



Fourth Semester B.E. Degree Examination, June/July 2025

Microprocessors

Max. Marks: 100

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

Module-1

- 1 a. Define Microprocessor. Describe the architecture of 8086 with neat block diagram. (10 Marks)
- b. Explain flag register of 8086 with its format. (08 Marks)
- c. Explain the formation of opcode for MOV AX, BX. Opcode for MOV instruction is "100010". (02 Marks)

OR

- 2 a. Explain the following addressing modes of 8086: (08 Marks)
 - (i) Register Addressing Mode
 - (ii) Based Indexed Mode.
 - (iii) Immediate Mode
 - (iv) Direct addressing Mode
- b. Write 8086 program to find the smallest number out of N 16 bit unsigned numbers stored in a memory block starting with the address 2000H. Store the result at word location 3000H. (08 Marks)
- c. Explain the significance of following pins of 8086: (04 Marks)
 - (i) ALE
 - (ii) RESET
 - (iii) $\overline{\text{TEST}}$
 - (iv) $\text{M}/\overline{\text{IO}}$

Module-2

- 3 a. Explain the working of following instructions with examples RCR, DAA, IMUL, DIV and SCAS. (10 Marks)
- b. Write an ALP to find the number of EVEN and ODD numbers from a sequence of 20-8 bit numbers. In the memory and save the result COUNT at EVEN and ODD. (10 Marks)

OR

- 4 a. Explain the working of following instructions with examples: XLAT, AAA, REP, LOOP and ROL. (10 Marks)
- b. Write an ALP to find the number of positive and negative numbers from a sequence of 20-8 bit numbers in the memory and save the counted result at NEG and POS. (10 Marks)

Module-3

- 5 a. Define Stack. Illustrate with diagram, how stack top address calculation will be calculate with push and pop instructions. Assume SS = 5000h and SP = 3500h. (06 Marks)
- b. Bring out the differences between MACRO and Procedure. (04 Marks)
- c. Illustrate with example, the various parameter passing techniques to a procedure. (10 Marks)

OR

- 6 a. Describe the purpose of interrupt vector table and conditions which causes the processor to perform the following types of interrupts type 0, type 1, type 2, type 3 and type 4. (06 Marks)
- b. Write an interrupt procedure that sets trap flag to enable trap. (04 Marks)
- c. Write a program to generate a delay of 100 ms using an 8086 system that runs at 10 MHz frequency. (10 Marks)

Module-4

- 7 a. Sketch the minimum mode configuration of 8086 and explain the operation briefly. (08 Marks)
- b. Interface two 4 k×8 EPROM and two 4 k×8 static RAM chips of 8086. The addresses of RAM and ROM should start from FC000H and FE000H respectively. (08 Marks)
- c. Draw the timing diagram for $\overline{\text{RQ}}/\overline{\text{GT}}$ for maximum mode. (04 Marks)

OR

- 8 a. Write the control word format of 8255 PIA. (06 Marks)
- b. Show an interface of keyboard of 8086 and explain with a flowchart. (10 Marks)
- c. How is key debounce achieved through hardware? (04 Marks)

Module-5

- 9 a. Write an ALP to rotate the stepper motor in clockwise direction by 180° and then in anticlockwise direction by 180° with suitable "delay" procedure. (08 Marks)
- b. Write an ALP to generate a triangular wave of 500 Hz using the DAC0800 interface to the 8086 CPU at 8 MHz. Amplitude of triangular wave should be +5 V. Show the interface diagram. (12 Marks)

OR

- 10 a. Explain the following DOS function calls of INT21H: (10 Marks)
 - (i) Function 01H
 - (ii) Function 02H
 - (iii) Function 4CH
 - (iv) Function 06H
 - (v) Function 09H
- b. Mention 4 differences between RISC and CISC architecture. (04 Marks)
- c. Explain how to generate interrupt on terminal count using a 8254 timer with a diagram. (06 Marks)

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