



CBCS SCHEME

15EC42

Fourth Semester B.E. Degree Examination, Jan./Feb. 2023

Microprocessor

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Explain the architecture of 8086 microprocessor with a neat block diagram and illustrate the concept of instruction pipelining. (08 Marks)
- b. Identify the addressing modes of the following instructions of 8086:
(i) MOV AL, 25H (ii) MOV BX, AX
(iii) MOV AL, [BX + SI] (iv) ADD CL, [BP+DI+30H] (04 Marks)
- c. What is memory segmentation? Explain its need in 8086 microprocessor and its advantages. (04 Marks)

OR

- 2 a. Given BX = 2496H, SI = 9A4BH, BP = 7596H, DI = 1495H, DS = 0001H, ES = A213H, SS = 04B0H. Estimate the effective address and physical address of the data for the following instructions:
(i) ADD AL, [BP + 0231H]
(ii) SUB AL, ES : [BX + SI]
(iii) MOV AL, [BX + 230AH]
(iv) MOV CL, [SI] (04 Marks)
- b. Write an assembly language program in 8086 to multiply two 8-bit numbers stored in memory location "SCR1" and "SCR2". Store the product (16-bit) in memory location "PROD". Do not use MUL instruction. (08 Marks)
- c. Explain the following instructions of 8086 and indicate the status of the flag bits after its execution: (i) TEST (ii) DAA (04 Marks)

Module-2

- 3 a. Differentiate between the following instructions of 8086:
(i) ROL and RCL (ii) SHR and SAR (iii) JZ and JB (06 Marks)
- b. Write an assembly language program to compare two strings stored in locations "STR1" and "STR2" using string instructions and store "01" in location "RES" if the two strings are equal or "00" if not equal. (08 Marks)
- c. Illustrate the purpose of D flag bit in string instructions. (02 Marks)

OR

- 4 a. Explain the following assembler directives:
(i) EQU (ii) Assume (iii) EVEN (06 Marks)
- b. Explain the string instructions of 8086 with suitable examples to illustrate their function. (10 Marks)

Module-3

- 5 a. Discuss the role of stack in calling and returning from a subroutine. (02 Marks)
- b. Draw and explain the interrupt vector table structure of 8086. (08 Marks)
- c. Explain PUBLIC and EXTRN directives with examples. (06 Marks)

OR

- 6 a. Bring out the difference between procedures and macros. Write a procedure "COMPUTE" to perform $X + Y - 3 \rightarrow R$ where X, Y and R bytes and the procedure "COMPUTE" is in the same code segment as the calling program. (08 Marks)
- b. Write a program to generate a delay of 100 ms using 8086 that runs on 10 MHz frequency. (06 Marks)
- c. What is the importance of interrupt flag in 8086? Mention the instructions to set and clear the interrupt flag. (02 Marks)

Module-4

- 7 a. Explain the function of the following signals of 8086:
(i) ALE (ii) $\overline{MN}/\overline{MX}$ (iii) \overline{BHE} (iv) \overline{INTR} (04 Marks)
- b. With a neat diagram, explain the minimum mode configuration of 8086. (08 Marks)
- c. Explain briefly MODE 0 and BSR mode of 8255 with their respective control word format. (04 Marks)

OR

- 8 a. Design a seconds counter that counts from 0 to 9 using 7 segment displays. Draw the suitable hardware schematic and write an assembly language program for the same. Assume that a delay of 1 sec is available as subroutine. Select the port address suitably. (08 Marks)
- b. With a neat sketch, explain the memory read timing in maximum mode of 8086. (08 Marks)

Module-5

- 9 a. Interface DAC 0800 to 8086 using 8255 and write an assembly language program to generate a triangular wave of frequency 500 Hz. Assume 8086 operates at 10 MHz and the amplitude of the triangular wave is +5V. (08 Marks)
- b. Discuss the interconnection of 8087 with 8086 processor with a neat diagram. (08 Marks)

OR

- 10 a. Interface a stepper motor to 8086 using 8255 to rotate it through an angle of 135° using a 1.8° step stepper motor. (08 Marks)
- b. Explain with an example the DOS function calls supported by INT 21H :
(i) AH = 01H (ii) AH = 02H (iii) AH = 09H (iv) AH = 4CH (08 Marks)

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