

COMPUTING & 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 supplemented with neat sketches.

Unnecessary long answer may result in loss of marks.

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

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

Group A

1. (a) Write a program to check whether a year is leap year or not. 5
- (b) Write a program for conversion of a decimal number to binary number. 5
- (c) Write a program to print the Fibonacci series using recursion. 5
- (d) Write a program to check whether a given number is palindrome or not. 5

2. (a) What is an algorithm ? Describe briefly various categories of algorithms. 5
Write an algorithm to find the largest of three numbers.
- (b) What do you understand by structured programming 5
- (c) Between recursion and iteration, which is more efficient ? Why ? 5
- (d) What are the advantages of C++ programming compared to C programming? 5

3. (a) With reference to object oriented programming (OOP), explain the terms (i) 8
encapsulation (ii) abstraction.
- (b) What is the difference between a local and a global variable ? 6
- (c) What are constructors and destructors in C++? Explain their use with 6
suitable examples.

4. (a) What is LAN? What are different LAN topologies? Explain briefly a LAN protocol. 5
- (b) What is DBMS? What are different types of DBMS? 5
- (c) What is a relational database management system? What are the distinctive features of a relational database? Specify with some examples. 5
- (d) What is TCP/IP protocol suite? How many layers are there in TCP/IP? Draw a neat diagram and briefly describe them. 5

Group B

5. (a) What is a cache memory? How does it improve the performance of the computer system? 5
- (b) What are the different forms of secondary storage media employed in modern day computer system? Explain their usefulness and applications in short. 5
- (c) What is meant by spooling? Briefly explain. 5
- (d) Using a schematic block diagram, explain how CPU, memory, secondary storage and the input/output units are interconnected in a computer. Explain how they interact with each other. 5
6. (a) What is the difference between application software and system software? Give examples of each. 5
- (b) What is an *interrupt* in a computer system? How is an interrupt handled? 5
- (c) How does the CPU execute program instructions? Explain using a block diagram. 5
- (d) What is program counter? What information does it store? 5
7. (a) Convert the following from one number system to another: 5
- (i) $(1267.3125)_{10} = ()_2$
- (ii) $(10110.101)_2 = ()_{10}$
- (iii) $(1234)_8 = ()_{16}$
- (iv) $(B2C)_{16} = ()_2$
- (v) $(10110111.1)_2 = ()_8$

- (b) (i) Perform following addition $1010111 + 1011010$ 5
(ii) Perform following subtraction $1101011 - 1010110$
- (c) Simplify the following Boolean equations using rules of Boolean algebra. 5
(i) $X = (A + \overline{BC})(\overline{B+C})$
(ii) $X = ABC + \overline{A}BC + A\overline{B}C$
- (d) Draw logic diagram that use only 2 input NOR gates to implement each of the following logic gates: 5
(i) 2 input OR
(ii) 2 input AND
(iii) NOT
(iv) 2 input EX-OR
8. (a) What are various functions of an operating system? Briefly explain them. Also, give name of any two OS known to you. 5
(b) Explain, in sequence, all the tasks performed at the time of booting up. 5
(c) What is difference between multi programmed, multitasking and time shared operation system? 5
(d) Briefly explain important components of UNIX operating system and their roles. 5

Group C

9. Answer the following questions: 20
- (i) What will be the output generated by the following code?

```
int k = 5 ;
int i = 0 ;
if (k) i ++ ;
cout << i
```
- (ii) What output will the following code generate?

```
char c = 'A';
int i;
for (i = 0; i < 3, i++)
cout << c++;
```
- (iii) What is the purpose of using a parity bit ?

- (iv) What is not-volatile memory?
- (v) What do you mean by "throughput" of an operating system ?
- (vi) What is the difference between a compiler and an interpreter ?
- (vii) What is the similarity between a structure, union and an enumeration ?
- (viii) How much time will be required to transmit 100 K bits of data over a 100 Mbps line?
- (ix) Write the truth table for a I-bit half adder.
- (x) To realize 8 Mbyte of memory, how many chips of size 512 kbytes are required ?

(Refer our course material for answers)

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