

B.Power Engg.3rd Year 2nd Semester Examination 2025
Microprocessors & Microcontrollers

Time: 3hrs

Full Marks 100

Answer All Questions

1. Evaluate the following using signed binary arithmetic :

$$(210)_{10} + (22)_{10}$$

$$(128)_{10} - (42)_{10}$$

$$(220.25)_{10} + (12.50)_{10}$$

$$(242.50)_{10} - (2.45)_{10}$$

20 CO(1)

OR

Define Fixed and Floating point representations of a real number. Where would you use a Fixed Point and a Floating Point representation for a real number? Estimate the number of bytes, Shift and addition operations for implementing $(220.25)_{10} + (12.50)_{10}$ on a 8085 Microprocessor.

20 CO(1)

2. Write an assembly level program for a 8085 Microprocessor to do the following, assuming:

(i) The Memory Location 2020H contains 22H

(ii) The Memory Location 2021H contains 46H

Load the Accumulator with 28H

Move the contents of Memory Location 2020H to B

Move the contents of Memory Location 2021H to C

Add the contents of B and C to the contents of the Accumulator

Store the result in location 2030H

Deduce the status of the Carry Flags when you add the result of addition of B and C registers to the content of the Accumulator. Calculate the number of Bytes required to store your program

20 CO(2)

OR

Write an assembly level program to sort 10 consecutive numbers stored in locations starting from 2020H in descending order and store the sorted result in 10 consecutive locations starting from 2040H

20 CO (2)

3. Define Instruction Cycle, Fetch Cycle and Machine Cycle.

Design a Memory System with Address and Chip Decoding Logic for an 8085 Microprocessor for a 32K Memory System with 8K×1 Memory Chips.

6+14 CO(2)

OR

Explain what the following code does and show the stack frame (contents of the stack with stack pointer) after each instruction.

LXI H, 8000H

SPHL

LXI H, 1234H

PUSH H

POP D

HLT

What is the content of DE register pair after the code is executed?

20 CO(2)

4. Define a Wait State in a 8085 Microprocessor in a typical RD Cycle. With a representation of a RD cycle, show how a Wait State is generated. Why is a Wait-State necessary? 20 CO(3)

OR

Differentiate between Hardware and Software Interrupts in a 8085 Micro-processor.

Enumerate the different Hardware Interrupts in a 8085 Microprocessor.

Write an Assembly Level code to disable RST 6.5 and RST 5.5 in a 8085 Microprocessor and keep other interrupts unaltered.

What is the advantage of using a Software Interrupt in an Assembly level program. 20 CO(3)

5. With the help of a schematic represent a Half-drive , a Full-Drive and a Wave-Drive for a Stepper Motor.

Design the base addresses for Port A, Port B, Port C and CR of an 8255 with IOCS2 used for Chip Select and represent the interface with a suitable schematic. For your selection, write the relevant instruction sequence to

(i) initialize Port A in Mode 0 (Input), Port B in Mode 0 (Output), upper nibble of Port C as input and lower nibble of Port C as output.

(ii) Input a Byte from Port A and complement it

(iii) Output the result to Port B

10+10 CO(4)

OR

With the help of a suitable schematic represent the interface between an 8051 Micro-controller and a Stepper Motor using LN293D connected to Port 2 so that an LED lights up when it comes back to its step 1 and remains on till it transits this step(or state). You may assume an IDE and write a C code/C++ code 20 CO(4)