

Fourth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025 Microcontroller and Applications

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.	Explain the architecture of the 8051 microcontroller and provide a detailed labeled diagram.	10	L1	CO1
	b.	Compare and contrast the Harvard and Von Neuman architectures and explain their differences with the role of labeled diagram.	10	L2	CO1
OR					
Q.2	a.	Explain with a neat diagram the port0 and port1 pin configurations of the 8051 microcontroller.	10	L1	CO1
	b.	Explain the process of interfacing an 8K EPROM and 4K RAM with an 8051 microcontroller. Illustrate the sequence of operations using a detailed timing diagram.	10	L2	CO1
Module – 2					
Q.3	a.	Give examples to illustrate the various addressing modes of the 8051 microcontroller.	10	L3	CO1
	b.	Create an assembly-level program to determine the number of ones in a given binary number and output the result to port0 if its even or port1 if its odd.	10	L3	CO1
OR					
Q.4	a.	Discuss the following instructions with examples: i) MOVC A, @A+PC ii) XCHD A, @R _p iii) DA A iv) MOV C, b v) ANL A, add	10	L3	CO1
	b.	Determine the largest number in an array of 10 numbers, starting at 9400h, write an assembly program and save the result in R5.	10	L3	CO1
Module – 3					
Q.5	a.	Write a program in C for an 8051 microcontroller to compute the checksum byte for the data bytes 32h, 44h, 68h and 27h. If the computed checksum indicates valid data, output 'G' to port2; otherwise output 'B' to port2.	10	L3	CO2
	b.	Explain different data types supported by 8051 with an example for each. Also explain the factors that affect the accuracy of delay.	10	L2	CO2
OR					
Q.6	a.	Write a 8051 C program to monitor the door sensor connected to P1.1, which should stratify the condition; when it opens, a buzzer connected to P1.7 should make sound.	10	L3	CO2
	b.	Explain with neat sketches 8051 timer/counter logic circuit. Also use of TMOD register.	10	L1	CO1
Module – 4					
Q.7	a.	Write an ALP to transmit data "Hello Department of Mechatronics" serially at 9600 baud rate, use 8 bit data and 1 stop bit. XTAL = 11.0592 MHz. Use Timer1.	10	L3	CO3
	b.	With the help of neat sketch explain the handshaking signals of RS232 DB9 connector. Also explain the importance of MAX 232 chip.	10	L2	CO3

OR

Q.8	a.	Write an 8051C program to send the 2 messages "Normalized" and "High Speed" to serial port. Based on the switch status connected to P2.0. SW = 0, 4800 baud rate, SW = 1, 9600 baud rate.	10	L3	CO3
	b.	Write the steps involved in programming 8051 for serial communication data transfer using mode1. Also explain with neat sketch SCON register.	10	L2	CO3

Module – 5

Q.9	a.	With a neat sketch, explain the pin description of LCD. Also write an 8051 assembly program to send message "YES" to the LCD using delay.	10	L3	CO4
	b.	Explain with neat sketch DC motor interfacing to 8051. Mention the significance of H-bridge circuit.	10	L2	CO4

OR

Q.10	a.	Draw the block schematic if stepper motor interfaced to 8051 at port P1. Write an 8051 C program for the rotation of 180° in anticlockwise direction. Assume motor step angle as 1.8° per step.	10	L3	CO4
	b.	Explain with neat sketch interfacing DAC to 8051. Write a C code to generate a sine wave using DAC.	10	L2	CO4
