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Roll No.

Date:

## NORTHWEST ACCREDITATION COMMISSION, USA

HIGH SCHOOL DIPLOMA (Sr. Secondary/12<sup>TH</sup>)

Subject- Computer Science(theory)

Subject Code – C410


Question Paper No. :

Question Paper code:

### General Instructions

**1. OPENING AND CHECKING OF THE QUESTION-BOOKLET**

Break open the seal of the Question-Booklet only when the announcement is made by the Invigilator. After

breaking the seal and before attempting the questions, student should immediately check for:

a) The number of the printed page in the Question-Booklet is the same as mentioned on the cover page of the Booklet and

b) Any printing error in the Booklet pages, if any.  
Any discrepancy or error should be brought to the notice of the Invigilator who will then replace the Booklet.

No additional time will be given for this.

**2.** No student, without the permission of the Superintendent, or the Invigilator concerned, is to leave his/her seat or the Examination Room.

**3. FILLING UP THE REQUIRED INFORMATION ON QUESTION-BOOKLET AND ANSWER SHEET**

After breaking open the seal and checking the Booklet, student should:

a) Fill up the **Question Paper No.** and **Question Paper Code** (mentioned on the cover of Question-Booklet) in the space provided on the First Answer Sheet.

b) Fill up his/her Roll Number on the First Answer Sheet and on each Supplementary Answer Sheet, if taken.

C) Student should mention the total number of **Supplementary Answer Sheet**, if taken, in the space provided on the First Answer Sheet and also fill up the Serial Number mentioned on each **Supplementary Answer Sheet** along with his/her Roll Number in the register maintained by the Invigilator. Student must tie all the Answer Sheets with the thread provided by the Invigilator.

#### 4. INSTRUCTIONS ABOUT QUESTION PAPER

This Question Paper is divided into three Sections – **A, B** and **C**. All Sections are compulsory. Attempt all Sections as per instructions.

a) Section A question No. 1 to 5 are very short questions carrying 2 marks each.

b) Section B question No. 6 to 15 are short questions carrying 3 marks each.

c) Section C question No. 16 to 21 are long questions carrying 5 marks each.

5. Student found in possession of Cellular Phone / Mobile Phone / Pager or any other Communication Device and/or any Book/Note whether using or not, will be liable to be debarred for taking examination(s) either permanently or for specified period or/and dealt with as per law or/and ordinance of the School/SERI according to the nature of offence, or/and he/she may be proceeded against and shall be liable for prosecution under the relevant provision of the Statutory Law.

TIME: 3 Hours.

TOTAL MARKS: 70

THE ANSWER SHEET IS TO BE RETURNED ON COMPLETION OF THE TEST

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#### SECTION A

<b>Total number of questions: 5</b>	<b>Marks allocated to each question: 2</b>	<b>Total marks: 10</b>
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Question 1. Which C++ header file(s) will be essentially required to be included to run/execute the following C++ code?

```
void main( )
{
    int Eno=123, char Ename[ ]="Rehan Swamp";
    cout<<setw(5)<<Eno<<setw(25)<<Ename<<endl;
}
```

Question 2. What is a default constructor? How does it differ from destructor?

Question 3. Write 4 characteristics of a constructor function used in a class.

Question 4. Evaluate the following postfix expression. Show the status of stack after execution of each operation separately:

F, T, NOT, AND, F, OR, T, AND

Question 5. Which function will be executed at //Stops here? What is this function referred as?

### SECTION B

Total number of questions: 10	Marks allocated to each question: 3	Total marks: 30
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Question 6. Find the output of the following program:

```
#include <iostream.h>
struct POINT
{int X, Y, Z;};
void StepIn(POINT & P, int Step=1)
{
    P.X+=Step;
    P.Y -=Step;
    P.Z+=Step;
}
void StepOut(POINT & P, int Step=1)
{
    P.X-=Step;
    P.Y+=Step;
    P.Z-=Step;
}
void main ( )
{
    POINT P1={15, 25, 5}, P2={10, 30, 20};
    StepIn(P1);
    StepOut(P2,4);
    cout<<P1.X<<" "<<P1.Y<<" "<<P1.Z<<endl;
    cout<<P2.X<<" "<<P2.Y<<" "<<P2.Z<<endl;
    StepIn(P2,12);
    cout<<P2.X<<" "<<P2.Y<<" "<<P2.Z<<endl;
}
```

P.T.O.

Question 7. Write a function in C++ to perform Insert operation in dynamically allocated Queue containing names of students.

Question 8. (a) Name two transmission media for networking.

(b) Expand the following terms:

- (i) XML                      (ii) GSM
- (iii) SMS                    (iv) MAN

Question 9. An array T[25][20] is stored along the row in the memory with each element requiring 2 bytes of storage. If the base address of array T is 42000, find out the location of T[10][15]. Also, find the total number of elements present in this array.

Question 10. Assuming the class GAMES as declared below, write a functions in C++ to read the objects of GAMES from binary file GAMES.DAT and display those details of those GAMES, which are meant for children of AgeRange "8 to 13".

```

Class GAMES
{
    int GameCode;
    char cameName [10] ;
    char AgeRange;
public :
    void Enter ( )
    {
        cin>>GameCode;
        gets (GameName ) ;
        gets (AgeRange ) ,
    }
    void Display ()
    {
        cout <<Gamecode<<“, „, „ <<GameName<<endl ;
        cout<< AgeRange<< endl ;
    }
    char* AgeR () {return AgeRange ; }
};

```

Question 11. Observe the following C++ code and answer the questions (i) and (ii):

```

class Passenger
{
    long PNR;
    char Name[210];
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; }
};

```

P.T.O.

Question 12. Write a function in C++ TWOTOONE() which accepts two array X[ ], Y[ ] and their size n as argument. Both the arrays X[ ] and Y[ ] have the same number of elements. Transfer the content from two arrays X[ ], Y[ ] to array Z[ ]. The even places (0,2,4...) of array Z[ ] should get the contents from the array X[ ] and odd places (1,3,5...) of array Z[ ] should get the contents from the array Y[ ].  
Example : If the X[ ] array contains 30,60,90 and the Y[ ] array contains 10,20,50. Then Z[ ] should contain 30,10,60,20,90,50.

Question 13. (a) What is a Candidate Key?

(b) Write one advantage of BUS topology as compared to STAR topology.

Question 14. Write a function to count the number of VOWELS present in a text file named "PARA.TXT".

Question 15. Reduce the following Boolean expression using K-Map:

$$F(A,B,C,D) = \prod (0,1,2,4,5,6,8,10)$$

### SECTION C

Total number of questions: 6	Marks allocated to each question: 5	Total marks: 30
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Question 16. Define a class ITEM in C++ with following description:

Private Members

- Code of type integer (Item Code)
- Iname of type string (Item Name)
- Price of type float (Price of each item)
- Qty of type integer (Quantity of item in stock)
- Offer of type float (Offer percentage on the item)
- A member function GetOffer() to calculate Offer percentage as per the following rule:  
If Qty≤50 Offer is 0  
If 50<Qty≤100 Offer is 5  
If Qty>100 Offer is 10

Public Members

- A function GetStock() to allow user to enter values for Code, Iname, Price, Qty and call function GetOffer() to calculate the offer
- A function Showitem() to allow user to view the content of all the data Members

Question 17. An array Arr[15][20] is stored in the memory along the row with each element occupying 4 bytes. Find out the Base Address and address of the element Arr[3][2], if the element Arr[5][2] is stored at the address 1500.

Question 18. Write a function in C++ which accepts an integer array and its size as arguments and replaces elements having even values with its half and elements having odd values with twice its value.

Example : if an array of five elements initially contains the elements as

3, 4, 5, 16, 9

then the function should rearrange the content of the array as

6, 2, 10, 8, 18

Question 19. Write the definition of a member function PUSH( ) in C++, to add a new book in a dynamic stack of BOOKS considering the following code is already included in the program:

```
struct BOOKS
{
    char ISBN[20], TITLE[80];
    BOOKS *Link;
};
class STACK
{
    BOOKS *Top;
public:
    STACK(){Top=NULL;}
    void PUSH();
    void POP();
    ~STACK();
```

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};

Question 20. Study the following tables STAFF and SALARY and write SQL commands for the questions (i) to (iv) and give outputs for SQL queries (v) to (vi).

**TABLE: STAFF**

ID	NAME	DEPT	SEX	EXPERIENCE
101	Siddharth	SALES	M	12
104	Raghav	FINANCE	M	5
107	Naman	RESEARCH	M	10
114	Nupur	SALES	F	3
109	Janvi	FINANCE	F	9
105	Rama	RESEARCH	M	10
117	James	SALES	F	3
111	Binoy	FINANCE	F	12
130	Samuel	SALES	M	15

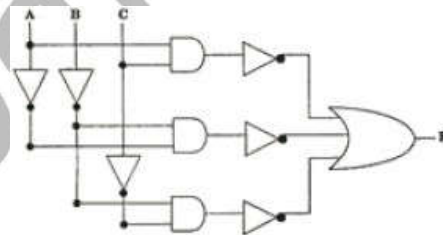
**TABLE SALARY**

ID	BASIC	ALLOWANCE	COMMISSION %
101	12000	1000	3
104	23000	2300	5
107	32000	4000	5
114	12000	5200	10
109	42000	1700	20
105	18900	1690	3
130	21700	2600	30

- Display NAME of all staff who are in "SALES" having more than 10 years experience from the table STAFF.
- Display the average salary of all staff working in "FINANCE" department using the tables STAFF and SALARY.  
SALARY BASIC + ALLOWANCE.
- Display the minimum ALLOWANCE of female staff.
- Display the highest commission% among all male staff.
- SELECT count (\*) from STAFF where SEX = "F".
- SELECT NAME, DEPT, BASIC from STAFF, SALARY where DEPT = "SALES" and STAFF.ID = SALARY.ID.

Question 21. (a) State and verify De Morgan's theorem.

- Write the equivalent expression for the following logical circuit:



**END OF THE QUESTION PAPER**