



MANGALORE INSTITUTE OF TECHNOLOGY & ENGINEERING

(A Unit of Rajalaxmi Education Trust®, Mangalore)
Autonomous Institute affiliated to VTU, Belagavi, Approved by AICTE, New Delhi
Accredited by NAAC with A+ Grade & ISO 9001:2015 Certified Institution

Model Question Paper

Fourth Semester BE Degree Examination

Microcontroller and Applications

Time: 3 Hours

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2. M: Marks, L: RBT (Revised Bloom's Taxonomy) level, C: Course outcomes.

Module -1			M	L	C
Q1	a.	Explain the architecture of the 8051 microcontroller with a neat and well-labeled sketch.	10	L2	CO1
	b.	List out the difference between Harvard and Von Neumann Architecture with necessary sketches	10	L2	CO1
OR					
Q2	a.	Illustrate the pin configurations of Port 0 and Port 2 in the 8051 microcontroller with a neat diagram, and explain their functions in I/O operations and external memory interfacing.	10	L2	CO1
	b.	Describe the process of interfacing an 8K EPROM and a 4K RAM with an 8051 Microcontroller. Then, illustrate the sequence of operations with a detailed timing diagram.	10	L2	CO1
Module- 2					
Q3	a.	Illustrate the functionality of the following assembly instructions with examples. Provide a clear description of their operation and demonstrate their use in a specific scenario. i)XRL A,@Rp ii)ANL A, add iii) MOV C,b iv)DA A v)MOVC A, @A+PC	10	L3	CO2
	b.	Create an assembly-level program to determine the number of ones in a given binary number and output the result to Port 0 if it's even, or Port 1 if it's odd?	10	L3	CO2
OR					
Q4	a.	Write an Assembly Level Program where you treat registers R0 and R1 together as a 16-bit register. The task is to rotate their combined value one place to the left. Specifically, bit 7 of R0 should become bit 0 of R1, and bit 7 of R1 should become bit 0 of R0, and so on.	10	L3	CO2
	b.	Determine the greatest number in an array of 10 numbers, starting at 9400h, write an assembly program and save the result in R5.	10	L3	CO2
Module - 3					
Q5	a.	Describe the process of programming the 8051 microcontroller in Timer Mode 2. Additionally, provide a C program for the 8051 that monitors a door sensor connected to P1.1. When the door opens, the program should trigger a buzzer connected to P1.7.	10	L3	CO3
	b.	Describe the data types supported by the 8051 microcontroller with relevant examples. Additionally, write an 8051 C program to read a byte from Port 1, wait	10	L3	CO3

		for ½ second, and output it to Port 2.			
OR					
Q6	a.	Explain the logic circuit of the 8051 timer/counter with a clear diagram, and calculate the value to be loaded into Timer 1 in Mode 1 configuration to generate a 1-second delay.	10	L3	CO3
	b.	Detail the steps involved in programming Timer Mode 1 on the 8051 microcontroller. Additionally, provide an assembly language program to generate a 100 kHz square wave with a 50% duty cycle on pin P1.5 using Timer 1 in Mode 1 for generating the required time delay.	10	L3	CO3
Module - 4					
Q7	a.	Write an ALP for to transmit data “Department of Mechatronics Engineering MITE” serially at 9600 baud rate, use 8bit data and 1 stop bit. XTAL=11.0592MHz. Use Timer1	10	L3	CO4
	b.	What is an interrupt, and how does it differ from the polling technique in the 8051 microcontroller? Describe the IE register's bit patterns and write a program to set the highest priority for the INT1 interrupt using the IP register.	10	L3	CO4
OR					
Q8	a.	Using a clear diagram, explain the handshaking signals of an RS-232 DB9 connector. With XTAL=11.0592MHz, find the value needed to have following baud rate. i)9600 ii)4800 iii)2400	10	L3	CO4
	b.	Write an 8051 C program using interrupts to do the following. i) Receive data serially and send to P0 ii) Read data from P1, Transmit data serially. Assume that XTAL=11.0592MHz. set the baud rate 4800	10	L3	CO4
Module - 5					
Q9	a.	Describe the pin configuration of an LCD with a clear diagram. Additionally, provide an 8051 Assembly language program that sends the message “Welcome” to the LCD using delay routines.	10	L3	CO5
	b.	Interface 8051 to 7 Segment LED display and write an ALP to display hexadecimal numbers (0 to F) on it.	10	L3	CO5
OR					
Q10	a.	Draw the block schematic of 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 degrees per step.	10	L3	CO5
	b.	Explain with neat sketch DC motor interfacing to 8051. Assume Switch is connected to P2.7, write 8051 C program to rotate DC motor based on following condition a)SW=0 DC motor rotates clockwise b)SW=1 DC motor rotates anti clockwise	10	L3	CO5
