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

(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.