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PRESIDENCY UNIVERSITY

BENGALURU

Mid - Term Examinations - March 2026

Date: 11-03- 2026

Time: 11.45am to 01.15pm

School: SOE	Program: B. Tech		
Course Code: ECE3171	Course Name: Microcontroller Applications		
Semester: VI	Max Marks: 50	Weightage: 25%	

CO - Levels	C01	C02	C03	C04	C05
Marks	22	14	0	14	0

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

5Q x 2M=10M

1	What is the function of the Program Counter (PC) and Stack Pointer (SP) in 8051?	2 Marks	L2	C01
2	Explain the concept of stack operation in 8051 and state how PUSH and POP instructions work.	2 Marks	L2	C04
3	Explain the role of logical instructions (ANL / ORL / XRL) in data manipulation with one application.	2 Marks	L2	C04
4	Differentiate between CALL and RET instructions in terms of stack usage.	2 Marks	L2	C02
5	Write an instruction to clear the carry flag and mention where it is used.	2 Marks	L3	C02

Part B

Answer the Questions.

Total Marks 40M

6.	a.	<p>Design a microcontroller system using 8051 with 4 KB external ROM and 8 KB external RAM.</p> <p>Interface the memories such that:</p> <p>Starting address of ROM = 1000H</p> <p>Starting address of RAM = C000H</p> <p>(a) Draw the neat interfacing diagram and clearly show:</p> <p>(b) Address range of ROM and RAM</p> <p>Address decoding logic</p> <p>(c) Use of ALE, PSEN, RD, WR signals</p>	10 Marks	L3	CO1
Or					
7.	a.	<p>Design the memory address map for interfacing two 8 KB ROMs with 8051 microcontroller.</p> <p>Show the neat connection diagram and clearly indicate:</p> <p>Number of address lines required</p> <p>Address range for each ROM</p> <p>Address decoding logic</p> <p>Use of PSEN, ALE and EA signals</p>	10 Marks	L3	CO1
Or					
8.	a.	<p>Explain the architecture of the 8051 microcontroller in detail.</p> <p>Discuss the following blocks:</p> <p>CPU and ALU</p> <p>Register organization (A, B, PSW, PC, SP)</p> <p>Internal RAM and SFR organization</p> <p>I/O ports and their functions</p> <p>Control and timing unit</p>	10 Marks	L2	CO1
Or					
9.	a.	<p>Compare microprocessor and microcontroller with respect to architecture, memory, power consumption and applications.</p>	10 Marks	L2	CO1

10.	a.	<p>Explain the 8051 instruction set with suitable examples.</p> <p>Classify the instructions into:</p> <p>Data transfer instructions</p> <p>Arithmetic instructions</p> <p>Logical and bit manipulation instructions</p> <p>Branch instructions</p>	10 Marks	L2	CO2
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Or

11.	a.	<p>Explain stack operation and subroutine handling in 8051 assembly language programming.</p> <p>Discuss PUSH, POP, CALL and RET instructions with suitable examples.</p>	10 Marks	L3	CO2
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12.	a.	<p>Write an 8051 Assembly Language Program to count the number of 0s in a data byte stored at memory location 60H. Store the count at memory location 70H.</p>	10 Marks	L3	CO4
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Or

13.	a.	<p>Write an 8051 ALP to find the largest number from a block of N data bytes stored starting at memory location 50H and store the result at 70H.</p> <p>Assume N = 05H.</p>	10 Marks	L3	CO4
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