2016
COMPUTER SCIENCE

Total marks : 70 Time : 3 hours

General instructions:

i) Approximately 15 minutes is allotted to read the question paper and revise the answers.

ii) The question paper consists of 32 questions. All questions are compulsory.

iii) Marks are indicated against each question.

iv) Internal choice has been provided in some questions.

N.B: Check that all pages of the question paper are complete as indicated on the top left side.

1. Define data structure. **1**
2. What is insertion sort? **1**
3. What do you mean by underflow in stacks? **1**
4. What is a priority queue in data structure? **1**
5. Who developed the C++ language? **1**
6. What is encapsulation in C++? **1**
7. What is the difference between get() and read()? **1**
8. What is a destructor in C++? **1**
9. What is private mode of inheritance in C++? **1**
10. What is call-by-reference in C++? **1**
11. What is a truth table? **1**
12. State the principle of duality. **1**
13. What is the cardinality of a relation? What is the domain of a relation? **1+1=2**
14. What is select operator in relational algebra? Explain with an example. **2**
15. Write any two significance of visibility modes. **2**

16. Give two characteristics of a C++ constructor. **2**

17. What are new and delete operators in C++? **2**

18. Give two characteristics of a C++ friend function. **2**

19. What are the various operations performed on stacks? **2**

20. What is the difference between an array subscript and an array element? **2**

21. Prove algebraically: (A+B)**'** = A**'.**B**'** **2**

22. What is the difference between HTML and DHTML? **2**

23. Give any one advantage and disadvantage of tree topology. **2**

24. Evaluate the following postfix notation:
10,40,+,8,2,+,*,10,- **4**

25. (a) For the following given numbers:80,17,27,58,20,66,55
Perform i) selection sort ii) insertion sort **2+2=4**

Or

(b) Write a program in C++ to implement binary search. (4)

26. Write sql command for the following questions based on the below table TEACHER. **1+1+1+1=4**

NO	NAME	AGE	GENDER	DEPARTMENT	DATEOFJOINING	SALARY
1	JUGAL	34	M	COMPUTER	10/01/97	12000
2	SHARMILA	31	F	HISTORY	24/03/98	20000
3	SANDEEP	32	M	MATHS	12/12/96	30000
4	SANGEETA	35	F	HISTORY	01/07/99	40000
5	RAKESH	42	M	MATHS	05/09/99	25000

(i) Show all the information about teachers from HISTORY department.
(ii) Display the name and age of all male teachers.
(iii) Count the number of teachers who are older than 23.
(iv) List the names of all the teachers in the order of their joining date.

27. Obtain a simplified form for the Boolean expression using K-map.
F(a,b,c,d) = Σ(1,2,3,11,12,14,15). **4**

28. **a.** Write a C++ program that reverses and sums up the digits of an integer.

Or **4**

b. Write a C++ program to determine whether a given number is prime number or not.

29. Write the output of the following programs: **2+2=4**

(i)

```
#include<iostream.h>
#include<conio.h>
void main()
{
clrscr();
char*ptr = “TECHNOLOGY”;
cout<<*ptr<<endl;
cout<<ptr<<endl;
cout<<*++ptr<<endl;
cout<<++*ptr<<endl;
getch();
}
```

(ii)

```
#include<iostream.h>
#include<conio.h>
void function(int[],int*);
void main()
{
clrscr();
int a[5]={2,4,6,8};
int i,b=5;
for(i=0;i<5;i++)
{
function(a,&b);
cout<<a[i]<<”\t”<<b<<endl;
}
getch();
}
void function(int p[],int *g)
{
for(int i=0;i<4;i++)
*p=*g+=2;
}
```

30. **a.** What is a computer network? Explain the various types of computer networks.

Or **4**

b. Explain any four communication medium.

31. **a.** Define a class ‘student’ with the following specifications:

Private members:

admno	integer
sname	20 characters
eng,math,science,total	float

ctotal() calculate eng+math+science

Public members:

takedata(): accepts values for admno, sname, eng, math, science and invokes ctotal() to calculate total.

showdata(): displays all the data members on the screen.

Or **4**

b. Explain any four types of inheritance with diagram.

32. **a.** Consider the following code and answer the questions given below:

```
Class A {
                        void anyval();
    protected:          int x,y;
                        void procval();
    public:             void getvalA();
                        void putvalA();
   };
class B: protected A {
                        int a,b;
    protected:          int c,d;
                        void getvalB();
    public:             void putvalB();
  };
class C: private B {
                        int p;
    protected:          int q;
                        void getval();
    public:             void showval();
    };
```

(i) Name all the member functions which are accessible by the objects of class C.

(ii) Name all the protected members of class B.

(iii) Name the base class and the derived class of class B.

(iv) Name the data members which are accessible from member functions of class C.

Or **4**

b. Consider the following code and answer the question given below;

```
class University
{
                        int NOC;
    protected:          char Uname[25];
    public:             University();
                        char state[25];
                        void enterdata();
                        void displaydata();
```

```
};
Class College:public University
{
                        int NOD;
                        char name[25];
        protected:      void affiliation();
        public:         College();
                        void enroll(int,int);
                        void show();
};
Class Department:public College
{
                        Char Dname[25];
                        int Nof;
        public:         Department();
                        void display();
                        void input();
};
```

(i) Which class constructor will be called first at the time of declaration of an object of class Department?

(ii) How many bytes does an object belonging to class Department require?

(iii) Name the member function(s) which are accessed from the objects(s) of class Department.

(iv) Name the data member(s), which are accessible from the objects of class College.

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