

INTERNATIONAL INDIAN SCHOOL - DAMMAM
SECOND TERMINAL EXAMINATION – DECEMBER 2015
COMPUTER SCIENCE (083)
CLASS - XII
SET- A

Time Allowed: 3 hours

Max Marks: 70

Note: All questions are compulsory.
Programming Language: C++

1 (a) What do you understand by Data Encapsulation and Data Hiding ? Also give a suitable C++ code to illustrate both. (2)

(b) Rewrite the following program after removing the syntactical errors (if any). Underline each correction. (2)

```
#include<iostream.h>
#include<stdio.h>
class AUTO
{
    char Model[20];
    float Price=0;
    AUTO() { Price = 0 ; strcpy(Model , " NULL" ); }
public:
    void GetInfo() { cin>> Price ; gets(Model); }
    void PutInfo() { cout << setw(10)<<Price<<setw(10)<<Model<<endl; }
};
void main()
{
    AUTO Car;
    Car.GetInfo();
    Car.PutInfo();
}
```

(c) Find the output of the following program segment: (3)

```
# include<iostream.h>
class Quiz
{
    int Round ; float Score;
public:
    Quiz() { Round = 1 ; Score = 0 ; }
    Quiz(Quiz &Q) { Round = Q.Round +1 ; Score = Q.Score +10; }
    void GetBonus (float B = 5)
    {
        Score += B;
    }
    void ShowScore()
    {
        cout<<Round<<"#"<<Score<<endl;
    }
}
```

```

};
void main()
{
Quiz A;
A.ShowScore();
A.GetBonus(10);
A.ShowScore();
Quiz B(A);
B.GetBonus();
B.ShowScore();
}

```

- (d) Write the output of the following C++ code. Also, write the name of feature of Object Oriented Programming used in the following program jointly illustrated by the functions [I] to [IV] : (3)

```

#include<iostream.h>
void Line() // Function [I]
{
for ( int L= 1 ; L <= 80 ; L++) cout<<" - ";
cout<< endl;
}
void Line(int N) //Function [II]
{
for ( int L= 1 ; L<=N ; L++ ) cout<<" * ";
cout<<endl;
}
void Line( char C, int N) //Function [III]
{
for ( int L= 1 ; L<=N ; L++ ) cout<< C;
cout<<endl;
}
void Line ( int M , int N ) // Function [IV]
{
for ( int L= 1 ; L<=N ; L++ ) cout<< M * L ;
cout<<endl;
}

void main()
{
int A = 9 , B= 4, C=3;
char K= "#";
Line (K, B);
Line( A, C);
Line( B );
}

```

- 2 (a) What is a copy constructor ? Give a suitable example in C++ to illustrate with its definition within a class and a declaration of an object with the help of it . (2)
- (b) Answer the questions (i) and (ii) after going through the following class. (2)

```

class passenger
{
    long PNR;
    char Name[20];
public:
    Passenger ()           // Function 1
    { cout<<"Ready"<<endl; }

    void Book(long P, char N[]) // Function 2
    { PNR = P; strcpy(Name,N); }

    void Print()           //Function 3
    { cout<< PNR << Name << endl; }

    ~Passenger()           //Function 4
    {cout<<"Booking cancelled!"<<endl; }
};

```

(i) Fill in the blank statements in Line1 and Line2 to execute Function 2 and Function 3 respectively in the following code:

```

void main()
{
    Passenger P;
    _____ //Line 1
    _____ //Line 2
} //Ends here

```

(ii) Write function will be executed at } //Ends here? What is this function referred as?

(c) Define a class Applicant in C++ with the following description: (4)

Private members

ANO long
NAME string
AGGREGATE float
GRADE char

A member function GradeMe() to find the GRADE as per the AGGREGATE Marks obtained by a student. Equivalent AGGREGATE Marks range and the respective Grades are shown as follows:

| AGGREGATE Marks | GRADE |
|------------------------|-------|
| >=80 | A |
| Less than 80 and >=65 | B |
| Less than 65 and >= 50 | C |
| Less than 50 | D |

Public member functions

- A function ENTER() to input the values of ANO, NAME and AGGREGATE and call the function GradeMe() to find the GRADE.
- A function RESULT() to allow user to view the content of all the data members.

(d) Consider the following C++ code and answer the questions from (i) to (iv): (4)

```
class Personal
{
    int Class, Rno;
    char Section;
protected:
    char Name [20];
public:
    Personal ( );
    void Pentry ( );
    void Pdisplay ( );
};
class Marks: private Personal
{
    float M [5];
protected:
    char Grade [5];
public:
    Marks ( );
    void Mentry ( );
    void Mdisplay ( );
};
class Result: public Marks
{
    float Total, Agg;
public:
    char FinalGrade, Comments [20];
    Result ( );
    void Rcalculate ( );
    void Rdisplay ( );
};
```

- Which type of inheritance is shown in the above example?
 - Write the names of those data members, which can be directly accessed from the objects of class Result.
 - Write the names of those member functions, which can be directly accessed from the objects of class Result.
 - Write the names of those data members, which can be directly accessed from the Mentry() function of class Marks.
3. (a) Write the definition for a function void Transfer (int A[6] , int B[6]) in C++ which takes two integer arrays, each containing 6 elements as parameters. The function should exchange all odd places (1st, 3rd and 5th) of the two arrays, for example If the array A contains. (3)

| | | | | | |
|----|----|----|----|----|----|
| 15 | 10 | 12 | 21 | 52 | 76 |
|----|----|----|----|----|----|

And if the array B contains

| | | | | | |
|----|----|----|----|----|----|
| 23 | 41 | 67 | 83 | 13 | 53 |
|----|----|----|----|----|----|

Then the function should make the contents of the array A as

| | | | | | |
|----|----|----|----|----|----|
| 15 | 41 | 12 | 83 | 52 | 53 |
|----|----|----|----|----|----|

And the contents of array B as

| | | | | | |
|----|----|----|----|----|----|
| 23 | 10 | 67 | 21 | 13 | 76 |
|----|----|----|----|----|----|

- (b) An array $S[50][20]$ is stored in the memory along the column with each of the elements occupying 4 bytes, Find out the base address and the address of element $S[30][15]$, if an element $S[25][10]$ is stored at the memory location 9800. (3)
- (c) Evaluate the following postfix notation of expression. Show the status of stack after execution of each operation separately: (2)
 $5, 3, 2, *, 4, 2, /, -, *$
- (d) Assume an array E containing elements of structure Employee is required to be arranged in descending order of Salary. Write a C++ function to arrange the same with the help of bubble sort, the array and its size is required to be passed as parameters to the function. Definition of structure Employee is as follows: (3)

```
struct Employee
{
    int Eno;
    char Name[25];
    float Salary;
};
```
- (e) Write a function in C++ which accepts a 2D array of integers and its size as arguments and displays the elements which lie on minor diagonal. [Top right to bottom left diagonal] (2)
 [Assuming the 2D array to be square matrix with odd dimension ie. 3×3 , 5×5 , 7×7 , etc..]
 Example : if the two dimensional array contains

$$\begin{matrix} 2 & 1 & 8 \\ 4 & 5 & 6 \\ 3 & 9 & 7 \end{matrix}$$
- The following should be displayed:

$$\begin{matrix} 8 \\ 5 \\ 3 \end{matrix}$$
- (f) Write a function in C++ to perform insert operation in a static circular queue containing book's information (represented with the help of an array of structure (4)



```

BOOK).
struct BOOK
{
    long Accno;           // Book Accession Number
    char Title [20];     // Book Title
};

```

4. (a) Observe the program segment given below carefully and fill the blanks marked as statement1 and statement2 using seekg() and tellg() functions for performing the required task. (1)

```

#include<fstream.h>
class Employee
{
    int Eno; char Ename[20];
public:
    int Countrec(); //Function to count the total number of records
};

int Item::Countrec()
{
    ifstream File;
    File.open("EMP.DAT",ios::binary{ ios::in });
    _____ // Statement 1 , To take the file pointer to the end of
                file
    int Bytes = _____ // Statement 2 , To return total number of bytes
                        from the beginning of the file to the file pointer.
    int Count = Bytes / sizeof(Item);
    File.close();
    return Count;
}

```

- (b) Write a function CountDig() in C++ which reads the content of a text file Story.txt and displays the number of digits in it. (2)

Example

Amrapali was a queen of Gareware kingdom in the year 1911. She had 2 daughters. Her place had 200 rooms.

Output will be : Number of digits in Story = 8

- (c) Assuming the class WORKER as declared below, write a function in C++ to read the objects of WORKER from binary file named WORKER.DAT and display those records of workers, whose wage is less than 300. (3)

```

class WORKER
{
    int WNO;
    char WName[30]; float Wage;
public:
    void Enter() { cin>>WNO; gets(WName); cin>>Wage; }
    void DISP() { cout<<ENO << "*" <<WName << "*" << Wage<< endl; }
    float GetWage() { return Wage; }
};

```

Observe the following table and answer the parts (i) and (ii):

(2)

Table : Store

| Item Code | Item | Qty | Rate |
|-----------|-----------------|------|------|
| 10 | Gel Pen Classic | 1150 | 25 |
| 11 | Maths | 1500 | 10 |
| 12 | Computer Sc | 1600 | 12 |
| 13 | Physics | 1600 | 5 |
| 15 | Chemistry | 800 | 20 |

- (i) In the above table, can we have Qty as primary key. [Answer as yes/no.].
Justify your answer.
- (ii) What is the cardinality and degree of the above table?
- (b) Write SQL commands for the queries (i) to (vi) and output for (vii) to (x) based on the table APPLICANTS and COURSES. (8)

TABLE : APPLICANTS

| NO | NAME | FEE | GENDER | C_ID | JOINYEAR |
|------|----------|-------|--------|------|----------|
| 1012 | Amandeep | 30000 | M | A01 | 2012 |
| 1102 | Avisha | 25000 | F | A02 | 2009 |
| 1103 | Ekant | 30000 | M | A02 | 2011 |
| 1049 | Arun | 30000 | M | A03 | 2009 |
| 1025 | Amber | 40000 | M | A02 | 2011 |
| 1106 | Ela | 40000 | F | A05 | 2010 |
| 1017 | Nikita | 35000 | F | A03 | 2012 |
| 1108 | Arleena | 30000 | F | A03 | 2012 |
| 2109 | Shakti | 35000 | M | A04 | 2011 |
| 1101 | Kirat | 25000 | M | A01 | 2012 |

TABLE : COURSES

| C_ID | COURSE |
|------|-------------------|
| A01 | FASHION DESIGN |
| A02 | NETWORKING |
| A03 | HOTEL MANAGEMENT |
| A04 | EVENT MANAGEMENT |
| A05 | OFFICE MANAGEMENT |

- i) To display name, fee, gender, joinyear about the applicants who have joined before 2010.
- ii) To display the names of applicants, who are paying fee more than 30000.
- iii) To display names of all applicants in ascending order of their joinyear.
- iv) To display the year and the total number of applicants joined in each year from the table APPLICANTS.
- v) To add a new row in the APPLICANTS table with the following.
1104, 'Karan', 30000, 'M', 'A03', 2012
- vi) To display the Applicant's name with their respective course's name from the

tables APPLICANTS and COURSES.

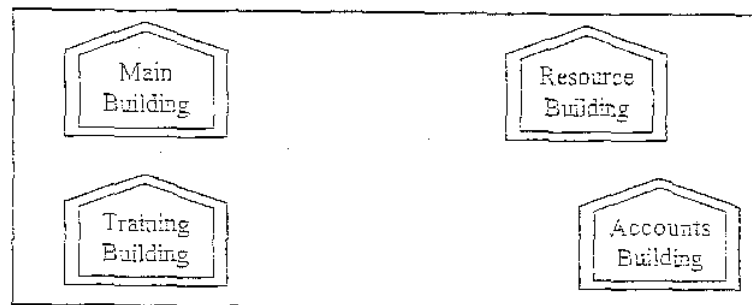
vii)SELECT Name , Joinyear FROM APPLICANTS WHERE GENDER = 'F' and C_ID = 'A02' ;

viii)SELECT MIN(JOINYEAR) FROM APPLICANTS WHERE GENDER = 'M';

ix)SELECT AVG(FEE) FROM APPLICANTS WHERE C_ID = 'A01' OR C_ID = 'A05';

x)SELECT SUM(FEE) , C_ID FROM APPLICANTS GROUP BY C_ID HAVING COUNT(*) >= 2;

6. (a) Draw the logic circuit for the following boolean expression: (2)
 $(X' + Y) . Z + W'$
- (b) Obtain the minimal form for the following Boolean expression using Karnaugh's Map: (3)
 $F(X,Y,Z,W) = \sum(0,1,4,5,6,7,8,9,11)$
7. (a) What was the role of ARPANET in the Computer Network? (1)
- (b) Which of the following is not a unit for data transfer rate ? (1)
i)mbps
ii)kbps
iii)sbps
iv)gbps
- (c) Name two switching techniques used to transfer data between two terminals. (1)
- (d) Write any two advantages and disadvantages of BUS topology? (2)
- (e) What is the purpose of Gateway? (1)
- (f) "Vidya For All " is an educational NGO . It is setting up its new campus at Jaipur for its web based activities. The campus has four buildings as shown in the diagram below: (4)



Approximate distances between these buildings is as follows:

| From | To | Distance |
|-------------------|-------------------|----------|
| Main building | Resource building | 120m |
| Main building | Training building | 40m |
| Main building | Accounts building | 135m |
| Resource building | Training building | 125m |
| Resource building | Accounts building | 45m |
| Training building | Accounts building | 110m |

In continuation of the above, the number of computers in each of their buildings:

| | |
|-------------------|-----|
| Main Building | 15 |
| Resource Building | 25 |
| Training Building | 250 |
| Accounts Building | 10 |

(i) Suggest the most suitable place (ie, building) to house the server of this organization. Also give a reason to justify your suggested location.

(ii) Suggest a cable layout of connections between the buildings.

(iii) Suggest the placement of the following devices with justification:

- 1) Hub/Switch
- 2) Repeater

(iv) The NGO is planning to connect its International office situated in Delhi. Which out of the following wired communication links, will you suggest for a very high speed connectivity?

- 1) Optical Fibre
- 2) Co-axial Cable
- 3) Ethernet Cable
