

[This paper contains 02 printed pages]

Unique Paper Code : 32511501
Name of the Paper : Microprocessors and Microcontrollers (Core)
Name of the Course : B.Sc. (H) Electronics
Semester : V
Duration : 3 Hours
Maximum Marks : 75

Instructions

1. There are six questions in all, out of which you have to attempt any four questions
2. All questions carry equal marks

Q1: Discuss the main features of the type of architecture on which 8085 processor is based upon. Specify the function of different types of registers available in 8085 in terms of the programming model. Draw the schematic of 8085 with demultiplexed address and data bus along with generation of appropriate control signals. Write two single 8085 instructions to clear the accumulator. It is required to have the flag bits Z=1, C=0, S=1 and P=0 and then display the contents of Flag register at an output port PORT1. Write an 8085 program to perform this task.

Q2: Explain the different addressing modes with suitable example. What are the steps involved in executing any instruction in 8085. The following sequence of instructions are executed by an 8085 microprocessor:

LXI SP, 27FF

LXI B, 1234H

MVI H, 11H

MOV A, H

ANI 10H

MOV L, A

PUSH PSW

JC 5006

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5006 POP B

Identify the size of each instruction. What will be the content of the stack pointer (SP), BC and HL register pair on completion of execution of these instructions? How are instructions DCR D and DCX D different? Draw and explain the timing diagram of DCR M. Will the time taken to execute DCR D and DCR M same? Comment.

Q3: Why does one need stack for programming 8085 microprocessor? How and where is it usually initialized? If the stack is initialized at 27FFH in beginning of a program and you want to change the position of stack within the program, specify an instruction which can do this, without using LXI instruction. For a crystal of

frequency 4 MHz connected to pin 1 and 2 of 8085, how would you calculate total time taken to execute any instruction. Explain it with an example, defining the terms used. Write a program for a continuous BCD counter with a subroutine providing a delay of 1s between each count using a register pair. How would the delay program be changed if nested loop technique is used?

- Q4: Explain the difference between RST 5 and RST5.5 Interrupt. Why is INTR called a non- vectored interrupt? What should be the minimum length of pulse on INTR pin to be recognised by 8085 microprocessor? What are the sequence of events that occur when INTR is recognized by the processor? Following bit pattern is loaded in Accumulator after the execution of instruction RIM

0	1	0	1	1	0	1	0
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Check for the pending interrupts and enable the pending interrupt without affecting any other interrupt.

- Q5: What are the different ways in which PIC16F887 can be reset? How is a particular bank selected in this controller? What is the significance of STATUS register? How is program counter loaded in PIC 16F887 microcontroller? What happens when a CALL to a subroutine is executed and how many cycles it takes. Configure alternate I/O pins of PORT C as output and input starting with RC₀ as output. Interface an LED to RC₄ line of PIC16F8XX microcontroller at Port C. Draw schematic and write the supporting program in C/Assembly language.

- Q6: In the following assembly program for PIC 16F877/887, identify the type, addressing mode and the function performed by each instruction? Also specify what this program segment will do?

TIME EQU 60H

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MOVLW D '250'

MOVWF TIME

MOVF TIME, 0

LOOP 1: NOP

DECFSZ TIME, 1

GOTO LOOP1

Explain the salient features of Timer0 and Timer 1. Discuss the role of OPTION_REG in the operation of Timer0.