FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I - Semester Supplementary Examination

April/May 2004

COMPUTER ORGANISATION AND ARCHITECTURE

Time : 3 Hours] [Max. Marks : 75

Note : Answer all questions from Part A and any five questions from Part B.

PART - A

1. What is the difference between a direct and an indirect address instruction? How many references to memory are needed for each type of instruction to bring an operand into a processor register? 2

2. Define the terms a) Micro instruction and b) Microprogram. 2

3. Convert the following arithmetic expressions from infix to reverse polish notation.
   a) A * B + C * D + E * F
   b) AB + A (BD + CE) 2

4. How many memory chips of 256 x 8 are needed to provide a memory capacity of 4K bytes? And how many address lines are required to access 4K bytes of memory? 2

5. What do you understand by indexed addressing mode? 2

6. Give at least six status conditions for the setting of individual bits in the status register of an asynchronous communication interface. 3

7. What is DMA? Explain its advantages. 3

8. Draw the block diagram of an associate memory and explain. 3

9. What is the difference between parallel processing and pipeline processing? Explain. 3

10. Write sequence of micro-operations for the fetch cycle of a basic computer. 3

(This paper is of 2 pages) (Turn over)
11. a) What is the difference between the BSA instruction and the interrupt cycle. Explain the BSA instruction can not fulfill the function of the interrupt cycle.

b) Three micro-operations that change the contents of PC are given by:
   
   \[ x_1 : PC \leftarrow PC + 1 \]
   \[ x_2 : PC \leftarrow MBR (AD) \]
   \[ x_3 : PC \leftarrow O \]

   Determine the control functions \( x_1, x_2, x_3 \).

12. Explain the floating point addition/subtraction algorithm with flow chart.

13. Write a program to evaluate the arithmetic statement
   \[ X = (A + B) \times (C + D) \]
   a) Using an accumulator type computer with one address instruction.
   b) Using two and three address instructions and
   c) Using stack-organised computer with zero address instructions.

14. a) Explain the function of a memory management unit in a typical computer.
   b) The logical address space in a computer system consists of 128 segments, each having up to 32 pages of 4K words each. Physical memory consists of 4K blocks of 4K words each. Formulate the logical and physical address formats.

15. What is priority interrupt technique? Explain parallel priority interrupt technique with the help of block diagram.

16. Draw the block diagram of microprogram sequencer for a control memory and explain.

17. Write short notes on:
   a) Compilers and Interpreters.
   b) Vector Processing.