

COMPUTER SCIENCE
SAMPLE PAPER

Max Marks: 70

Time: 3 hr.

Note: (i) All questions are compulsory.
(ii) Programming Language: C++

1. (a) Differentiate between a global variable and a local variable. Also give suitable example in C++. 2

(b) Name the Header file(s), to which the following built-in functions belongs to: 1

(i) setw () (ii)isdigit () (iii) strcpy () (iv) gotoxy ()

(c) Rewrite the following program after removing syntactical error(s) if any. Underline each correction. 2

```
#include<iostream.h>
void main()
{
    struct movie
    {
        char movie_name[20];
        char movie_type;
        int tickets=100;
    } MOVIE;
    gets(movie_name);
    gets(movie_type); }
```

(d) Find the output of the following program (Assuming that all required header files are included) 3

```
char * NAME = "AdmiNStrAtiOn";
for( int x=0;x<strlen(NAME);x++)
if(islower(NAME[x])
    NAME[x] = toupper(NAME[x]);
else
if(isupper (NAME[x]))
    if(x%2==0)
        NAME[x] = NAME[x -1];
    else
        NAME[x]--;
Cout<<NAME <<endl;
```

(e) Find the output of the following program 3

```
#include<iostream.h>
void Modify(int &a,int b=10)
{
    if(b%10==0)
        a+=5;
    for(int i=5;i<=a;i++)
        cout<<b++<<" ";
    cout<<endl; }
```

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```

void Disp(int x)
{
    if(x%3==0)
        Modify(x);
    else
        Modify(x,3);
}

void main()
{
    Disp(3);
    Disp(4);
    Modify(2,20);
}

```

(f) Differentiate typedef and #define with suitable example. 2

2. (a) Differentiate between a default and a parameterized constructor in context of class and object . Give suitable example in C++. 2

(b) Answer the questions (i) and (ii) after going through the following class 2

```

class Computer
{
    char C_name[20];
    char Config[100];
public:
    Computer(Computer &obj); // function 1
    ~Computer();           //function 2
};

```

(i) Write the statement(s) which will invoke the function 1.

(ii) Name the specific feature of the class shown by function 2. Also write the time of its invoke.

(c) Define a class travel in C++ with the description given below : 4

Private members:

plancode	of type long
place	of type f characters array
number_of_travellers	of type integer
number_of_buses	of type integer

Public members:

A constructor to assign initial values of plancode as 1001, place as "Kolkata", number_of_travellers as 5 and number_of_buses as 1

A function newplan() which allows user to enter plancode , place and number_of_travellers and also assign the number_of_buses as per the following conditions:

<u>number of travellers</u>	<u>number of buses</u>
less than 20	2
equal to and more than 20 and less than 40	3
equal to and more than 40	4

A function show() to display the contents of all the data members on the screen.

(d) Answer the questions (i) to (iv) based on the following code : 4

```

class Goods
{
    int id;
protected :
    char name[20];
}

```

```

        long qty;
        void Incr(int n);
        public :
        Goods();
        ~Goods();
        void get();
};
class Food_products : public Goods
{
    char exp_dt[10];
    protected :
    int id;
    int qty;
    public :
    void getd();
    void showd();
};
class Cosmetics : private Goods
{
    int qty;
    char exp_date[10];
    protected :
    int id;
    public :
    ~Cosmetics();
    Cosmetics();
    void show();
};

```

- (i) How many bytes will be required by an object of class Food_products.
- (ii) Name the member functions accessible through the object of class Food_products.
- (iii) From the following, Identify the member function(s) that cannot be called directly from the object of class Cosmetics
 - show()
 - getd()
 - get()
- (iv) If the class cosmetics inherits the properties of food_products class also, then name the type of inheritance.

3. (a) Write a function in C++ which accepts an integer array and its size as an arguments and exchanges first half side elements with second side elements of the array 4

Example:

If the given array as eight elements are
10, 15, 6, 16, 21, 20, 1, 0

The function should rearrange the array as
21, 20, 1, 0, 10, 15, 6, 16

- (b) An array A[13][14] is stored in the memory along the column with each element occupying 4 bytes. Find out the Base address and address of the element A[3][7] if the element A[4][4] is stored at the address 1300. 3

- (c) Write a function in C++ to delete a node containing names of student, from a dynamically allocated stack of names implemented with the help of following structure : 3
 struct student
 {
 char name[20];
 student *next; };
- (d) Write a function in c++ which accepts a 2 D array of integers and its arguments as parameters which displays the sum of row elements. 3
 [Assuming the 2 D array to be a square matrix with odd dimension i.e., 3 X 3 , 5 X 5, 7 X 7 etc.]
 Example array is
 5 3 8
 10 0 4
 7 4 6
 The Output will be as follows
 Row One is : 16
 Row Two is : 14
 Row Three is : 17
- (e) Evaluate the following postfix expression using a stack and show the contents of stack after execution of each operation: 2
 25 8 3 - / 6 * 10 +

4. (a) What is the use of the following with syntaxes. 2
 (i) read() (ii) get()
 (b) Explain about the random access functions? 2
 (c) Write a function in c++ to count number of uppercase letters present in a text file "article.txt"? 2
5. (a) What do you understand by DDL and DML. Write at least two DDL and DML commands. 2
 (b) Consider the following tables Employee and salary. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii) 6

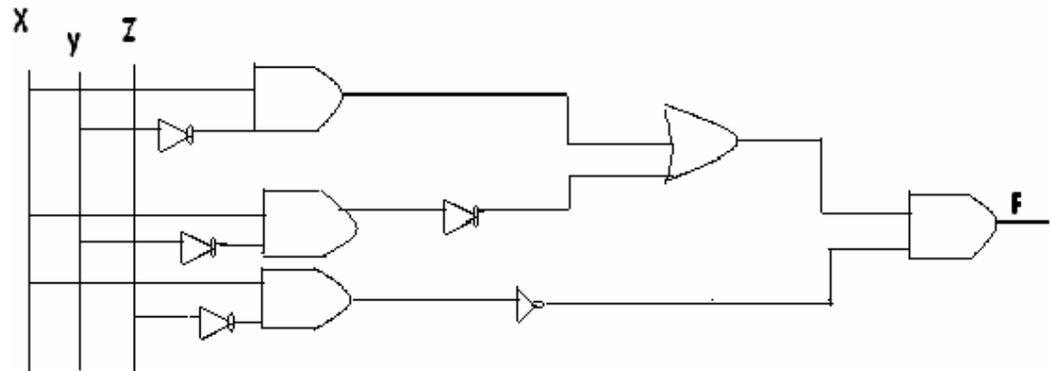
Table: Employee

Eid	Name	Deptid	Qualification	Sex
1	Deepali Gupta	101	MCA	F
2	Rajat Tyagi	101	BCA	M
3	Hari Mohan	102	B.A	M
4	Harry	102	M.A	M
5	Sumit Mittal	103	B.Tech	M
6	Jyoti	101	M.Tech	F

Table : Salary

Eid	Basic	DA	HRA	Bonus
1	6000	2000	2300	200
2	2000	300	300	30
3	1000	300	300	50
4	1500	390	490	30
5	8000	900	900	80
6	10000	300	490	150

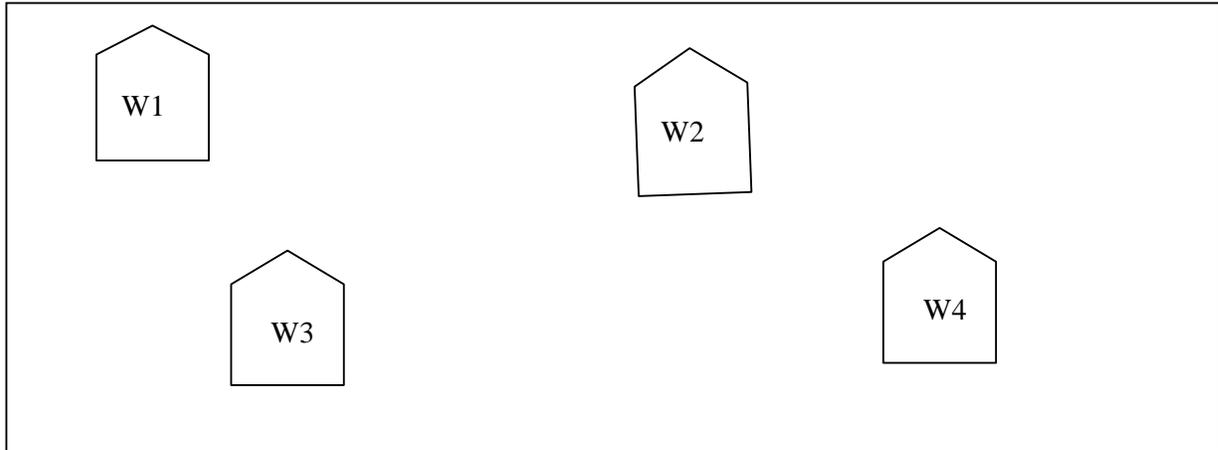
- (i) To display the name of employees department wise.
 - (ii) To list the names of those employees only whose basic is greater than 3000.
 - (iii) To print the net salary from salary table where as net salary is calculated as basic+da+hra+bonus
 - (iv) To display highest bonus among the all male employees.
 - (v) Select Name, basic, bonus from tables employee, salary Where employee.eid=salary.eid AND basic>5000;
 - (vi) select Avg(basic) from salary where bonus >40;
 - (vii) Select count(*) from employee where sex='F';
 - (viii) select name from employee where qualification like '%Tech';
6. (a) State and prove the absorption law algebraically. 2
- (b) Write the equivalent Boolean expression for the following Logic Circuit. 2



- (C) Convert the following expression into Canonical POS form

$$x + y\bar{z} + \bar{x}y$$
1
- (D) Obtain the simplified form of a Boolean expression using K-Map. $F(A,B,C,D)=\sum (0, 1, 2, 5, 10, 12, 14, 15)$ 3

7. (a) What is repeater. 1
 (b) Define the term Bandwidth. Give unit of Bandwidth. 1
 (c) Expand the following terminology: 2
 (i) Mbps (ii) GSM (iii) URL (iv) SMS
 (d) A company in Reliance has 4 wings of buildings as shown in the diagram:



Center to center distances between various Buildings:

W3 to W1	50m
W1 to W2	60m
W2 to W4	25m
W4 to W3	170m
W3 to W2	125m
W1 to w4	90m

Number of computers in each of the wing:

W1	150
W2	15
W3	15
W4	25

Computers in each wing are networked but wings are not networked. The company has now decided to connect the wings also.

i) Suggest a most suitable cable layout of the connection between the wings. [1]

ii) Suggest the most suitable wing to house the server of this company with a suitable reason. [1]

iii) Suggest the placement of the Hub / Switch device with justification: [1]

iv) The company is planning to link its head office situated in India with the offices at Reliance. Suggest an economic way to connect it; the company is ready to compromise on the speed of connectivity. Justify your answer. [1]