

S'05 : 2 FN : AN 203/AD 303 (03)

**COMPUTING AND INFORMATICS**

*Time : Three hours*

*Maximum marks : 100*

*Answer FIVE questions, taking ANY TWO from Group A,  
ANY TWO from Group B and ALL from Group C.*

*All parts of a question (a, b, etc) should be  
answered at one place.*

*Answer should be brief and to-the-point and be supple-  
mented with neat sketches. Unnecessary long answers  
may result in loss of marks.*

*Any missing data or wrong data may be assumed suitably  
giving proper justification.*

*Figures on the right-hand side margin indicate full marks.*

Answer to all parts of the same questions must be grouped together  
in one place. This is applicable to subparts as well

**Group A**

1. (a) Give a hierarchical view of a computer system clearly depicting the following layers —

Basic Hardware, Operating System, Trans-  
lator, Editor and Application Layer.

5

( Turn Over)

- (b) Distinguish between an Information system and a File system. 5
- (c) Write a C program that will accept an integer N as input if and only if that integer N lies within 0-9999. Then it will produce the summation of its digits and lastly prints the integer as well as the summation. 3 + 7
2. (a) What are the key features of a LAN? 8
- (b) Convert 123789 decimal into its equivalent Binary Number. Clearly depict all steps. 7
- (c) Write a C++ program to generate a series of pseudo random numbers. 5
3. (a) Specify the key differences between an impact printer and a non-impact printer OR a graphics printer and a character printer with relevant examples. 5
- (b) Specify the various processing steps that are needed in exact sequence when any existing high level source program like a C program file stored on Disc is to be executed on a PC. Clearly mention the various system Software modules involved clearly highlighting their roles. 8
- (c) Write a C function that will compute the K in largest and K in smallest element alongwith their positions in an array of N signed integers. Assume the following  $5 \leq N \leq 50$  and  $1 \leq K < N$  7
4. (a) What are the distinctive features of a Relational Data Base? Specify with some examples. 4

(b) Specify by schematic as well as shunt precise description the following network topology: 16

(i) Mesh Topology

(ii) Star topology

(iii) Ring topology

(iv) Bus topology.

### Group B

5. (a) Show that only 2 input NAND gates can be used to implement each of the following logic gates: 3 + 3 + 6 + 2

(i) 2 input OR gate

(ii) 2 input AND gate

(iii) 2 input Ex-OR gate

(iv) NOT gate.

(b) Specify a C Data type/structure using C declarations for implementing the following Record Structure about a student:

Roll No. : 10 digit integer

Name : Maxm 40 characters composed of Letters (A...Z) and blanks

Cgpa : d.dd (decimal)

6

6. (a) Write C function for implementing the following operation on a singly linked linear list of integers:

(i) Create List (List)—Creates the list and returns its head pointer. 4

- (ii) Find (List element)—Searches for the specified element within the specified list, Returns the leftmost node number within the list that has a value equal to the element (if found) or return (0) if not found. 8
- (b) What are the various types of resource management modules (if any) that are present in any operating system? Specify their functionality in brief. 8
7. (a) Specify an algorithm that can be used to convert a +ve binary integer into its equivalent Hex value. Clearly depict all steps. What will be the associated data structures? 14
- (b) Construct a R-S Flip-Flop using NOR gates only. 6
8. (a) What are the key characteristics of a Network protocol? Why protocols are needed? 6 + 4
- (b) What is Spooling? 5
- (c) Consider a CPU having 32 bit Address Bus, 32 bit Data Bus and a 32 bit ALU. If is to be connected to a Memory system consisting of 32 bit Address bus but 8 bit wide data bus. Show the connection schematic. 5

### Group C

9. Write briefly about each of the following: 1 × 20
- (i) Access time of a Disk
- (ii) A simple data type
- (iii) A relational Algebra

- (iv) Accumulator Register
- (v) Full form of FORTRAN and the reason behind it
- (vi) FAQ
- (vii) ATM
- (viii) Attach
- (ix) Short Integer
- (x) Cross Compiler
- (xi) Cross Talk
- (xii) CXT
- (xiii) Desktop Printer
- (xiv) FTP
- (xv) Function Subprogram
- (xvi) NOR
- (xvii) Cache Memory
- (xviii) Tally 7·2
- (xix) WINDOWS 2000
- (xx) Formatting.