ANNUAL EXAMINATION : 2018-19

Class - XI (ISC)

Time : 3 hr.   **Subject - Computer Science Paper 1**   **M.M. : 70**

[Candidates are allowed additional 15 minutes for only reading the paper.
The must NOT start writing during this time.]

Answer ALL questions in Part I (Compulsory) and SIX questions from Part II, choosing TWO from Section A, Section B and Section C.

All working including rough work, should be done on the same sheet as the rest of the answers.
The intended marks for questions or parts are given in [ ].

PART - I

Attempt ALL questions.

**While answering questions in this part, indicate briefly your
working and reasoning, wherever required.**

Q.1- a. State the distributive law and prove it with the help of truth table.   [1]

     b. Define chain rule and modus ponens.   [1]

     c. If A denotes "it is cloudy" and B denotes "it will rain", then express the following
statements in symbolic form :   [1]

         i. If it does not rain then it is not cloudy.

         ii. If it is raining then it is cloudy.

     d. Define string tokenizer.   [1]

     e. Vefify if, $(\sim P \vee P) \wedge 1 = 1$ [1]

Q.2- a. Differentiae between recursion and interation.   [2]

     b. Solve the following:-   [2]

     $(101101)_2 / (1101)_2$

     c. Each element of an array a[−15....10][15....40] requires 4 bytes of storage in the memory.
If the array is stored in column major format with base address 1500, find the location of
a[5][20].   [2]

     d. Name the file stream class to perform the following options :   [2]

         i. to write data into a binary file.

         ii. to read data from a text file.

     e. Define recursion. Give two advantages of recursion.   [2]

Q.3- Read the code given below and answer the questions that follow. Also show the dry run/
working and outputs of them:-

```
void abc(String str, String str1, int x)
{
    if(x >= 0)
    {
        if (x % 2 == 0)
            str1+ = str.charAt(0);
        else
            str 1 = str.charAt(x) + str;
        abc(str, str1, x – 1)
    }
}
```

```
        else
            System.out.println(str 1);
    }
```

    i.   What does the method abc("School", " ", 5) print?   [2]

   ii.   What does the method abc("Welcome", " ", 6) print)?   [2]

  iii.   State in one line, what is the function abc( ) doing apart from recursion.   [1]

PART - II

Answer SIX questions in this part, choosing TWO questions from Section A,
TWO question from Section B and TWO questions from Section C.

SECTION - A
Answer any TWO questions from this section.

Q.4- a.   Prove using Boolean law:-   [3]

         $x' + y' . z = x'y'z' + x'yz' + x'yz + x'y'z + xy'z$

    b.   Verify if : $(a \Rightarrow b) \vee (b \Rightarrow a) = 1$ [2]

    c.   From the given truth table, derive the Boolean expressions, simplify them and draw
the logic gate diagram (for A & B).   [5]

P	Q	R	A	B
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

Q.5- Perform the following as directed:-   [5]

    a. $(124)_{10} = (?)_2$

    b. $(270.25)_8 = (?)_{16}$

    c. $(1011.101)_2 + (110.101)_2$

    d. $(1011)_2 - (1100)_2$ (using 2's complement method)

    e. $(1257)_8 - (167)_8$

Q.6- a.   Define law of duality. Write the dual of :-   [3]

         $(x + y)(\bar{x} + \bar{z}) \cdot 1 = 0$

    b.   Draw the logic gate for the following using NAND gates only.   [3]

         $(A + B) \cdot \bar{C}$

    c.   Define contradiction and consistent statements.   [2]

    d.   Define parity check and its types.   [2]

SECTION 'B'

Answer any TWO questions from this section.

Each program should be written in such a way that its clearly depicts the logic of the problem.

This can be achieved by using mnemonic name and comments in the program.

(Flowcharts and Algorithms are not required)

The program must be written in JAVA.

Q.7- A beam number is a number in which the sum of the square of the digits of the number is larger than the number itself.

Class Name	:	BEAM

Data Members / instance variables :

int n	:	integer

Member Functions :

BEAM( )	:	constructor to initialize member data to null.
int void fnGet(int mm)	:	to return the sum of the square of the digits of the argument.

eg. d = 69

final method return $6^2 + 9^2 = 36 + 81 = 117$

boolean is Beam( )	:	to verify whether the member data is a Beam number or not as per the criteria given above.

Specify the class BEAM, giving details of the above member methods and data members only.

Also define the main( ) method to create an object and call the methods accordingly to enable the task. [10]

Q.8- Define a class named Text which displays the longest word of the given string (in length) and if there are more than one word with the longest length then it will print all of them without using any sorting technique.

Class Name	:	Text

Data Members / instance variables

String str	:	to hold the string as input

Member functions / methods

Text(String S)	:	constructor to initialize str with s
int longestWord( ) :		display the longest word or words (if present) in the order they are appearing in the given string.

Specify the class Text giving details of constructor longestlen( ) and longestWord( ). Also write the main method and create the required objects and call the functions accordingly. [10]

Q.9- A class ADM contains the admission number of 500 students. Some of the member data/ methods are given below :

Class Name	:	ADM

Data member/instance variables :

A[ ]	:	integer array to store the admission numbers.

Member methods / functions :

ADM( )	:	constructor to allocate memory to member array
void fillAR( )	:	to fill the array with integers representing admission numbers [The array should get filled with numbers in ascending order].

int binSearch(int l, int u, int v)   :   to search for a particular admission number (v) using binary search and recursive technique and return 1 if found, 0 otherwise.

Specify the class ADM, giving the details of the above member data and methods only. Also define the ~~in()~~ main( ) method to create an object and call the other methods accordingly to enable the task.   [10]

SECTION 'C'

Each program/Algorithm should be written in such a way that its clearly depicts the logic of the problem.

This can be achieved by using mnemonic name and comments in the program.

Answer any TWO questions from this section.

Each program should be written in such a way that its clearly depicts the logic of the problem.
This can be achieved by using mnemonic name and comments in the program.

Q.10-a. Write algorthim of Insertion sort.   [2½]
     b. Write algorthim of binary search.   [2½]

Q.11-a. Write a program in Java to perform the following operations on a binary file: [3]
     i. Open a binary file "Employee.dat" in read mode which is storing the following data : Employee Number(int), Employee name(String) and Gross Monthly income(double)
     ii. Read data from the above mentioned file and compute the professional tax (as 5 % of the Gross income if it is more than ₹ 10000 otherwise 0)
     iii. Display the employee number, name, gross pay and professional tax of all the employees from the file (you can do the entire program code in main method).

     b. State any one difference between binary file and text file.   [2]

Q.12-a. What is firewall?   [5 × 1 = 5]
     b. What is Spyware?
     c. Explain hasMoreTokens( ) function.
     d. What is spamming?
     e. Which statement comes automatically in each class of a user defined package?

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