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Fourth Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024
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.

				M	L	C
		Module – 1		**M**	**L**	**C**
Q.1	a.	With neat block diagram, analyze the architectural features of 8051 microcontroller.		10	L2	CO1
	b.	Illustrate the memory organization of Internal RAM of 8051.		06	L2	CO1
	c.	List out the differences between Microprocessor and Microcontroller.		04	L1	CO1
		OR				
Q.2	a.	Distinguish between RISC and CISC.		04	L1	CO1
	b.	With neat Pin configuration diagram of 8051 Microcontroller. Explain function of each Pin.		08	L2	CO1
	c.	Design a circuit to interface external memory of 4 KB RAM with 8051 Microcontroller, consider starting address of RAM is 7000H.		08	L3	CO1
		Module – 2				
Q.3	a.	Explain the various addressing modes of 8051 Microcontroller with example.		07	L2	CO2
	b.	Write an ALP (Assembly Language Program) to separate positive and negative numbers in an Array.		07	L3	CO2
	c.	Analyze the function of Rotate instructions of 8051 Microcontroller.		06	L2	CO2
		OR				
Q.4	a.	Justify whether the following instructions are valid or not. If valid brief the function with an example. i) MOV@PTR, R_0 ii) SWAP A iii) ADC A, #07H iv) MUL AB v) SUBB A, R_0		05	L2	CO2
	b.	Interpret the JUMP instructions of 8051 Microcontroller.		07	L3	CO2
	c.	Write an assembly language program to add two 16 bit numbers loaded in R_1R_0 and R_3R_2. Store the result in R_6, R_5 and R_4 from MSB to LSB.		08	L3	CO2
		Module – 3				
Q.5	a.	Explain TMOD Register with the help of neat Bit frame structure.		06	L2	CO3
	b.	Write an ALP to generate the Time delay of 10ms using Timer 0 Mode 1 operation with crystal frequency of 11.0592 MHz.		08	L3	CO3
	c.	With a diagram explain the different steps to program timer 0 in Mode 1.		06	L3	CO3
		OR				
Q.6	a.	Explain the bit pattern of SCON register in 8051 Microcontroller.		06	L2	CO3
	b.	Analyze the RS232 DB09 connector signals used for serial communication by connecting it to 8051 Microcontroller.		07	L2	CO3
	c.	Write a 'C' program for 8051 Microcontroller to transmit the message ECE using serial communication with a baud rate of 9600.		07	L3	CO3

		Module – 4			
Q.7	a.	Write an interrupt vector table of 8051 Microcontroller and also explain how the register IE is used for activating the interrupts.	10	L2	CO4
	b.	List the steps involved in executing an interrupt.	05	L2	CO4
	c.	Show the instructions to (i) Enable the serial interrupt, Timer0 interrupt and external hardware interrupt. (ii) Disable the timer0 interrupt. (iii) Disable all interrupts, with a single instruction.	05	L2	CO4
		OR			
Q.8	a.	Explain the programming of serial communication interrupt.	08	L2	CO4
	b.	Interpret how multiple interrupts can be handled in 8051 Microcontroller.	08	L2	CO4
	c.	Analyze the function of Interrupt Priority (IP) register with bit pattern diagram.	04	L2	CO4
		Module – 5			
Q.9	a.	With neat diagram of LCD connection to 8051 Microcontroller, write an assembly language program to interface LCD to 8051 microcontroller to display word "WORLD".	12	L3	CO5
	b.	With neat diagram, explain DAC interface with 8051 Microcontroller and also write ALP program to generate staircase waveform with 5 steps, when SW = 0 and triangular waveform when SW =1.	08	L3	CO5
		OR			
Q.10	a.	Draw the diagram to interface a stepper motor to 8051 MC. Also write a 'C' program to monitor the status of switch connected to Port P2.7. If SW = 0, the stepper motor should rotate clock-wise else it should rotate in anticlockwise direction.	10	L3	CO5
	b.	With neat diagram explain 8051 connection to ADC 0804 and also write 'C' program interface ADC 0804 to 8051 Microcontroller.	10	L3	CO5

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