VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)
CHENNAI

Reg. Number:

Continuous Assessment Test(CAT) – I - AUGUST 2024

Programme	:	B.Tech. (CSE)	Semester	:	Fall 2024-25
Course Code & Course Title	:	BECE204L & Microprocessors and Microcontrollers	Class Number	:	CH20242501003
Faculty	:	Dr. M. Jagannath	Slot	:	G2 + TG2
Duration	:	90 Minutes	Max. Mark		50

General Instructions:

- Write only your registration number on the question paper in the box provided and do not write othe information.
- Only non-programmable calculator without storage is permitted

Answer all questions

Q. No	Sub Sec.	Description	Marks	Blooms Taxonomy Level
1.		In what ways do the architectural differences between microcontroller-based and microprocessor-based systems influence their applications in embedded systems, and how might these differences impact design decisions when choosing between the two for a specific project?	5	L2
2.		Design an 8051 assembly language program that implements an 8-bit calculator. The program should execute different arithmetic operations based on the content stored in the memory location 60H (M). Specifically, if M = 0, the program should perform addition; if M = 1, it should perform subtraction; if M = 2, it should perform multiplication; and if M = 3, it should perform division. How would you structure the program to handle these operations and ensure correct execution for each possible value present in the memory location? Use Table 1 for read the input and store the output.	15	L3
3.		Write an 8051 assembly language program to control the water inflow to a tank using a float sensor as shown in Figure 1. The float sensor is connected to port pin P2.1, the motor controlling the inflow of water is connected to P2.2, and a GREEN LED is connected to P2.3, both of which are normally set to 1. If the sensor detects a high water level	15	L4

Table 1

INPUT		OUTPUT		
Memory Location	Value	Result	Memory Location	Value
D: 40H	CDH	Sum	D: 50H	?
D: 41H	ABH	Difference	D: 51H	?
		Product (lower-byte)	D: 52H	?
		Product (higher-byte)	D: 53H	?
		Quotient	D: 54H	?
		Remainder	D: 55H	?

P2.3 1
P2.2 1
P2.1 0 initially from 1

(P2.1 = 1), the program should stop the motor by sending a 0 to P2.2 and turn off the GREEN LED. Additionally, the program should light up a RED LED connected to P2.4 to indicate that the tank is full. How would you implement this logic in 8051 assembly language, ensuring proper response to the sensor input?

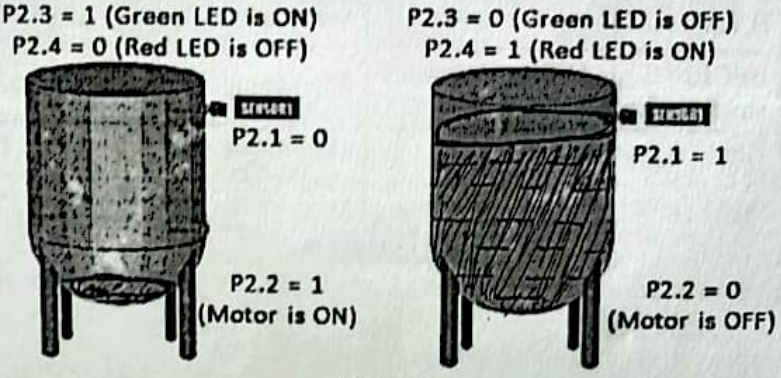

Figure 1

4. (a) Find the time delay of the given 8051 assembly language program. Assume the crystal frequency is 12 MHz. [7 Marks] — 15 — L3

Instruction	Number of Machine Cycle
MOV R1, #250	1
LABEL: MOV R2, #250	1
HERE: NOP	1
DJNZ R2, HERE	2
DJNZ R1, LABEL	2
RET	2

(b) Write an 8051 assembly language program to create the delay found in Q.No. 4(a) using Timer 0 in Mode 1. Assume the crystal frequency is 12 MHz. [8 Marks]

**********All the best **********