

[This question paper contains 4 printed pages.]

115

Your Roll No. ....

B.Sc. (G) / I / NS

C

COMPUTER SCIENCE – Paper II

Computer Organisation and Operating System

(Admissions of 1999 and upto 2005)

Time : 3 Hours

Maximum Marks : 38

*(Write your Roll No. on the top immediately  
on receipt of this question paper.)*

*Attempt All questions.*

*Attempt all parts of a question together.*

1. (a) What is an algorithm? Describe the basic characteristics of an algorithm. (3)
- (b) Perform the following conversions :-
  - (i)  $(101100.0001)_2 = (??)_{10}$
  - (ii)  $(0101111)_2 = (?)_{10}$
  - (iii)  $(3452.645)_{10} = (?)_8$  (3)
2. (a) What is the advantage of an inkjet printer compared to a dot matrix printer? (1)

P.T.O.

- (b) What are the size of MAR and MDR of a computer system with a 16 KB memory? Assume that the word size is one byte. (1)
- (c) What is non-volatile memory? Give an example. (1)
3. (a) If a computer has 128 operation codes and has a memory capacity of 1024 K, how many bits would be required for a two-address instruction? How many bits are there in the program counter? (2)
- (b) Perform the following operations on the given binary numbers:
- (i)  $10001 \cdot 011 - 10101 \cdot 1010$  (Subtract)  
(Use 2's complement representation of negative numbers) (1)
- (ii)  $(10110) \times (1101)$  (Multiply) (1)
- (c) Convert binary numbers  $1101011 \cdot 110101$  and  $110101 \cdot 0101$  into 16-bit floating point representation, where 4 bits are used for exponent & 12 bits for mantissa. Add these numbers using 16-bit floating point representation. (2)
4. (a) Show that  $(A+B) \cdot (A+C) = A + B \cdot C$  using theorems of Boolean algebra. (1)

- (b) A comparator is a circuit which compares two numbers A and B and gives an output 1 if  $A \geq B$ , otherwise gives 0. Assume both A and B are two-bit positive numbers. Obtain a truth table to design it and a boolean expression for the truth table. (3)
5. (a) What is Cache Memory? Explain how Cache Memory reduces the effective memory access time. (2)
- (b) What is an interrupt service routine? Describe briefly. (1)
6. (a) What are the responsibilities of Operating System in context of process management? (2)
- (b) Describe disadvantages of FCFS and SJF scheduling methods. (2)
- (c) The following processes with the given estimated run-times arrive in the READY queue. For FCFS and SJF scheduling policies, calculate the waiting time for each process.

<u>Job</u>	<u>Est. routine</u>
1	50
2	100
3	2
4	10

(2)

P.T.O.

7. (a) Consider a computer system with 18 bit address, where 8 bits are used for page address and the remaining bits are used for displacement. What is the page size? How many page frames are there in the system? Describe the page address translation using a diagram. (3)
- (b) Write short notes for
- (i) Page Replacement policy
  - (ii) Demand Paging
  - (iii) Resident Set (3)
8. (a) What is buffering? How does it improve I/O efficiency? (1)
- (b) List the typical set of information that is stored in a directory entry. (2)
- (c) What do you understand by Dynamic allocation of file space on secondary storage? (1)