

CBGS SCHEME

USN

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BEC405A

Fourth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
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.	Differentiate between microprocessors and microcontrollers.	5	L1	CO1
	b.	With neat diagram explain the architecture of 8051 microcontroller.	10	L2	CO1
	c.	Explain the alternate functions of port-3 in 8051 microcontroller.	5	L2	CO1
OR					
Q.2	a.	Differentiate between RISC and CISC architectures.	5	L1	CO1
	b.	With suitable interfacing diagram, interface 16 KB of ROM and 32 KB of RAM to 8051 microcontroller. Starting address of ROM is 0000h and of RAM is 8000 h.	10	L3	CO1
	c.	With neat diagram, explain the internal memory organization of 8051 microcontroller.	5	L2	CO1
Module – 2					
Q.3	a.	What do you mean by addressing mode? Explain any four addressing modes with examples.	8	L2	CO2
	b.	Explain the following instructions with examples: i) DA A ii) XCHD iii) JBC	6	L2	CO2
	c.	Develop an ALP to find smallest number in an array starting at 40 h with five elements. Store the smallest number in the external memory address 5000 h.	6	L4	CO2
OR					
Q.4	a.	With neat diagram, explain the classification of branch instructions based on the range of their memory access.	8	L2	CO2
	b.	Explain PUSH and POP instructions with the help of neat diagram and examples.	6	L2	CO2
	c.	Develop an ALP to convert a packed BCD number stored in 50 h (internal memory) into two ASCII numbers. Store the result in 30 h and 31 h respectively.	6	L3	CO2

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Module – 3

Q.5	a.	Explain the data types available in 8051 C programming.	6	L2	CO3
	b.	List the steps to program the Timer-0 in mode-2.	6	L1	CO3
	c.	Assume XTAL = 11.0592 MHz, develop an ALP to generate a square wave of 2 kHz frequency on pin P1.5 using Timer-1 in 16-bit mode.	8	L3	CO3

OR

Q.6	a.	Explain TMOD register with its bit format.	6	L2	CO3
	b.	Develop a 8051 C program to toggle all the bits of Port-0 and Port-2 continuously with 250 ms delay.	6	L3	CO3
	c.	Generate a square wave with an ON time of 3 msec and an OFF time of 10 msec on all pins of Port-0. Show the calculations by assuming XTAL = 22 MHz.	8	L3	CO3

Module – 4

Q.7	a.	List the 8051 microcontroller interrupts with their ROM locations.	5	L1	CO4
	b.	What is the difference between RET and RETI instructions? Explain why we cannot use RET instead of RETI.	5	L2	CO4
	c.	Develop an Assembly Language Program (ALP) to : i) Take data from Port-2 and send it serially and continuously. ii) Generate a square wave at P1.2 using Timer-0 in mode-1, interrupt mode. iii) When INTO is activated, Port-0 is mode 0 for a short time, to switch OFF the LEDs connected to it. The LEDs will also remain OFF if the switch connected to INTO pin (P3.2) is kept pressed.	10	L3	CO4

OR

Q.8	a.	Explain in detail TCON register with its bit format.	8	L2	CO4
	b.	Assume that after reset, the interrupt priority is set by the instruction "MOV IP, #00001100B". Explain the sequence in which the interrupts are serviced.	5	L2	CO4
	c.	Develop an ALP to generate two square waves: one of 5 kHz frequency at pin P1.3, and another of frequency 25 kHz at pin P2.3. Assume XTAL = 22 MHz.	7	L3	CO4

Module – 5

Q.9	a.	A door sensor is connected to the pin P1.1 pin, and a buzzer is connected to P1.7. Develop an 8051 C program to monitor the door sensor and when it opens, sound the buzzer. Hint : You can send the buzzer by sending a square wave of a few hundred Hz.	6	L3	CO5
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	b.	A switch is connected to pin P1.5. Develop a C program to interface DC motor to 8051 and to monitor switch (SW) status to perform the following: i) If SW = 0, the DC motor moves with 50% duty cycle pulse. ii) If SW = 1, the DC motor moves with 25% duty cycle pulse.	6	L3	CO5
	c.	Develop a C program to send the letters 'V', 'T' and 'U' to LCD by interfacing it to the 8051 microcontroller. Also write the interfacing diagram.	8	L3	CO5
OR					
Q.10	a.	With an interfacing diagram, explain the connections of ADC-0804 to the 8051 microcontroller.	6	L2	CO5
	b.	The switch SW is connected to pin P0.0. Develop a 8051 C program to do the following: i) When SW = 0, the DAC output gives a triangular waveform ii) When SW = 1, the DAC output gives a ramp waveform.	6	L3	CO5
	c.	A switch is connected to pin P2.7. Develop a C program to monitor the status of switch (SW) and perform the following: i) If SW = 0, the stepper motor rotates in clockwise direction. ii) If SW = 1, the stepper motor rotates in counter clockwise direction.	8	L3	CO3
