

**Sixth Semester Examination – 2007**

**MICROPROCESSOR AND MICROCONTROLLER**

**Full Marks – 70**

**Time : 3 Hours**

*Answer Question No. 1 which is compulsory and any **five** from the rest.*

*The figures in the right hand margin indicate full marks for the questions.*

1. Answer the following questions : 2×10
  - (a) It is known that Pentium II has a 36-bit address bus. What is the maximum memory size that it can support ?
  - (b) What is the purpose of GDTR ?

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- (c) For which segment register are the contents of the pointer registers used as an offset ?
- (d) What is the difference between SI and DI ?
- (e) How are status flags used by software ?
- (f) What are the voltage levels of the clock waveform supplied to the 8086 MPU ?
- (g) What are the word lengths of the 8086's address bus and data bus ?
- (h) A data segment is to be located from address A0000 to AFFFF; what value must be loaded into DS ?
- (i) Which register pair in 8085 processor is used as memory pointer ?
- (j) Give valid reasons for having segmentation in 8086. Convert the following address into linear address for 8086 based system ABCD : 0014.
2. (a) Explain the term physical addressing and virtual addressing and their relationship if any. 5
- (b) Explain through example the requirement of virtual addressing while semiconductor

memory of large size available. Some data is given in the following which you may use to give explanation. 1 megabyte of RAM requires 1 cubic inch space (using 4-megabyte DRAM chips). 5

3. (a) Discuss the protected mode programming model of the 80286 microprocessor giving details of all registers. 5
- (b) Discuss the protected mode programming model of the 80386/80486 microprocessor giving details and all functions of all registers. 5
4. (a) Give main differences between the protected mode of the 80286 and 80386 microprocessors software viewpoints. 5
- (b) Define 'addressing modes'. Discuss various kinds of memory reference addressing of the 8086 microprocessor through example of segmented programming. 5
5. (a) Explain logical, linear and physical address spaces of 80386. What do you mean by EFFECTIVE address (EA) of an operand in 80386? Calculate the linear address of the following instruction :
- MOV EAX, LOCALTABLE [EDI\*4]  
[EPB+80] 5

(b) What does GRANULARITY BIT (G) of 80386 descriptor specify? What is the size of segment when (a)  $G = 0$  (b)  $G = 1$ ?

5

6. What are the different modes of 8255 PPI chip? Explain mode 1 operation. Write a program using Bit set reset mode of 8255 to control the switching phenomena of a device at every 1 ms. 10

7. (a) Write down main function of segment unit and page unit of the 80386 giving details of address translation. 5

(b) Write an assembly language program for getting a delay of 1 sec assuming the clock frequency of 3.3 MHz using 8085 microprocessor instructions. 5

8. Design an 8051 microcontroller based traffic light system for a four-lane system. 10