VIT
Vellore Institute of Technology

Slot: E1+TE1

School of Computer Science Engineering and Information Systems

Fall Semester 2024-2025

Continuous Assessment Test – I

Programme Name & Branch: B. Tech. IT

Course Name & code : Embedded Systems and IoT BITE403L

Class Number (s): VL2024250103424, VL2024250103426, VL2024250103430, VL2024250103479

Faculty Name (s) : Dr. SwarnaPriya R M, Dr. Nithya S, Dr. Karthikeyan D, Dr. Jerart Julus L

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

General instruction(s): Wherever required give assumptions, configurations and diagrams

Answer all the Questions: (5*10=50)

1. (a) Consider the following data given. Analyze the instructions and specify the addressing mode, calculate the effective address of the memory operand and the value in accumulator in each of the following instructions. **(4 Marks)**

100:	MOV A
101:	Operand
200:	34
299:	49
300:	55
350:	70
360:	77
500:	80

R0 : 200
R1: 30
DPTR: 500

(i) MOV A, @R0
(ii) MOVX A, @DPTR
(iii) ADD A,R1 (Assume A as 50H)
(iv) ADD A,360H (Assume A as 50H)

(b) Write an assembly language program for finding the Smallest of a set of 15 numbers stored in a memory block starting from 3000H. The smallest number has to be stored in the memory location 2000H. **(6 Marks)**

2. Assume a switch is connected to pin P7 of Port 0. Write a program using Embedded C to monitor its status every 20 microseconds and send two messages to the ports 1 and 2 as follows:
(i) SWITCH=0 send "1A" to Port 1
(ii) SWITCH=1 send "2C" to Port 2
Assume Oscillator Frequency = 11.0592 MHz, 9600 baud rate, 8-bit data, 1 stop bit and 1 start bit serial mode with timer 1 mode 1 configuration. Show the configuration of TMOD, TCON and T_X(Timer) registers. **(10 Marks)**

3. Schedule the tasks in the following table using EDF Scheduling policy. Assume that Task 1 enters the CPU for scheduling at 2 ms, Task 2 at 5 ms, Task 3 at 7 ms and Task 4 at 9 ms. Also the task 2 is more critical than task 1 and task 4 is more critical than task 3. (i) Show the scheduling for the time interval 0-30 ms.
(ii) Also comment on whether RMS scheduling policy can be used for this scheduling scenario. Justify your comment with proper interpretations. **(10 Marks)**

Task	c_k (ms)	τ_k (ms)
1	4	20
2	3	15
3	2	15
4	2	10

4. Write an Assembly Language Program using 8051 microcontroller to transmit a letter "Z" at a baud rate 2400, with an oscillator frequency of 12.475 MHz, 8 bit data and 1 bit stop and start bit mode, using Timer 1 in mode 1. Show the configuration of TMOD, TCON, TH_x, and SCON registers **(10 Marks)**

5. Design a baby-sitting device which can monitor the room temperature, humidity and bed-wet. When the room temperature is below 20 degree Celsius, the parent has to be intimated using a bulb indicator. Also when the humidity reaches a threshold value, the parent has to be intimated. When the bed is wet, then an alarm has to be blown. Discuss the sensors and actuators which can be used, their specifications and also implement the same using arduino platform. **(10 Marks)**