

**First Semester Examination, 2003**

**Microprocessor and Assembly  
Language Programming**

*Full Marks : 70*

*Time : 3 hours*

Answer **Q. No. 1** and any five from  
the remaining questions

*The figures in the right-hand margin indicate marks*

*Symbols carry their usual meanings*

1. Answer the following questions: 2 × 10
- (i) Mention the addressing modes for the following two instructions:
    - (a) LDAXD,
    - (b) CMA
  - (ii) Name the general-purpose registers of 8085 and the register for handling the stack.
  - (iii) How many clock cycles are required execution of the instruction MOV A, C.

*(Turn Over)*

2

- (iv) In a memory mapped I/O scheme, theoretically how many I/O devices can be addressed?
- (v) Write down the instruction used to mask and unmask the interrupts. Also write the instruction to read the status of masking.
- (vi) Write down the control word in hexadecimal to configure all the ports as the output port of 8255 PPI chip in simple I/O mode.
- (vii) Does 8155 PPI has static RAM? If yes, what is its capacity?
- (viii) How many channels can be handled by an 8257 DMA controller?
- (ix) What is the maximum rate of data transfer and maximum number of connecting devices for an IEEE 488 bus?
- (x) How many ports and how much RAM are in 8051 microcontroller?
2. Draw and explain the timing diagrams of the following instructions with two wait states:
- (i) LXIH, 5412H
- (ii) RET.

10

3. (a) Explain how does nested CALL routine works. Explain how the stack gets modified to keep track of the nested CALLs. 4
- (b) Write an assembly language program to generate a square wave of 1 kHz frequency. 6
4. (a) If you were a microcomputer designer, which memory-mapping scheme you would prefer to interface a few numbers of I/O devices. Justify your answer in the context of address space partitioning. 2
- (b) Design a memory interfacing scheme to interface 1K bytes of RAM and two I/O devices using memory mapped I/O scheme. Show the address space partitioning. The available memory chip is of 512 bytes capacity. 8
5. In a given plant, the voltage samples are collected at every 5 minutes and stored in memory locations starting from FC00H. After every one hour the average value has to be computed and checked if it executed the value  $V_1$ . Write an assembly language program for the above problem. 10

6. In a given chemical plant it is desired to monitor the temperature of a furnace. If the temperature is above  $100^{\circ}\text{C}$ , there should be an alarm to the operator to switch off the power supply. Design an 8085 microprocessor based scheme for the above problem using 8255 PPI chips. 10
7. (a) Explain how DMA controller works in a master mode. 4
- (b) It is desired to interface 8257 DMA controller to a microprocessor. Draw the circuits for the above problem. 6
8. (a) Enumerate the features of IEEE 488-interface bus. Also mention the communication parameters for this standard. 4
- (b) In synchronous data link control (SDLC), explain how loop transmission can be achieved by taking an example of one station. 6