Reg. No. : | | | | | | | | | | | |

K 3501

M.C.A. DEGREE EXAMINATION, JANUARY 2008.

First Semester

MC 1601 — COMPUTER ORGANIZATION

(Regulation 2005)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Find the 9's and 10's compliment of 25.639.

2. Show that $xy + x'z + yz = xy + x'z$.

3. Draw the logic diagram of a 2-to-4 line decoder with only NOR gates. Include an enable input also.

4. Show the block diagram of the hardware that implements the following register transfer statement $x'T_1 : A \leftarrow B$.

5. A computer with 256 K words of memory. A word is of length 32 bits. One bit is used for indirect mode of addressing, there are totally 64 registers. How many bits are required for opcode and how many operations can be performed? Draw the instruction format.

6. Write any 4 memory reference instruction with their symbolic description.

7. Define baud rate. If 10 characters are transmitted per second and the character stream contains 1 start bit, 2 stop bits and 8 character bits. What is the baud rate for transmitting the string 10110001100?

8. What is the difference between isolated and memory mapped I/O?

9. Write 4 major characteristics of RISC architecture.

10. A computer has virtual memory of 64K and physical memory of size 32K. Find the no. of pages and page frames if the size of the pages is 4K and the no. of bits for addressing physical and virtual memory.

PART B — ($5 \times 16 = 80$ marks)

11. (a) (i) Simplify the Boolean function by using tabulation method.

$F = \Sigma(0, 1, 2, 8, 10, 11, 14, 15)$. (10)

(ii) Explain the working of RS flip-flop. How the issues can be rectified? (6)

Or

(b) (i) Design half adder and full adder using only universal gates. (10)

(ii) Explain the use of D flip flop. (6)

12. (a) (i) Design a counter using JK flip-flop for the sequence 0, 1, 2, 4, 5, 6. (10)

(ii) Design a 4 bit parallel full adder circuit with carry. (6)

Or

(b) (i) Design a BCD to decimal decoder. (8)

(ii) What are the various types of shift operations? Give example for each type. Design a 4 bit circuit shifter for shifting the data left or right. (8)

13. (a) Discuss in detail the hardware components and its function required in the design of basic computer. (16)

Or

(b) Explain with necessary flowchart the multi-pass assembler. (16)

14. (a) What are the ways in which asynchronous data transfer can be done? Explain about the interface involved in it. (16)

Or

(b) What is an interrupt? Explain the role of interrupt in data transfer. (16)

15. (a) What is meant by virtual address? Explain how the mapping of addresses are done with an example. (16)

Or

(b) Explain the operations that are performed in a stack. Illustrate with an arithmetic expression. (16)
