

B. TECH.**SIXTH SEMESTER EXAMINATION, 2003-2004
MICROPROCESSORS**

Time : 3 Hours

Total Marks : 100

Note : Attempt ALL questions.1. Attempt any *FOUR* parts of the following :— (5×4=20)

- (a) Describe the main advantages of a distributed processing computer system over a simple time-sharing system.
- (b) Describe the sequence of signals that occurs on the address bus, the control bus, and the data bus when a simple microcomputer fetches an instruction.
- (c) What are the main differences between 8085 and 8086 microprocessors ?
- (d) Draw the internal architecture of 8086 microprocessor. Also explain the function EU.
- (e) What are the Segment Registers ? How are segment registers used to form a 20-bit address ?
- (f) Which control bus signal is active during an instruction fetch bus cycle ? How does a memory read bus cycle differ from an I/O read bus cycle ?

2. Attempt any *FOUR* parts of the following :— (5×4=20)

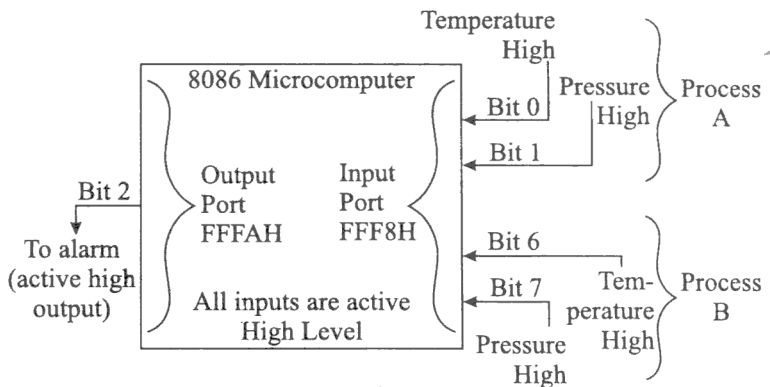
- (a) What are the different addressing modes supported by 8086 ? Which 8086 general-purpose registers cannot be used as base pointer or index registers in the indirect memory access addressing mode ?

What are the different instruction types of 8086 ? Each of the following instructions is invalid :—

- (i) MOV DS, 1234 H;
- (ii) IN AL, 70 FF H;
- (iii) MOV CX, [AX].

Explain, why.

- (c) Draw the flow chart to convert a four-digit BCD number passed in AX to its binary equivalent. Also write a 8086 assembly language program.
- (d) Describe the execution of a CALL instruction. Write a program to add two multibyte numbers and store the result as a third number. The numbers are stored in the form of the byte lists stored with the lowest byte first.
- (e) Figure below is a list of inputs and outputs for a computer monitoring system for an industrial process. You are to design and write the assembly language program that monitors the temperature and pressure sensors for both processes. The alarm is to be sounded whenever the temperature and pressure for process A or B are both high or both low.



What are the assembler directives ? Explain the DD and END directives.

3. Attempt any TWO parts of the following :— (10×2=20)

- (a) Why are latches required on the ADO-AD 15 bus in an 8086 system ? Bring out the architectural and signal differences between 8086 and 8088. What are the functions of the clock generator IC 8284 in the 8086/8088 systems ?
- (b) What logic levels will be on the 8086 \overline{RD} , \overline{WR} and M/\overline{IO} lines when the 8086 is doing a write to a memory location and a read from a port ? Draw and discuss the read timing diagram of 8086 in minimum mode and maximum mode.
- (c)
 - (i) List and describe, in general terms, the steps an 8086 will take when it responds to an interrupt. What addresses in the interrupt-vector table are used for a type 2 interrupt ?
 - (ii) How does the main processor distinguish its instruction from those for the 8087 as it fetches instruction from memory ? Also draw the block diagram of 8087 numeric data co-processor.

1. Attempt any FOUR parts of the following :— (5×4=20)

- (a) Explain the different modes of operation of 8255. Describe the control word format of 8255 in I/O and BSR mode.
- (b) Draw and discuss the asynchronous mode transmitter and receiver data format of 8251.
- (c) Explain the function of the following pins of 8259 :—
 - (i) CAS_0 – CAS_2 ,

(ii) $\overline{SP}/\overline{EN}$.

Also describe an interrupt request response of an 8086 system.

- (d) Draw and explain the internal architecture of 8253/8254 programmable timer/counter.
- (e) Discuss the following modes of DMA transfer :—
 - (i) Single transfer mode
 - (ii) Memory to Memory transfer
 - (iii) Demand transfer mode
- (f) How many clock cycles does a 12-bit successive approximation A/D converter take to do a conversion on a 0.1 V - input signal, and on a 5-V input signal ?

5. Attempt any TWO parts of the following :— (10×2=20)

- (a) Describe the procedure of interfacing DRAM. Why does the size of a DRAM go up by a factor of 4 for each single address line that is added ?
- (b) What is the basic difference between primary memory and secondary memory ? What are the various types of ROM available ? Interface eight 8 K chips of RAM and four 8 K chips of EPROM with 8086. Interface the RAM bank at a segment address OBOOH and the EPROM bank at a physical address F 8000 H.
- (c) Why are so many virtual 8086 tasks possible ? How many general purpose registers are available in the pentium ?
- (d) What are the essential sections of a Microcontroller ? Also draw the block diagram of 8051.