Question Paper

Exam Date & Time: 22-Nov-2022 (02:00 PM - 05:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

MANIPAL INSTITUTE OF TECHNOLOGY, MANIPAL
FIFTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, NOV/DEC 2022

MICROCONTROLLER BASED SYSTEMS [BME 3154]

Marks: 50 **Duration: 180 mins.**

Answer all the questions.

Instructions to Candidates:
1. Answer ALL questions
2. Draw diagrams wherever necessary
3. Missing data may be suitably assumed

1)		Compare the 8051 Timer modes: MODE-1 and MODE-2 for the differences and similarities.	(3)
	A)		
	B)	How do you raise or lower the priorities of the interrupts in the 8051 microcontroller? Illustrate.	(3)
	C)	How do you make use of Port-3 lines of the 8051 microcontroller for memory control, serial communication and counting applications? Explain.	(4)
2)		Generate a time delay of 5 mS using the Timer-0 in mode-1, and the 8051 microcontroller operating with a clock speed of 11.0592 MHz. Write delay calculations.	(3)
	A)		
	B)	How do you decrement 16-bit data pointer register decimally? Illustrate.	(3)
	C)	Generate a periodic pulse of duty cycle 33% on Port pin P1.5 of the 8051. Let the frequency of the signal generated be 1 KHz, and assume that the microcontroller is operating at a clock speed of 12 MHz.	(4)
3)		Develop an assembly language program for the 8051 microcontroller to convert an 8-bit binary number in to its equivalent grey code. Assume that the binary number is available in the external data memory and make available the result in accumulator A.	(4)
	A)		
	B)	Develop a subroutine for the 8051 microcontroller to pack two single-digits of a decimal numbers available in the registers R0 and R1 as lower and higher digits respectively. Return the packed data in to the register B.	(3)
	C)	Compare the indirect and indexed addressing modes of the 8051 instructions.	(3)
4)		How do you increase driving capability of address and data bus in the 8051 system? Illustrate with appropriate devices.	(4)
	A)		
	B)	Interface two 8255 PPI to the 8051 microcontroller and assign appropriate address to all ports of both devices.	(3)

	C)	Design a key board interface for the 8051 to connect 8 push-to-on keys using a priority encoder chip.	(3)
5)		Design an 8051 system to generate a triangular waveform of frequency 1 KHz and an amplitude of 0 to 5V. Assume a clock frequency of 10 MHz. Depict both hardware and required software.	(5)
	A)		
	B)	Develop a microcontroller based product counter. Write both hardware and software specifications required to build the system.	(3)
	C)	How do you employ the 8051 microcontroller to measure frequency of an unknown signal? Illustrate.	(2)

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