

USN 1 A Y 2 3 E C 1 D 3

BEC405A

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 neat architecture diagram explain the features of 8051 microcontroller.	8	L2	CO1
	b.	Explain 4 I/O ports circuitry of 8051 with neat circuit diagram.	8	L2	CO1
	c.	Differentiate microprocessor and microcontroller.	4	L1	CO1

OR

Q.2	a.	Interface the RAMN of 8 Kbytes with starting address C000H and ROM of 32 Kbytes.	8	L3	CO1
	b.	With neat diagram explain the internal memory structure and programming model of 8051 microcontroller.	8	L2	CO1
	c.	Which are the criteria for choosing a microcontroller?	4	L1	CO1

Module - 2

Q.3	a.	Explain different types of bit and byte Jump instructions.	6	L2	CO2
	b.	Analyse the following instructions with example : i. MOVX A, @DPTR ii. DA A iii. RLC A.	6	L3	CO2
	c.	Write an assembly language program to arrange the given array of numbers stored at starting address 30 H. (Assume array of 5, 8-bit numbers) in ascending order.	8	L3	CO2

OR

Q.4	a.	Write an assembly level program to add the five consecutive 8 bit numbers located in RAM location with starting address 40 H. Store the 16 bit result in 50 H (lower byte) and 51 H (higher byte).	8	L3	CO2
	b.	Explain various addressing modes of 8051 microcontroller with example.	8	L2	CO2
	c.	What is stack? Explain the working of PUSH and POP instructions.	4	L1	CO2

## Module - 3

Q.5	a.	Explain the timer mode 1 and mode 2 operation.	6	L2	CO3
	b.	With neat diagram list and analyse the bit contents of TMOD and TCON registers.	6	L1	CO3
	c.	Write an assembly language program to generate a square wave with an ON time of 3 ms and on OFF time of 10 ms on all pins of port 0. Assume an XTAL of 22 MHz. Use Timer 0 in mode 1.	8	L3	CO3

## OR

Q.6	a.	Write an 8051 C program to transfer the message "HELLO" serially at 9600 baud continuously. Use 8-bit data, 1 stop bit.	8	L3	CO3
	b.	Write an 8051 C program to receive bytes of data serially and put them in port P0 and P2. Set the baud rate at 9600, 8 bit data and 1 stop bit. Use Timer 1 for baud rate generation.	8	L3	CO3
	c.	List and explain working of pins of RS 232 DB – 9 connector.	4	L1	CO3

## Module - 4

Q.7	a.	List out 8051 interrupt priority upon reset from highest to lowest with their vector address, what are the uses ands function of six interrupts of 8051.	8	L2	CO4
	b.	Write an assembly program to generate two square wave. One of 5 KHz frequency at P1.3 and another of frequency 25 KHz at P2.3. Assume XTAL = 22 MHz.	8	L2	CO4
	c.	What is an interrupt? Compare interrupt vs polling.	4	L1	CO4

## OR

Q.8	a.	Write an assembly program I which 10 bytes of data stored in RAM locations starting from 45 H are transferred serially. At the end of data transfer the value of R0 is displayed on P1. Use timer 1 mod 2 (baud rate 9600).	8	L3	CO4
	b.	What are the steps involved in executing interrupt.	4	L2	CO4
	c.	With neat diagram explain bit contents of interrupt priority (IP) register and interrupt enable (IE) register.	8	L2	CO4

## Module - 5

Q.9	a.	Explain the operation and pin description of LCD display.	6	L2	CO5
	b.	With neat diagram explain internal architecture of ADC 0804 chip.	8	L2	CO5
	c.	With the help of diagrams explain the working of DC motor rotation clock wise and counter clock wise direction using H-bridge connection.	6	L2	CO5

## OR

Q.10	a.	A switch is connected to pin 2.7. Write a C program to monitor the status of switch (SW) and perform the following : i. If SW = 0, stepper motor moves clockwise ii. If SW = 1, the stepper motor moves counter clockwise.	10	L3	CO5
	b.	A door sensor is connected to the P1.1 pin and Buzzer is connected to P1.7. Write 8051 C program to monitor the door sensor and when it opens, sound the buzzer. You can sound the buzzer by sending square wave of few hundred Hz.	10	L3	CO5

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