

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

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.  
 $F(a,b,c,d) = \Sigma(1,2,3,11,12,14,15)$ . 4
28. a. Write a C++ program that reverses and sums up the digits of an integer. 4

**Or**

- 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.

\*\*\*\*\*