

INTERNATIONAL INDIAN SCHOOL, DAMMAM
PRELIMINARY EXAMINATION, JAN-2016

SUBJECT: COMPUTER SCIENCE

TIME: 3HRS

CLASS: XII

MAX MARKS: 70

SET A

General Instructions:

1. All questions are compulsory.
2. Programming language: C++.

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- a) What is the function of typedef in C++. Also give a suitable C++ code to illustrate it. 2
- b) Name the header file(s) that shall be needed for successful compilation of the following C++ code: 1
- ```
void main()
{ char Text[]="Welcome";
cout<<"Remaining SMS Chars:"<<140-strlen(Text)<<endl; }
```
- c) Rewrite the following program after removing the syntactical errors(if any). Underline each correction. 2
- ```
#include<iostream.h>
struct Pixels
{
    int Color, Style;
}
void ShowPoint(Pixels P)
{ cout<<P.Color , P.Style<<endl; }
void main()
{
    Pixels Point1=(5,3);
    ShowPoint(Point1);
    Pixels Point2=Point1;
    Color.Point1+=2;
    ShowPoint(Point2); }
```
- d) Find the output of the following program: 2
- ```
#include<iostream.h>
#include<ctype.h>
void Encrypt(char T[])
{
 for(int i=0;T[i]!='\0';i+=2)
 if(T[i]=='A' || T[i]=='E')
 T[i]='#';
 else if(islower(T[i]))
 T[i]=toupper(T[i]);
 else
 T[i]='@';
}
void main()
{
 char Text[]="GloBAL WArmINg";
 Encrypt(Text);
 cout<<Text<<endl;
}
```

- (e) Find the output of the following program:

```
#include<iostream.h>
void in(int x, int y, int &z)
{
 x+=y;
 y--;
 z*=(x-y);
}
void out(int z, int &y, int x)
{
 x*=y;
 y++;
 z/=(x+y);
}
void main()
{
 int a=20, b=30, c=10;
 out(a,c,b);
 cout<<a<<"#"<<b<<"#"<<c<<"#"<<endl;
 in(b,c,a);
 cout<<a<<"@"<<b<<"@"<<c<<"@"<<endl;
 out(a,b,c);
 cout<<a<<"$"<<b<<"$"<<c<<"$"<<endl;
}
```

- (f) Study the following program and select the possible output(s) from (i) to (iv). Also write the least value and highest value assigned to variable number.

```
#include<iostream.h>
#include<stdlib.h>
void main()
{
 randomize();
 int array[10]={1, 2, 3, 4, 5, 6, 7, 8, 9, 10};
 int N=6;
 int number = random(array[N]);
 for(int i=number; i>=1;i--)
 {
 cout<<j;
 if(i!=1) cout<<',';
 }
}
```

**Output:**

- (i) 7,5,3,2,1
- (ii) 4,3,2,1
- (iii) 7,5,3,2
- (iv) 7,6,5,4,3,2,1

2. (a) Write any two similarities between Constructors and Destructors. Write the function headers for constructor and destructor of a class **Flight**.

answer the question (i) and (ii) after going through the following class:

2

```
class Book
{
 int BookNo; char BookTitle[20];
public:
 Book(); //Function 1
 Book(Book &); //Function 2
 Book(int, char[]); //Function 3
 void Buy(); //Function 4
 void Sell(); //Function 5
};
void main()
{
 :
 :
}
```

- (i) Name the feature of Object Oriented Programming demonstrated by Function 1, Function 2 and Function 3.
- (ii) Write statements in C++ to execute Function 3 & Function 4 inside the main( ) function.

Define a class Seminar with the following specification:

4

**private members**

**SeminarId** long  
**Topic** string of 20 characters  
**VenueLocation** string of 20 characters  
**Fee** float  
**CalcFee( )** function to calculate Fee depending on VenueLocation

| VenueLocation | Fee  |
|---------------|------|
| Outdoor       | 5000 |
| Indoor Non-AC | 6500 |
| Indoor AC     | 7500 |

**public members**

**Register( )** function to accept values for SeminarId, Topic, VenueLocation and call **CalcFee( )** to calculate **Fee**  
**CalcFee( )** function to calculate fee  
**ViewSeminar( )** function to display all the data members on the screen.

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

4

```
class FaceToFace
{
 char CenterCode[10];
public:
 void Input();
 void Output();
};
class Online
{
 char Website[50];
public:
 void SiteIn();
 void SiteOut();
};
```

```

class Training : public FaceToFace, private Online
{
 long Tcode;
 float charge;
 int period;
public:
 void Register();
 void Show();
};

```

- (i) Which type of inheritance is shown in the above example?
- (ii) Write names of all the member functions accessible from Show() function of class Training.
- (iii) Write names of all members accessible through an object of class Training.
- (iv) Is the member **Website** accessible inside the function Show()? Justify your answer.

3. (a) Write code for a function OddEven(int s[], int N) in C++, to add 5 in all the odd values and 10 in all the even values of the array S.

**Example:** If the original content of the array S is

|    |    |    |    |    |
|----|----|----|----|----|
| 50 | 11 | 19 | 24 | 28 |
|----|----|----|----|----|

The modified content will be:

|    |    |    |    |    |
|----|----|----|----|----|
| 60 | 16 | 24 | 29 | 38 |
|----|----|----|----|----|

- (b) Each element of a two-dimensional array (with 5 rows and 4 columns) is stored in one memory location. If A(1,1) is at location 2000, what is the address of A(4,4). The arrangement is column-major. Use a suitable formula for the calculation.
- (c) Write the definition of a member function PUSH( ), to add a new game detail in a dynamic stack of GAMES considering the following code is already included in the program:

```

struct GAMES
{
 char GameName[30];
 int NumofPlayer;
 GAMES *next;
};
class STACK
{
 GAMES *Top;
public:
 STACK() { Top=NULL; }
 void PUSH();
 void POP();
 ~STACK();
};

```

- (d) Write a function DISPLAY(X[4][4]) in C++ to display the elements which do not lie on the diagonals. For example, if the content of array is as follows:

|             |             |             |             |
|-------------|-------------|-------------|-------------|
| 15<br>(0,0) | 12<br>(0,1) | 56<br>(0,2) | 45<br>(0,3) |
| 13<br>(1,0) | 91<br>(1,1) | 94<br>(1,2) | 87<br>(1,3) |
| 51<br>(2,0) | 63<br>(2,1) | 11<br>(2,2) | 46<br>(2,3) |
| 23<br>(3,0) | 61<br>(3,1) | 81<br>(3,2) | 72<br>(3,3) |

The function should display the elements: 12, 56, 13, 87, 51, 46, 61, 81.

Evaluate the following postfix expression (show status of Stack after each operation) 2

100, 40, 8, /, 20, 10, -, +, \*

1) What is the output of the following C++ code if the file content before the execution of the program is the string "ABC". (note that "" are not part of the file) 1

```
void main()
{
 char ch='D';
 ofstream Fileout("data.dat", ios::app);
 Fileout<<ch;
 int p=Fileout.tellg();
 cout<<p;
}
```

2) Write a function in C++ to count the number of "Me" or "My" words in a text file "DIARY.TXT". 2

**For example, if the file contains:**

My first book was Me and My family. It gave me a chance to be known to the world.

The output of the function should be :

Count of Me/My in the file : 4

3) Assuming a class PLAYER as declared below, write a function in C++ to read the objects of PLAYER from a binary file SPORTS.DAT and display the details of those players whose rank is above 500. 3

```
class PLAYER
{
 char PNO[10];
 char Name[20];
 int rank;
public:
 void EnterData()
 {
 gets(PNO); gets(Name); cin>>rank;
 }
 void DisplayData()
 {
 cout<<PNO<<endl;
 cout<<Name<<endl;
 cout<<rank<<endl;
 }
 int Ret_rank() { return rank; }
};
```

a) What is the difference between candidate key and alternate key? Give examples. 2

b) Consider the following tables EMPLOYEE and DEPARTMENT and answer (a) and (b) parts of this question. 6

**Table : EMPLOYEE**

| Tcode | TName         | DepCode | Salary | Age | JoinDate   |
|-------|---------------|---------|--------|-----|------------|
| 15    | Sameer Sharma | 123     | 75000  | 39  | 2007-04-01 |
| 21    | Ragvinder K   | 101     | 86000  | 29  | 2005-11-11 |
| 34    | Rama Gupta    | 119     | 52500  | 43  | 2010-05-03 |
| 46    | C R Menon     | 103     | 67000  | 38  | 2004-07-12 |
| 77    | Mohan Kumar   | 103     | 63000  | 55  | 2000-11-25 |
| 81    | Rajesh Kumar  | 119     | 74500  | 48  | 2008-12-11 |
| 89    | Sanjeev P     | 101     | 92600  | 54  | 2009-01-12 |
| 93    | Pragya Jain   | 123     | 32000  | 29  | 2006-08-05 |

**Table DEPARTMENT**

| DepCde | DepName  | DepHead      |
|--------|----------|--------------|
| 101    | ACCOUNTS | Rajiv Kumar  |
| 103    | HR       | P K Singh    |
| 119    | IT       | Yogesh Kumar |
| 123    | RESEARCH | Ajay Dutta   |

- (a) Write SQL commands for the following statements:
- To display all DepName along with the DepCde in descending order of DepCde.
  - To display the average age of Employees in DepCde as 103.
  - To display the name of DepHead of the Employee named "Sanjeev P".
  - To display the details of all Employees who has joined before 2007 from EMPLOYEE table
- (b) Give the output of the following SQL queries:
- SELECT COUNT(DISTINCT DepCde) FROM EMPLOYEE;
  - SELECT MAX(JoinDate), MIN(JoinDate) FROM EMPLOYEE;
  - SELECT TName, DepHead FROM EMPLOYEE E, DEPARTMENT D WHERE E.DepCde = D.DepCde and Tcode>50;
  - SELECT COUNT(\*) FROM EMPLOYEE WHERE Salary>60000 AND Age>30;

6. (a) Verify the following using Boolean Laws  
 $X + Z = X + X'.Z + Y.Z$
- (b) Draw the logic circuit for the following Boolean Expression :  
 $Y = (U + V') . (U + W')$
- (c) Convert the following Boolean expression into its equivalent Canonical Sum of Products form (SOP) :  
 $(X + Y + Z) (X + Y + W') (X' + Y + W) (X' + Y' + W')$
- (d) Reduce the following Boolean Expression using K-Map :  
 $F(P,Q,R,S) = \sum(0,2,4,5,6,7,8,10,13,15).$
7. (a) Identify the Domain name and URL from the following :  
<http://www.income.in/home.aboutus.html>
- (b) Write two characteristics of Wi-Fi.
- (c) Name any two components required for networking.
- (d) Which of the following is not a unit for data transfer ?
- bps
  - abps
  - gbps
  - kbps
- (e) Explain any two switching techniques used in networking.
- (f) Vidya Senior Secondary Public School in Naintal is setting up the network between its different wings. There are 4 wings named as SENIOR(S), JUNIOR(J), ADMIN(A), AND HOSTEL(H). Distance between various wings are given below :

|                  |      |
|------------------|------|
| Wing A to Wing S | 100m |
| Wing A to Wing J | 200m |
| Wing A to Wing H | 400m |
| Wing S to Wing J | 300m |
| Wing A to Wing H | 100m |
| Wing J to Wing H | 450m |

Number of computers installed at various buildings are as follows :

| Wing   | Number of Computers |
|--------|---------------------|
| Wing A | 20                  |
| Wing S | 150                 |
| Wing J | 50                  |
| Wing H | 25                  |

- (i) Suggest a suitable Topology for networking the computers of all wings.
- (ii) Name the most suitable wing where the Server should be installed. Justify your answer.
- (iii) Suggest the placement of Hub(s)/Switch(es) in the network.
- (iv) Which communication medium would you suggest to connect this school with its main branch in Delhi?

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