2003
COMPUTER ORGANIZATION AND ARCHITECTURE

Time Allotted: 3 hours *Full Marks: 70*

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

Answer question No.1 and any six from the rest.

1. Answer the following: 1x10
   a) Give the decimal equivalent of $(3FA8)_{16}$.
   b) Obtain the 2's complement of 100011.
   c) Simplify the following Boolean function algebraically: $xy + xy'$.
   d) What is the full form of EPROM?
   e) What is the function of decoder?
   f) Obtain the 9's complement of the decimal number 1234.
   g) How many bits are in PC?
   h) What is the full form of ASCII?
   i) How many byte(s) is (are) in 1100 1001 ?
   j) Express 8620 in BCD.

2. a) Verify the two De-Morgan's theorem by means of truth tables. 6
   b) Obtain the truth table for the function F = AB′ + B′C + A′C. 4

3. Design a combinational circuit that accepts a three-bit number and generates an output binary number equal to the square of the input number. 10

4. a) Draw the logic diagram of a 4 by 1 multiplexer with an enable input. 5
   b) Show how two 4 by 1 multiplexers with enable inputs can be connected to provide an 8 by 1 multiplexer. 5

5. a) What is the difference between an immediate, a direct and an indirect address instruction? 6
   b) How many references to memory are needed for each type of instruction to bring an operand into a processor register? 4

6. a) Give an example of external interrupt and internal interrupt. 2
   b) What are the differences between software interrupt and a subroutine call? 4

   c) What does the control in a digital computer wait until the er the execute cycle to check for an interrupt request? What would happen if it responds at any other time?

7. What do you mean by micro programmed control organiza Explain briefly its functions.

8. a) What is the difference between synchronous counter asynchronous counter?
   b) Draw the logic diagram of a 4-bit up-down binary counter wi enable input terminal.

9. a) Design a 16x4 bit RAM using 4x2 bit RAM IC modules.
   b) Describe memory hierarchies.
   c) What is virtual memory?

10. Write short notes on any two of the following:
   a) Vector processing.
   b) Bus structure.
   c) Dynamic RAM.
   d) DMA controller.

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