USN

RV COLLEGE OF ENGINEERING®
(An Autonomous Institution affiliated to VTU)
V Semester B. E. Examinations March / April-2023
Computer Science and Engineering
MICROPROCESSOR AND MICROCONTROLLER

Time: 03 Hours   *Maximum Marks: 100*

Instructions to candidates:
   1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
   2. Answer FIVE full questions from Part B.

PART-A

1	1.1	What are the offset registers for the 8086 segment registers?	02
	1.2	List the 8086 Hardware & Software interrupts?	02
	1.3	How to configure 8255?	02
	1.4	Write all the possible processor activities when an *RET* instruction is executed by 8086?	02
	1.5	On power up, the 8051 uses which *RAM* locations for registers $R0 - R7$	01
	1.6	The internal *RAM* memory of the 8051 is _____	01
	1.7	How many 16-bit registers does 8051 series have?	01
	1.8	When 8051 wakes up the address loaded to *PC* register is _____	01
	1.9	How are the bits of the register *PSW* affected if we select Bank2 of 8051?	01
	1.10	The 8051 has _____ parallel *I/O* ports.	01
	1.11	How many timers are there in 8051 and what is the size of timers?	02
	1.12	Indicate the number of steps required to rotate the 2-Phase, 4-winding 200 steps per revolution motor by 288 degree.	02
	1.13	Assume single digit common cathode display is connected to *P0*, with segment '*a*' connected to *P0.7* and '*dp*' connected to *P0.0*. Indicate the hex value to be output to the *P0* to get the display '*H*'.	02

PART-B

2	a	Draw and discuss the internal block diagram of 8086.	08
	b	Draw and discuss a typical minimum mode 8086 system.	08

OR

3	a	Explain with a neat diagram de-multiplexing of Address/data bus.	06
	b	Explain the following addressing modes with an example: i)　　Immediate ii)　　Direct iii)　　Register Indirect iv)　　*IP* Relative v)　　Register Relative.	10

4	a	What are assembler directives? Explain any five assembler directives. Also give an example for each.	10

	b	What are the different instruction types of 8086?	06
		OR	
5	a	Describe how an assembly language program is developed and debugged using system tools such as editors, assemblers, linkers, locators, emulators, and debuggers.	08
	b	Write 8086 *ALP* to compute the average of any number of bytes in an array in memory. The number of bytes to be added is in the first byte of the array.	08

6	a	Explain the following:
		   i) Exceptions in 8086
		   ii) Macros Vs Procedures.
			08

	b	Draw circuits showing Interfacing of programmable input output device 8255 to 8086.	08
		OR	
7	a	Explain the various modes of operation of 8255 using appropriate control word formats.	08
	b	Explain, with examples, different mechanisms of passing parameters to procedures and compare memory mapped I/O and I/O mapped I/O.	08
8	a	Draw the neat block diagram of 8051 Microcontroller and list their specifications and different addressing modes with examples.	06
	b	With examples explain the different addressing modes of 8051.	10
		OR	
9	a	Indicate the different Conditional and Unconditional Jump instructions in 8051.	08

	b	Indicate the meaning of the following instructions:
		   i) $MOVC\ A, @A + DPTR$
		   ii) $MOVX\ A, @DPTR$
		   iii) $MOVX\ A, @R0$
		   iv) $MOV\ A, 80H$
			08

10	a	Interface two common anode seven segment display digits to 8051 using $PO, P1$. Write a sample code to display the number 12h.	08
	b	Design Microcontroller based door locking system. User will feed pre-stored 4 digit key code (say 9875), if the key code matches door must open. Opening and closing of door is controlled by stepper motor. Draw the complete interfacing circuit and embedded C code to perform the required work. Make suitable assumptions.	08
		OR	
11	a	Explain the major steps followed for keyboard interfacing in 8051 with schematic representation.	08
	b	Design Microcontroller based function generator (one which generates square and sine waveforms of different frequencies). One toggle key is provided to select the type of waveform (square/sine). Draw the interfacing circuit and develop embedded C program to implement the required task. Make suitable assumptions.	08