

SAMPLE PAPER – 2008-09
INTRODUCTORY COMPUTER SCIENCE (Theory)
CLASS – XII

Time allowed : 3 hours

Maximum marks : 70

Note :

- i) All the questions are compulsory .
- ii) Programming Language : C++ .

1. a) What is the difference between *#define* & *const* ? Explain through example. 2
b) Name the *header files* that shall be required for successful compilation of the following C++ program : 1

```
main()
{
    char str[20];
    cout<<fabs(-34.776);
    cout<<"\n Enter a string : ";
    cin.getline(str,20);

    return 0; }
```

- c) Rewrite the following program after removing all the syntactical errors underlining each correction. (if any) 2

```
#include<iostream.h>
#include<stdio.h>
struct NUM
{ int x;
float y;
}*p;

void main( )
{
    NUM A=(23,45.67);
    p=A;
    cout<<"\n Integer = "<<*p->x;
    cout<<"\n Real = "<<*A.y;
}
```

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

```
void FUNC(int *a,int n)
{ int i,j,temp,sm,pos;
  for(i=0;i<n/2;i++)
    for(j=0;j<(n/2)-1;j++)
      if(*(a+j)>*(a+j+1))
        { temp=*(a+j);
          *(a+j)=*(a+j+1);
          *(a+j+1)=temp; }
  for(i=n-1;i>=n/2;i--)
    { sm=*(a+i);
      pos=i;
      for(j=i-1;j>=n/2;j--)
        if(*(a+j)<sm)
          { pos=j;
            sm=*(a+j); }
    temp=*(a+i);
    *(a+i)=*(a+pos);
    *(a+pos)=temp; } }
```

```
void main( )
{
    int w[ ]={-4,6,1,-8,19,5},i;
    FUNC(w,6);
    for(i=0;i<6;i++)
        cout<<w[i]<<' ';
```

- e) Give the output of the following program (Assuming that all required header files are included in the program) : 2

```
class state
{
private:
    char *sname;
    int size;
public:
    state( )
    { size=0;
      sname=new char[size+1];}
    state(char *s)
```


Type	Price(Rs.)
Coat	2400
Sweater	1600

For material other than “WOOLEN” the above mentioned price gets reduced by 30%.

Public members :

A constructor to get initial values for code, Type & material as “EMPTY” & size and price with 0.

A function INWEAR() to input the values for all the data members except price which will be initialized by function calprice().

Function DISPWEAR() that shows all the contents of data members

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

4

```
class COMP
{ private :
    char Manufacturer [30];
    char addr[15];

public:
    toys();
    void RCOMP();
    void DCOMP();
};
class TOY: public COMP
{ private:
    char bcode[10];
    public:
    double cost_of_toy;
    void RTOY ();
    void DTOY();
};
class BUYER: public TOY
{ private:
    char nm[30];
    char delivery date[10];
    char *baddr;
public:
    void RBUYER();
    void DBUYER();
};
void main ()
{ BUYER MyToy; }
```

- Mention the member names that are accessible by MyToy declared in main() function.
- Name the data members which can be accessed by the functions of BUYER class.
- Name the members that can be accessed by function RTOY().
- How many bytes will be occupied by the objects of class BUYER?

3. a) Define a function that would accept a one dimensional integer array and its size. The function should reverse the contents of the array without using another array. (main() function is not required) 4

b) A two dimensional array A[15][25] having integers (long int), is stored in the memory along the column, find out the **memory location** for the element A[8][12], if an element A[10][6] is stored at the memory location 2800. 4

c) Evaluate the following **postfix notation** of expression : 2

5, 8, 7, +, /, 7, *, 13, -

d)) Write a user defined function in C++ which accepts a squared integer matrix with odd dimensions (3*3, 5*5 ...) & display the sum of the middle row & middle column elements. For ex. : 2

2	5	7
3	7	2
5	6	9

The output should be :

Sum of middle row = 12

Sum of middle column = 18

e) Consider the following program for linked **QUEUE** : 4

```
struct NODE
{ int x;
  float y;
  NODE *next; };

class QUEUE
{ NODE *R,*F;;
```

```

public :
    QUEUE()
    { R=NULL;
      F=NULL;
    }
void INSERT();
void DELETE();
void Show();
~QUEUE(); };

```

Define INSERT() & DELETE() functions outside the class.

4. a) Observe the following program carefully and fill in the blanks using seekg() and tellg() functions : 1

```

#include<fstream.h>
class school
{ private :
    char scode[10],sname[30];
    float nofstu;
public:
    void INPUT();
    void OUTPUT();
    int COUNTREC(); };
int school::COUNTREC()
{ fstream fin("scool.dat",ios::in|ios::binary);
  _____ //statement 1
  int B=_____ //statement 2
  int C=B/sizeof(school);
  fin.close();
  return C; }

```

b) Write a function in c++ to count the number of words starting with capital alphabet present in a text file DATA.TXT. 2

c) Write a function in c++ to add new objects at the bottom of binary file "FAN.DAT", assuming the binary file is containing the objects of following class : 3

```

class FAN
{ private:
  int srno;
  char name[25];
  float pr;
public:
  void Enter(){ cin>>srno; gets(name); cin>>pr; }
  void Display(){ cout<<srno<<name<<pr<<endl; } };

```

5. a) What do you mean by **degree & cardinality** of a relation? Explain with example. 2

b) Consider the tables **FLIGHTS** & **FARES**. Write SQL commands for the statements (i) to (iv) and give the outputs for SQL queries (v) & (vi) .

Table : FLIGHTS

FNO	SOURCE	DEST	NO_OF_FL	NO_OF_STOP
IC301	MUMBAI	BANGALORE	3	2
IC799	BANGALORE	KOLKATA	8	3
MC101	DELHI	VARANASI	6	0
IC302	MUMBAI	KOCHI	1	4
AM812	LUCKNOW	DELHI	4	0
MU499	DELHI	CHENNAI	3	3

Table : FARES

FNO	AIRLINES	FARE	TAX
IC301	Indian Airlines	9425	5%
IC799	Spice Jet	8846	10%
MC101	Deccan Airlines	4210	7%
IC302	Jet Airways	13894	5%
AM812	Indian Airlines	4500	6%
MU499	Sahara	12000	4%

i) Display flight number & number of flights from Mumbai from the table flights. 1

ii) Arrange the contents of the table flights in the descending order of destination. 1

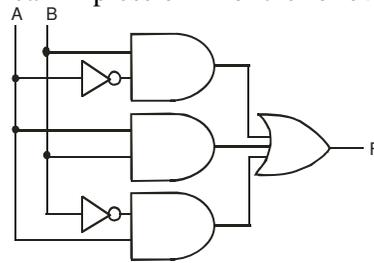
iii) Increase the tax by 2% for the flights starting from Delhi. 1

iv) Display the flight number and fare to be paid for the flights from Mumbai to Kochi using the tables, Flights & Fares, where the fare to be paid =fare+fare*tax/100. 1

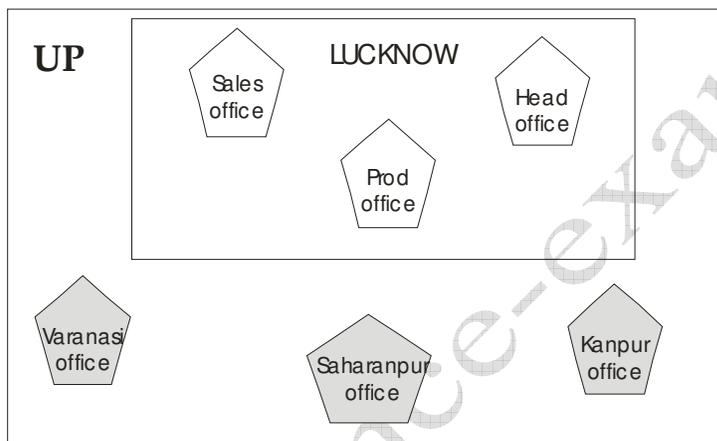
v) SELECT COUNT(DISTINCT SOURCE) FROM FLIGHTS; 1

vi) SELECT FNO, NO_OF_FL, AIRLINES FROM FLIGHTS,FARES WHERE SOURCE='DELHI' AND FLIGHTS.FNO=FARES.FNO; 1

6. a) State and verify *De Morgan's law*. 2
 b) If $F(A,B,C,D) = \sum(0,1,2,4,5,7,8,10)$, obtain the simplified form using *K-Map*. 3
 c) Convert the following Boolean expression into its equivalent Canonical *Sum of Products form (SOP)* : 2
 $(X+Y+Z) (X+Y+Z') (X'+Y+Z) (X'+Y'+Z')$
 d) Write the equivalent Boolean Expression F for the following *circuit diagram* : 1



7. a) What is a *switch*? How is it different from *hub*? 1
 b) What is the difference between *optical fibre & coaxial* transmission media. 1
 c) Define *cookies & firewall*. 1
 d) Expand *WLL & XML*. 1
 e) "Kanganalay Cosmetics" is planning to start their offices in four major cities in Uttar Pradesh to provide cosmetic product support in its retail fields. The company has planned to set up their offices in Lucknow at three different locations and have named them as "Head office", "Sales office", & "Prod office". The company's regional offices are located at Varanasi, Kanpur & Saharanpur. A rough layout of the same is as follows :



Approximate distances between these offices as per network survey team is as follows :

Place from	Place to	Distance
Head office	Sales office	15 KM
Head office	Prod office	8 KM
Head office	Varanasi Office	295 KM
Head office	Kanpur Office	195 KM
Head office	Saharanpur office	408 KM

Number of computers :

Head office	156
Sales office	25
Prod office	56
Varanasi Office	85
Kanpur Office	107
Saharanpur office	105

- i) Suggest the placement of the *repeater* with justification. 1
 ii) Name the branch where the *server* should be installed. Justify your answer. 1
 iii) Suggest the *device* to be procured by the company for connecting all the computers within each of its offices out of the following devices : 1
 - Modem
 - Telephone
 - Switch/Hub
 iv) The company is planning to link its head office situated in Lucknow with the office at Saharanpur. Suggest an economic way to connect it; the company is ready to compromise on the speed of connectivity. Justify your answer. 1