



USN

BEE403

**Fourth Semester B.E./B.Tech. Degree Examination, June/July 2025**  
**Microcontrollers**

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.  
 2. M : Marks, L: Bloom's level, C: Course outcomes.*

Module – 1				M	L	C
Q.1	a.	With a neat diagram explain the internal architecture of 8051 microcontroller.		12	L1	CO1
	b.	List the special function registers and their address in 8051 micro controller.		8	L1	CO1
OR						
Q.2	a.	Explain with example various addressing modes of 8051 $\mu$ c.		8	L2	CO1
	b.	Compare Microprocessor and Microcontroller.		6	L2	CO1
	c.	Mention address of the registers and contents of RAM locations after the following program: SETB PSW.4 MOV R <sub>0</sub> , # 10H MOV R <sub>1</sub> , # 0ABH MOV R <sub>2</sub> , # 2FH MOV R <sub>5</sub> , # 11H		6	L2	CO1
Module – 2						
Q.3	a.	What will be the content of the A and B register after executing the following code: CLRC MOV OEOH, # OFFH MOV OFOH, # OFH DIV AB		4	L1	CO2
	b.	What are assembler directives? Explain any 4 of them with an example.		8	L1	CO2
	c.	Differentiate between the following restrictions of 8051 microcontroller: i) SWAP & XCH ii) MOVX & MOVC iii) LCALL and ACALL iv) Bit level ANL and byte level ANL		8	L2	CO2
OR						
Q.4	a.	A switch is connected to pin P1.7. Write a program to check the status of the switch and make the following decision. If SW = 0, then send 00H to P2. If SW = 1 then send FFH to p2.		6	L1	CO2

	b.	Write an ALP to find the average marks of a student scored in six subjects. Assume that the marks are stored from location 40h and the average is to be stored at location 50h.	8	L1	CO2
	c.	Explain bit Jump instructions with an example.	6	L2	CO2
<b>Module – 3</b>					
Q.5	a.	Explain different data types supported by 8051C microcontroller.	8	L1	CO3
	b.	Write an 8051 C program to send the value 44 H serially one bit at a time via P1.0 the LSB should go out first.	8	L1	CO3
	c.	Explain the bit pattern of TMOD register.	4	L1	CO3
<b>OR</b>					
Q.6	a.	Assume that crystal frequency XTAL = 12 MHz and write a program to generate a square wave of 50 Hz frequency on pin 1.2. Use timer – 1 and operate the timer – 1 in mode – 1.	8	L4	CO4
	b.	Write a program for counter – 1 in mode – 2 to count the pulses and display the state of TL <sub>1</sub> count on P <sub>2</sub> . Assume that clock pulses are feed into pin T1.	8	L1	CO4
	c.	Explain the bit pattern of TCON register.	4	L1	CO4
<b>Module – 4</b>					
Q.7	a.	Compare polling and interrupts. What are the steps a microcontroller performs upon activation of interrupts?	8	L3	CO5
	b.	Write an 8051 C program that continuously gets data from P1.7 and sends it to P1.0 while simultaneously creating a square wave of period 200 $\mu$ s on pin P2.5. Assume crystal frequency = 11.0592 MHz and use Timer '0' to create square wave.	12	L3	CO5
<b>OR</b>					
Q.8	a.	Explain the importance of TI and RI flags.	8	L1	CO6
	b.	If the crystal frequency is 22 MHz what will be the baud rate if i) TH <sub>1</sub> = -3 ii) TH <sub>1</sub> = -12 with SMOD = 0 and SMOD = 1	4	L1	CO6
	c.	Write an 8051C program to transfer the message "HELLO" serially at 9600 baud rate 8-bit data, 1-stop bit. Do this continuously.	8	L4	CO6
<b>Module – 5</b>					
Q.9	a.	Explain how DAC 0808 can be interfaced to 8051 microcontroller and also write an assembly language program to generate triangular wave.	10	L1	CO5
	b.	A switch is connected to P2.7. Write an assembly language program to monitor the status of the switch 'SW'. If SW = 0, DC motor moves clockwise and If SW = 1, DC motor moves anticlockwise.	10	L3	CO5
<b>OR</b>					
Q.10	a.	Show the interfacing of a stepper motor to 8051 and write a program to rotate the stepper motor clockwise/anticlockwise continuously with full step sequence.	10	L3	CO6
	b.	Explain how to interface 4 x 4 matrix key board to 8051 microcontrollers.	10	L1	CO6

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