

Department of Electrical Engineering
Motilal Nehru National Institute of Technology, Allahabad
End Semester Examination
VI Semester, Electrical Engg.
(EE-1602) - Microcontroller and Computer Organization

Duration: 3.00 Hr

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M.M. 60

Q1. Differentiate between the following:

- Microcontroller & Microprocessor
- High level and low level language
- RISC Processor and CISC Processor
- I/O Mapped I/O and Memory Mapped I/O.
- Assembler and Cross Assembler.

[5]

Q2. Design a seven segment LED output port with the device address F5 H, using a 74LS138 3-to-8 decoder, a 74LS20 4-input NAND gate, a 74LS02 NOR gate, and a common anode seven segment LED. Given WR and IO/M signals from 8085 generate the IOW control signal. Write the instructions to display digit 7 at the port.

[5]

Q3. a) Draw and explain the architecture of 8086. Describe the function of queue in 8086. How does the queue speeds up processing?

[4]

b) Discuss the addressing technique used in 8086 and explain the various addressing modes of 8086.

[3]

Q4. Draw the Block Diagram of 8254 PPI and explain the various modes in which 8254 can operate and write down the control word for each mode. Specify the conditions to start the timer of 8254 PPI.

[6]

Q5. Draw the block diagram of 8259A programmable interrupt controller. Explain the different modes in which 8259 can operate and discuss how 8259A is initialized.

[6]

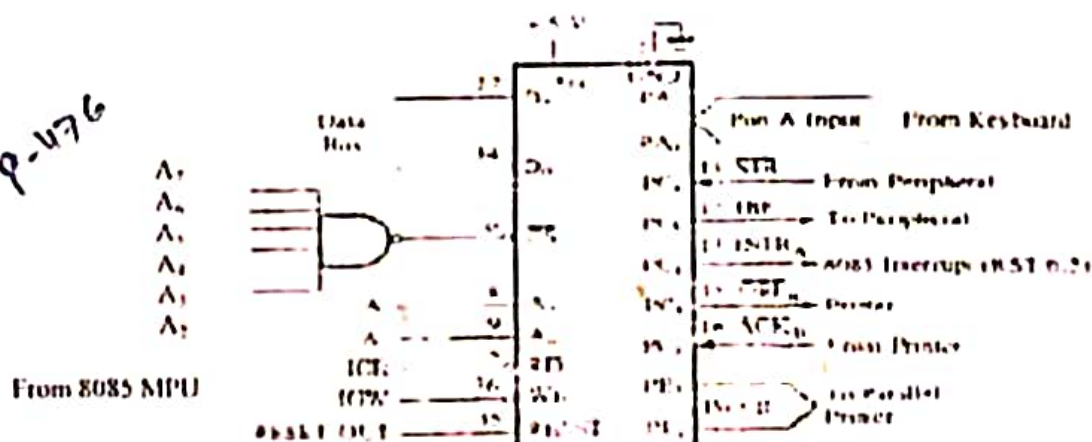
Q6. Explain the different interrupts available in 8085 processor. What is the purpose of the instruction RIM and SIM? How the status of pending interrupts is checked? Assuming the microprocessor is completing an RST 7.5 interrupt request, check to see if RST 6.5 is pending. If it is pending, enable RST 6.5 without affecting any other interrupts; otherwise, return to the main program.

[5]

Q7. The fig. 1 below shows an interfacing circuit using the 8255 PPI in mode 1. Port A is designed as the input port for a keyboard with interrupt I/O, and port B is designed as the output port for a printer with status check I/O. For the given interfacing circuit do the following.

[8]

- Find port addresses by analyzing the decode logic.
- Determine the control word to set up port A as input and port B as output in mode 1.
- Determine the BSR word to enable $INTA$ (port A).
- Determine the masking byte to verify the OE/\overline{F}_R line in the status check I/O (port B).
- Write initialization instructions and a printer subroutine to output characters that are stored in memory.



Q8. Draw the Block Diagram of 8237 PPI and explain how the 8237 PPI transfers 64K bytes of data per channel with eight address lines.

[6]

P.T.O. →

Q9. A set of ten packed BCD numbers is stored in the memory location. Write a program to add these numbers in BCD. If carry is generated save it to register B, and adjust it for BCD. Write a subroutine to unpack the stored BCD sum and store it in two consecutive memory locations. [4]

Q10. Two sets of three readings each are stored in memory. Write a program and draw the flowchart to sort the readings in descending order, assuming that the two sets are separated by word FFFF. [3]

Q11. Write a program to insert a string of four characters from the tenth location in the given array of 50 characters. [3]

Q12. Read the following program and answer the questions. [2]

2000 LXI SP, 2100 H	DELAY:	2064 PUSH H
2003 LXI H, 0006 H		2065 PUSH B
2006 PUSH B		2066 LXI B, 80FF H
2007 POP PSW	LOOP:	2069 DCX B
2008 LXI H, 200B H		206A MOV A, B
200B CALL 2061 H		206B ORA C
200E OUT 01 H		206C JNZ LOOP
2010 JH 1		206E POP B
		2070 RET

a) What is the status of the flags and the contents of the accumulator after the execution of the pop instruction located at 2007 H?

b) Specify the stack locations and their contents after the execution of the call instruction (not the call subroutine)

c) What are the contents of the stack pointer register and the program counter after the execution of call instruction?

d) Specify the memory location where the program returns after the execution of subroutine?