USN

RV COLLEGE OF ENGINEERING®
(An Autonomous Institution affiliated to VTU)
VII Semester B. E. Fast Track Examinations Jul-19
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	Mention all the segment registers of 8086.	02
	1.2	What is the maximum memory addressing and I/O addressing capabilty of 8086?	02
	1.3	Compute the effective address for direct addressing mode when $[DS] - 1000H$ and the instruction is $MOV\ AX, [6000]H$.	02
	1.4	Identify all the machine control instructions of 8086.	02
	1.5	Distinguish between $EXTRN$ and $PUBLIC$ assembler directives.	02
	1.6	Develop an ALP to display a message using Macro definition.	02
	1.7	Write the different methods of interfacing I/O devices.	01
	1.8	Write the basic functionality of the oscillator.	01
	1.9	What are the advantages if Microcontroller based systems over microprocessor based systems.	02
	1.10	List any four salient features of ARM microcontroller.	02
	1.11	Draw the format structure of $PCON$ register.	02

PART-B

2	a	Draw the architecture diagram of 8086. Explain all functional units of organization in detail.	08
	b	Using memory segmentation diagram, discuss the 8086 memory segmentation with respect to non-overlapping and overlapping segments.	08

OR

3	a	With the help of a timing diagram, illustrate Read and Write operations for minimum mode of 8086.	08
	b	Compare and contrast between $8\ bit, 16\ bit, 32\ bit$ and $64\ bit$ microprocessors. Give an example for each.	08

4	a	What do you mean by addressing modes? What are the different addressing modes supported by 8086? Illustrate any four addressing modes with suitable examples.	10

	b	Explain the following 8086 instructions. Also give an example for each:
		  i) *XCHG*
		  ii) *DAA*
		  iii) *CALL*
		  iv) *TEST*.
			06

		OR	
5	a	Construct an *ALP* to perform transfer of 10 bytes of data from one memory location to another memory location. Write the complete code along with the implications of overlapping of memory locations.	08

	b	Using programming code example, illustrate the usage of the following assembler directives.
		  i) *DW*
		  ii) Offset
		  iii) *TYPE*
		  iv) Assume.
			08

6	a	Develop an *ALP* program to change a sequence of sixteen 2-byte numbers from ascending to descending order. The numbers are stored the new series at address starting from 7000*H*. Illustrate the complete code including data with *LIFO* property.	08
	b	Bring out the differences between Interrupt Service Routine (*ISR*) and Subroutine Refine. Using an example, discuss transfer of control using an *ISR*.	08
		OR	
7	a	With the help of block diagram, explain briefly the 8255 internal architecturecapabilities in detail. Also mention the different modes of 8255.	10
	b	Draw the 7-segment display schematic circuit interfacing. Develop a code to display *HELP* and *FIRE* messages along with the time interval between them.	06
8	a	Draw the internal architecture of 8051. Also describe the functional description of each block in detail.	10

	b	Draw and discuss the formats and bit definitions of the following *SFR's* of 8051:
		  i) *IE*-Register
		  ii) *TMOD*.
			06

		OR	
9	a	Illustrate the internal data memory of 8051. Also write the program memory map of an 8051 system.	10
	b	Write an Embedded *C* program to generate square wave form from port 1.5 using timer1. Assume that the oscillator is running at different clock speeds. (assume clock speed)	06

10	a	Write an Embedded *C* program to rotate stepper motor in clock-wise direction for *N*-steps. Also write the complete schematic interfacing circuit diagram for the *I/O* data transfer.	08
	b	Design a 4 × 4 keyboard interface using 8051. Write a code to enable and disable the key stroke operations.	08

OR

11	a	With the help of schematic interfacing circuit diagram, explain the program to control high power devices using 8051 microcontroller.	10
	b	Discuss communication of 8051 microcontroller with the *PC* using serial port.	06