

Bachelor of Engg. (Electronics and Telecommunication Engg.) Exam., 2025
(3rd Year, 1st Semester Examination, Session 2024-2025)

MICROPROCESSORS & MICROCONTROLLERS

Time: Three Hours

Full Marks: 100

Answer ALL the Questions

(All Parts of the same question must be answered at one place only)

Module I – M1 (CO1)

1. (a) (i) Compare and differentiate the Architectural Block Diagram of Microprocessor Unit (MPU) and Microcontroller Unit (MCU). (2)
(ii) What is the Memory word size required in an Intel 8085 MPU system? (1)
(iii) Calculate the number of address lines required on the chip of 4KB Memory. (3)
(b) (i) In addition to the Interrupts, List the Pins of 8085 MPU that accepts externally initiated signals as Inputs and their function. (4)
(ii) List the 8085 MPU Status Signals and their function. (3)
(iii) Most Opcode Fetch Operations consist of _____ T-States, and the subsequent Memory Read / Write cycles require _____ T-states. (2)
(iv) Crystal frequency required for an 8085 system to operate at 3MHz is _____. (1)
(v) Identify the Machine cycles in the following Instruction: PUSH B (2)
(vi) Can the Microprocessor differentiate whether it is reading from a Memory Mapped I/O Port or from Memory? Explain. (2)

Module II (CO2)

2. (a) (i) Name and define the two components of an Instruction, and also the term Addressing Mode. (ii) Let (8001H) = 01H, (8002H) = 02H. Write an 8085 Assembly Language Program (ALP) to add the two data, and to store the result at 8003H using Indirect Addressing Mode. [(1+1)+(2)]
(iii) Differentiate Assembler and Compiler. (iv) How does the Microprocessor change the sequence of Program Execution with a Jump Instruction? (v) Flags can be tested through _____ Instructions, and they can be examined by storing them on the _____. [(2+2+1)]
(b) (i) Explain the mathematical operation performed by the following ALP / Mnemonics: MVI A,07H
RLC
MOV B,A
RLC
RLC
ADD B
HLT

Support your conclusion with all the intermediate results.

[(3)]

[Turn over

- (c) Explain how the Time Delay in the Loop, T_L is calculated. [(3)]
- (d) (i) When a Subroutine is called, the address of the Instruction following the _____ Instruction is stored on the _____.
- (ii) What happens when the RET instruction at the end of the subroutine is executed?
- (iii) Explain the operation of the following instruction: XTHL [(1+2+2)]

Module III (CO3)

3. (a) (i) What is the drawback of the Polling method of Data Transfer ? How the same can be avoided?
- (ii - i) Name the Interrupt signal in 8085 MPU which is both Maskable as well as the Non-Vectored. Illustrate the steps involved in the execution of this Interrupt.
- (ii - ii) Identify the Triggering Level of this Interrupt. [(2+8)]
- (b) Write an 8085 ALP to enable all the Interrupts. [(3)]
- (c) The 8259 PIC – Programmable Interrupt Controller device is specially designed for use with the _____ Interrupt signal of the 8085 MPU. List the Primary Features of this device. [(1+5)]
- (d) In situations, in which the Microprocessor-controlled data transfer is too slow, the _____ is generally used. [(1)]

Module III (CO4)

4. (a) (i) List the steps involved in order to communicate with Peripherals through the 8255A PPI – Programmable Peripheral Interface.
- (ii) Consider the following scenario of Interfacing 8255 I/O Ports in Mode 0: Pin A15 is connected to the CS of 8255A through an Inverter Gate. Port B is connected to the DIP Switch Port and Port A is connected to the LED Port. (i) Identify the Address of the 8255A Ports, (ii) Write the Control Word; and also (iii) the 8085 ALP to read the DIP Switch Port and to display the same at the LED Port. [(3+7)]
- (b) (i) How many Counters are there in 8253 (8254) Timer? Write the Process / steps involved in order to operate a Counter.
- (ii) It is required to generate a Square wave of 10 KHz from Counter 0 (Binary count) of 8253 Timer. Identify the Control word, Calculate the Count to be loaded and the 8085 ALP for the same. [(3+7)]

Module V (CO5)

5. (a) With an example, demonstrate the use of Microprocessor to implement a conditional Sequence Controller. Show the associated Block Diagram Flow Chart and the ALP.
- (b) List the salient feature of the Single Chip Microcomputer / Intel 8051 Microcontroller Unit (MCU) [(7+6+4) + (3)]