Ref:Ex/PE/PE/B/T/323D/2024

Jadavpur University
B.Power Engg.3rd Year 2nd Semester Examination 2024
Microprocessors & Microcontrollers

Time: 3hrs **Full Marks 100**

Answer All Questions

1. **Evaluate the following using signed binary arithmetic :**
   $(120)_{10}$ + $(22)_{10}$
   $(210)_{10}$ – $(42)_{10}$
   $(220.25)_{10}$ + $(12.50)_{2}$
   CO(1) 5+5+10

   OR

   Express (256.28) in 6Byte (M,E) format with 4 Bytes for Mantissa and 2 for Exponents expressed in Hexadecimal Code. Calculate the largest signed real number that you can represent using this 6Bytes representation CO(1) 10+10

2. **Express the functioning of a Full Adder with Carry using a Moore Machine CO(2) 20**

   OR

   Deduce the size of Address Bus for a Micro-processor with a Memory Size of 1MB. For a 8085 Micro-processor, which of the Address Lines are multiplexed with data? Define the terms Instruction Cycle and Machine Cycle for a Micro-processor CO(2)5+5+5+5

3. **Write an assembly level program for a 8085 Microprocessor to do the following, assuming that [2020H] is 22H and [2021H] is 24H**
   (i) Load the Accumulator with 28H
   (ii) Move the contents of Memory Location 2020H to B
   (iii) Move the contents of Memory Location 2021H to C
   (iv) Add the contents of B and C to the contents of the Accumulator
   (v) Store the result in location 2030H
   Deduce the number of Bytes in Memory taken up by your code and the time it takes to execute on a 8085 Micro-processor with a 3MHz. clock CO(3)10+10

   OR

   Develop an assembly level program to calculate *factorial(5)* and store the result in memory location 2020H CO(3) 20

4. **Design a Memory System for an 8085 Microprocessor for a 32K Memory using 8K×1 Memory Chips. Deduce the Chip Select and Location Select Logic for your system.**

   OR **CO(3) 20**

   Write an Assembly Level program in 8085 to
   (i) Initialize the TOS to 2FFFH
   (ii)Load the HL register pair with 2034H
   (ii)Load the DE register pair with 1022H
   (iv)Exchange the contents of the HL and the DE registers
   Show the stack frame (TOS plus data pushed in the stack memory) for each stack operation. CO(3) 20

5. **Write an Assembly Level program in 8085 to do the following**
   (i) Enable RST 7.5 interrupt only
   (ii) Read the interrupt mask
   (iii) Toggle the interrupt masks for RST7.5 6.5 and 5.5
   With a neat sketch show the Interrupt Enable/Disable Logic of a 8085 microprocessor and

infer the trigger logic (edge, level etc.) of the Trap ,RST 7.5,RST 6.5 and RST 5.5 signals. How is a RST 7.5 reset? What are the steps in an Interrupt Sequence and how many vectored interrupts can an 8085 accommodate? CO(4) 6+10+4

Or

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 CO(4) 10+10