 on a monitor. Assume the crystal frequency as 11.0592MHz. Also, the entry gate of the counselling hall is connected with one digital InfraRed (IR) sensor for monitoring the candidates entering the hall (connected to INT0 pin of 8051). Whenever there is a candidate entering the counselling hall, IR sensor generates an interrupt signal to display the message "HAVE A GREAT DAY" on LCD which is interfaced with 8051. Write an 8051 microcontroller assembly language program to configure the above system to perform serial transmission and the necessary LCD display. **15**

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Continuous Assessment Test II – October 2023

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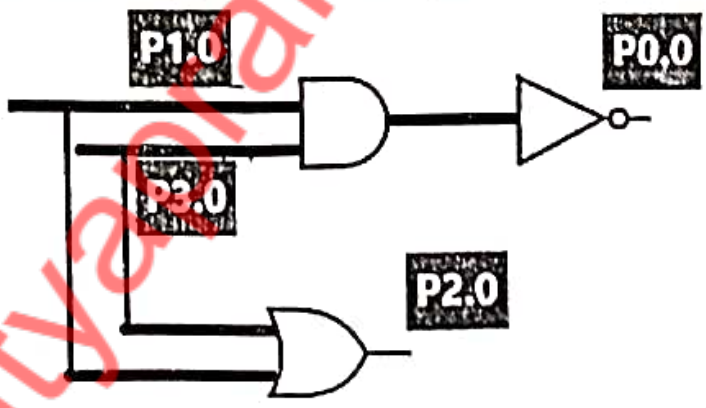
Course	:	Microprocessors and Microcontrollers	Code	:	BECE204L
			Class Nbr	:	CH2023240100967 CH2023240100969 CH2023240100973 CH2023240100980 CH2023240100983 CH2023240100987 CH2023240101187 CH2023240101190 CH2023240101216 CH2023240101236 CH2023240101243
Faculty	:	Dr. R. MANOJ KUMAR Dr. SOURABH PAUL Dr. A. SASITHRADEVI Dr. S. SELVENDRAN Dr. E. MANIKANDAN Dr. R. BALAKRISHNAN Dr. G. GUGAPRIYA Dr. ABRAHAM SUDHARSON PONRAJ Dr. CHANTHINI BASKAR Dr. V. BERLIN HENCY Dr. I. HARIHARAN	Slot	:	E2+TE2
Time	:	90 Minutes	Max. Marks	:	50

Answer ALL the questions

Q.No.	Sub. Sec.	Questions	Marks
1.		Write an 8051-Assembly Language Program to implement the provided logic circuit.	5+5



2.		In a classroom, a sensor triggers an 8051 microcontroller to count student entries using Mode 2 operation, with a 12MHz clock frequency. Write an Assembly Language Program (ALP) to implement this, taking into consideration a maximum class capacity of 60 students.	10
3.		How to create a 0.25-second delay in an 8051-Assembly Language Program using only registers and machine cycles for implementing the delay (without a timer), while considering a clock frequency of 12 MHz. Also, write sample delay loop program.	5

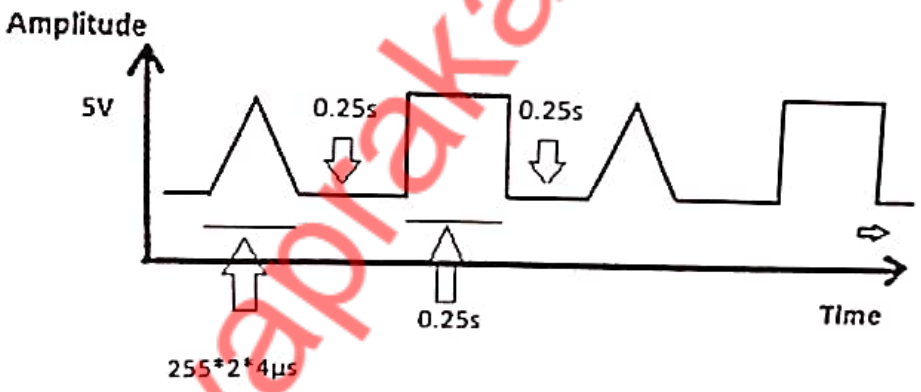
4. Consider a scenario where an LED needs to be toggled every 25 microseconds to create the illusion of continuous illumination due to the precision of human eye perception. The goal is to achieve this LED toggling on port P1.2 of an 8051 microcontroller. The applied clock frequency is 12 MHz.

a) In the first implementation, the LED toggling is achieved by continuously monitoring specific conditions, particularly the interrupt register, while preferring Timer 0 in mode 1 operation.

b) In the second approach, an automated system with interrupts acting as triggers is created, with a preference for Timer 1 in mode 1. An interrupt service routine (ISR) is set up to effectively manage the LED toggling. 7+8

Write the assembly code for both implementations (2 different program) and explain the key steps involved in each approach.

5. Write an Assembly Language Program to generate a periodic waveform as given below using DAC.



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Course Faculty

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