



**VIT**<sup>®</sup>

Vellore Institute of Technology  
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CHENNAI

Reg. Number:

### Continuous Assessment Test (CAT) – II OCTOBER 2025

Programme	:	B.Tech.	Semester	:	FALL 2025-2026
Course Code & Course Title	:	BECE204L & Microprocessors and Microcontrollers	Class Number	:	CH2025260102180 CH2025260102220 CH2025260102217 CH2025260102214 CH2025260102190 CH2025260102212 CH2025260102210 CH2025260102208 CH2025260102193 CH2025260102186
Faculty	:	Dr. S. Revathi, Dr R Dhanush, Dr Kirankumar M, Dr Karthikeyan P R, Dr V R Balaji Dr.R.Saravana Kumar, Dr Balakrishnan Dr. J. Florence Gnana Poovathy , Dr Ravi Tiwari, Dr. Idayachandran G	Slot	:	G1+TG1
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 other information
- Use statistical tables supplied from the exam cell as necessary
- Use graph sheets supplied from the exam cell as necessary
- Only non-programmable calculator without storage is permitted

#### Answer all questions

Q. No	Su b Se c.	Description	Marks	CO	BT Level
1.		<p>The contents of different registers are given below.          Offset (displacement) = 1000H, [AX] = 2000H, [BX] = 3000H, [SI] = 3000H, [SP] = 7000H, [CS] = 2000H, [DS] = 4000H, [SS] = 6000H, [IP] = 7000H.</p> <p>Calculate the physical addresses for the following addressing modes when moving operands from source to destination.</p> <p>(i) Direct addressing mode          (ii) Register indirect addressing mode          (iii) Register relative addressing mode          (iv) Base indexed addressing mode          (v) Relative base indexed addressing mode</p> <p>(Note: Write the instruction to move the operand for each addressing mode and calculate the corresponding address)</p>	5	2	K2
2.		In an effort to promote water conservation, a housing board wants to monitor daily water usage per household and inform those exceeding a specified safe limit to encourage responsible consumption. Write an 8086 assembly program that accepts an array of daily water usage values (in litres, 8-bit unsigned) for N households from memory location 1000:2003H. The			

	<p>number of households N is stored at 1000:2000H and the safe daily usage limit is stored at 1000:2002H. The program should:</p> <ul style="list-style-type: none"> <li>(i) Count how many households exceeded the safe usage limit and store the result at memory location 1000:3000H.</li> <li>(ii) Calculate the total water usage of all households and store the result at memory location 1000:3002H.</li> </ul>	10	2	K3								
3.	<p>A quality control system in a beverage company uses the 8255 interfaced with the 8086 microprocessor. The sensor data (8-bit), read from a production line, is sent to the 8086 through Port B of the 8255. The system reads data from the sensor only when PC0 goes low, which indicates that new data is available on Port B.</p> <p>The system should:</p> <ul style="list-style-type: none"> <li>• Read 4 bytes of data from Port B, but only when PC0 is low,</li> <li>• Store the 4 values consecutively starting from memory location 2000H in the data segment 1000H,</li> <li>• After collecting the 4 values, find the smallest value among them,</li> <li>• Output the smallest value to Port A.</li> </ul> <p>Initialize Port A in Mode 0 (simple output) and Port B in Mode 1 (input with handshake). The base address of Port A is 0020H.</p>	10	2	K3								
4.	<p>The schematic of temperature warning system is shown in Figure 1. The current temperature recorded by sensor is converted to digital using an ADC and send through port P0. The current temperature should be compared with the required temperature stored in memory location 40H and the DAC should generate a waveform according to the conditions given in the table</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Temperature comparison</th> <th>DAC Output</th> </tr> </thead> <tbody> <tr> <td>Current temp &gt; Required temp</td> <td>RAMP</td> </tr> <tr> <td>Current temp = Required temp</td> <td>SINUSOIDS</td> </tr> <tr> <td>Current temp &lt; Required temp</td> <td>STAIRS</td> </tr> </tbody> </table>	Temperature comparison	DAC Output	Current temp > Required temp	RAMP	Current temp = Required temp	SINUSOIDS	Current temp < Required temp	STAIRS	10	4	K3
Temperature comparison	DAC Output											
Current temp > Required temp	RAMP											
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Current temp < Required temp	STAIRS											

Figure 1

Write an assembly language program in 8051 for the above scenario.

5. A 2X3 keypad and 16X2 LCD is interfaced with 8051 microcontroller as shown in the Figure 2. Also, Red, Green and Blue LED's are connected to port pins. The 'ON' & 'OFF' of LEDs and display message in LCD depends on the keypress as given in the table.

Key Pressed	LED 'ON'	LCD Display
No key pressed	Only RED -ON others -OFF	-
0	Green-ON others -OFF	Key-0 Pressed
1	Green-ON others -OFF	Key-1 Pressed
2	Green-ON others -OFF	Key-2 Pressed
3	Blue-ON others-OFF	Key-3 Pressed
4	Blue-ON others-OFF	Key-4 Pressed
5	Blue-ON others-OFF	Key-5 Pressed

15 4 K3

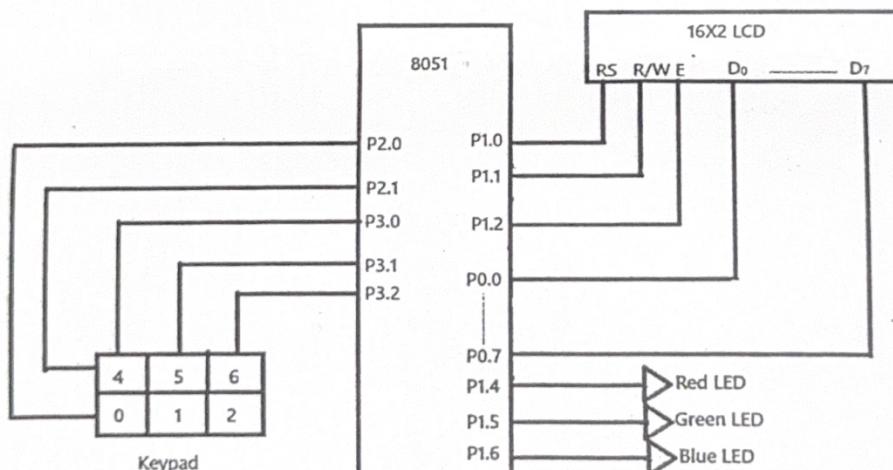


Figure 2

Write an assembly language program in 8051 for the above scenario.

