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1. Answer the following :-

- a) Name the **header files** that shall be required for successful compilation of the following C++ program : [2]

```
void main( )
{
    char str[20];
    cout<<"\n Enter a string : ";
    gets(str);
    if(isalnum(str[5]))
    cout<<ceil(34.567);
}
```

- b) Consider the following array declarations: [2]

i) char X[2+5][50];

ii) float A[20][70-3];

Find the total number of bytes required to store each array.

- c) Write one limitation for each of the following :- [4]

i) 2 D unsized array

ii) Default arguments

iii) Formal argument

iv) Non Void Functions

- d) Give reasons for the errors and write necessary statements to remove the errors :- [2]

i) Compiler displays an error message "Function Prototype missing" when Rohan writes the function invoke statement **→cout<<Sum(10,20);**

ii) Compiler displays an error message "L-Value required" when Somya writes the statement to store "hello" in a char array named S **→ S = "hello" ;**

- e) Write any two differences between the following: - [8]

i) Undersized array and Oversized array

ii) Function prototype and Function definition

iii) Call by value and call by reference

iv) #define and const

- f) Write one advantage and one disadvantage of user defined functions. [2]

2. Write output of the following programs (assuming all the header files are included) :-

a) void main ( ) [2]  
{ char Text[ ] = "Butterfly";  
for ( int K = 0 ; Text [K] !='\0' ; K++)  
if ( K % 2 == 0)  
Text [K] = Text [K] - Num;  
else if ( islower (Text[K] ))  
Text [K] = toupper ( Text [K] )  
else  
Text[K] = Text[K] + Num;  
cout<<Text;  
}

b) void main( ) [2]  
{  
char Status[][10]={"EXCEL", "GOOD", "OK"};  
int Turn=10, Trick;  
for(int Count=1; Count<4; Count++)  
{  
Trick=random(Count);  
cout<<Turn-Trick<<Status[Trick]<<"#";  
}  
}  
i. 10EXCEL#10EXCEL#80K#  
ii. 10EXCEL#80K#9GOOD#  
iii. 10EXCEL#9GOOD#10EXCEL#  
iv. 10EXCEL#10GOOD#80K#

c) void main( ) [2]  
{  
int Sequence,Select[4]={25,92,30,45};  
randomize( );  
for (int C=0; C<4; C++)  
{  
Sequence=random(4 - C);  
cout<<Select[Sequence]<<"@";  
}  
}  
i. 45@90@30@25@  
ii. 45@25@90@25@  
iii. 30@30@25@25@  
iv. 30@30@90@25@

d) int func(int &x, int y = 10) [2]  
{ if (x%y == 0)

```

        return ++x;
    else
        return y--;
}
void main()
{ int p=20, q=23;
  q=func (p,q);
  cout << p << " " << q << endl;
  p=func (q);
  cout<< p << " " <<q << endl;
}
e) void main()
{ int ar[3][2], T[3][2]={1,2,3};
  ar[1][0]=45;
  ar[2][1]=-89;
  cout<<ar[0][1]<<"\t"<<T[1][0]<<"\t"<<ar[2][1]+T[2][1] ;
}

```

3. a) An array T [50][20] is stored in the memory along the Column with each element occupying 4 bytes of storage. Find the address of the element T [30][15], if an element T [25][10] is stored at the address 9800. [3]
- b) An array A[10][20] is stored in the memory along the Row with each element occupying only 2 bytes of storage. If the address of location A[9][10] is 5095 find the address of A[5][15] [3]
- c) Calculate the address of 0 index if the address of 8<sup>th</sup> index is 973 of an integer array defined with 10 elements. [2]

4. Find errors and underline the corrections done (assuming all header files are included) :- [3]
- a) void main()
- ```

{ char name[] = { " " };
  float marks[ ];
  int Top [4][ ] = { 8,9,10 };
  cout<<enter the name of student";
  gets(name[i]);
  for(i=0;i<10,i++)
  cin>>marks(i);
  cout<<"Name \t\t marks";
  putc(name);
}

```

b) void main( ) [2]

```

    {
        char s[2,2];
        int ar[5];
        ar={ 6,7,8};
        for(int x=0; x<2; x++)
            for(int y=0; y<2; y++)
                { if(y==0 ) s[x][y]="A";
                  else s[x]="B";
                  cout<<s[x][y];
                }
    }

```

c) void print( float X, Y=7, int Z) [3]

```

    {
        return = X+Y+Z;
    }
    void main();
    {
        print(10.5, 20);
        cout<<print(4);
    }

```

- d) Identify the invalid statements. Give reasons and write the correct statement:- [2]
- i) int S[0-10];
  - ii) float X[+5];
  - iii) char ch[5\*2];
  - iv) double D[N];

5. Write programs in C++ for the following :-

- a) Write a program which accepts a integer array from user and prints the output (using nested loops) in following format : [3]
- Example : if the array is having  
 1 2 4 5 9  
 Then the output should be  
 1  
 2 2  
 4 4 4 4  
 5 5 5 5 5  
 9 9 9 9 9

- b) Write a program to perform the following on the string inputted by user :- [3]
- i) count and print the number of words starting with capital alphabet 'D'
  - ii) change all the digits to '#'
- Print both the original and modified string

- c) Write a program to find sum of squares of non-diagonals elements of square matrix n x n.  
 Example :- if array is defined of 3 rows and 3 cols with following values : [3]

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 8 \\ 9 & 10 & 11 \end{bmatrix}$$

Then the output is :

$$\begin{matrix} & 2 & \\ 4 & & 8 \\ & 10 & \end{matrix}$$

And the sum of  $(2^2 + 4^2 + 8^2 + 10^2) = 184$

- d) Write a program using function to find the sum of series that receives N as an argument and print the sum. [3]  
 $(1) + (1 + 1) + (1 + 1 + 1) + (1 + 1 + 1 + 1) + \dots + (1 + 1 + 1 + \dots + 1) \dots \text{upto } N \text{ terms.}$
- e) Write a program using function that swaps two numbers passed as arguments. The change implement to the numbers inside the function should be reflected back to the variables used in main() function. [3]
- f) Write a program using function that accepts two numbers and a character as an argument and returns the result of operation indicated by the character ( + , - , \* , / , % ). If the value passed in character is other than arithmetic operators the function should return the value -32767. Write main function that invokes this UDF with different values inputted by the user till the user desires. (assuming '\*' as default value for the character argument) [4]
- g) Write a program using function that accepts radius and height as an argument and returns the volume of a cone.  $(V = \frac{1}{3}\pi r^2 h)$  [3]

-X-X-X-X-X-X-X-