

Name:

Enrolment No:



**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, May 2019**

**Programme Name:** B. Tech. EE-Spz-(BCT)/ EE-Spz-(IOT)/ EE

**Course Name :** Computer Programming Techniques

**Course Code :** ELEG 384

**Nos. of page(s) :** 10

**Semester :** VI

**Time :** 03 hrs

**Max. Marks :** 100

**Instructions:**

**SECTION A [20 Marks]**

S. No.		Marks	CO
Q 1.	<p><b>Choose the correct option:</b></p> <p><b>i. Which special symbol is allowed in a variable name?</b> a) ! b)   c) * d) _</p> <p><b>ii. Which is the only ternary operator in C++?</b> a) ?: b) &amp;&amp; c) *= d) &lt;&lt;</p> <p><b>iii. Which of the following statement is true about the function func?</b></p> <pre>void func(int x, int y) { x- -; y- -;   return (x+y); }</pre> <p>a) The sum of x and y b) The sum of the decremented value of x and y c) returns a pointer to the sum of the decremented value of x and y d) Compilation Error: return value type does not match the function type</p>	[1+1+2 	CO1, CO2
Q 2.	<p><b>Look at the following code segment and decide which statement(s) is/are correct:</b></p>	4	CO2

	<pre> int main() { char m = 4;   const char n = 5;   const char * p = &amp;n;   char * const q = &amp;m;    n = 6; // stmt-1   *p = 7; // stmt-2   p = &amp;m; // stmt-3   *q = 8; // stmt-4    return 0; } </pre> <p>a. stmt-1 b. stmt-2 c. stmt-3 d. stmt-4</p>		
<p>Q 3.</p>	<pre> #include &lt;iostream&gt; using namespace std;  inline int SQR(int x) { return x * x; }  int main() {   int a , b, c;   a = 10, b = 14; b = SQR(a);   cout &lt;&lt; b &lt;&lt; endl;   c = SQR(++a);   cout &lt;&lt; c &lt;&lt; endl;   return 0; } </pre> <p>a. 100 121 b. Compilation Error: invalid function definition c. 100 132 d. Compilation Error: invalid function parameter</p>	<p>4</p>	<p>CO1</p>
<p>Q 4.</p>	<p>Define Lambda function. Write a lambda function to find area of circle in Python language.</p>	<p>4</p>	<p>CO3</p>

<b>Q5.</b>	<p><b>Guess the output of the following programme:</b></p> <pre><b>#include &lt;iostream&gt; using namespace std; int sum(int a, int b, int c) { return a*b*c; }  int main() { int (*function_pointer)(int, int, int);   function_pointer = sum;   cout&lt;&lt; function_pointer(1, 4.5, 5);   return 0; }</b></pre> <p><b>a) 22.5</b> <b>b) Compilation Error: Error in function arguments</b> <b>c) 20</b> <b>d) Compilation Error: Invalid assignment of sum</b></p>	<b>4</b>	<b>CO2</b>
<b>SECTION B [40 Marks]</b>			

Q 6.

Consider the following code segment:

```
class A
{ public:
virtual void f(int) {}
virtual void g(double) {}
virtual void d(char) {}
int h(A *) {}
};
```

```
class B: public A
{ public:
void f(int) {}
virtual int h(B *) {}
};
```

```
class C: public B
{ public:
void g(double) {}
void d(char) {}
int h(B *) {}
};
```

*What will be the content of the virtual function table (VFT) for the instance of class C in correct order?*

- a. C::g(C\*const, double)  
C::d(C\*const, char)  
C::h(C\*const, B\*)  
B::f(B\*const, int)
- b. B::f(B\*const, int)  
C::g(C\*const, double)  
C::d(C\*const, char)  
C::h(C\*const, B\*)
- c. C::d(C\*const, char)  
C::h(C\*const, B\*)  
C::g(C\*const, double)  
B::f(B\*const, int)
- d. B::f(B\*const, int)  
C::d(C\*const, char)  
C::h(C\*const, B\*)  
C::g(C\*const, double)

10

CO2

**Q 7.**

```
#include<iostream>
using namespace std;
```

```
class PTR
{
public:
    int seven;

    PTR(int five)
    {
        cout << "A constructor is called" << endl;
        seven=five;
    }
    PTR ()
    {
        cout << "A default constructor is called " << endl;
    }

    ~PTR ()
    {
        cout << "Destructing " << seven << endl;
    }

    int add()
    {
        return(seven+seven);
    }
};

int main()
{
    PTR myobj1(5);
    PTR myobj2;

    cout << myobj1.seven << endl;
    cout << "Enter a number : " ;

    cin >> myobj2.seven;
    cout << myobj2.add() << endl;

    return(0);
}
```

**Go through the aforementioned code and endeavor to suggest the expected results to be obtained at Output screen.**

10

CO1,  
CO2

Q 8.	<p>Write the prototype/syntax for the following in C++:</p> <p>(a) Ternary operator  (b) Virtual function  (c) Overloading new operator  (d) Run time binding for an array of size [25]  (e) A reference for a variable</p>	10	CO1, CO2
Q 9.	<p>Write a program in C++ to implement the friend function 'print()' which is a member of class TWO and accesses the private data members a and b of class ONE.</p> <p style="text-align: center;">OR</p> <p>Define arrays in python. Find maximum number in a given array of 10 (TEN) elements.</p>	10	CO2  CO3
<b>SECTION-C [40 Marks]</b>			
Q 10.			
(a)	<p>What will be the output of the following code?</p> <pre>#include &lt;iostream&gt; using namespace std;  class B { int id; public: static int count;       B() { count++;            id = count;            cout &lt;&lt; id &lt;&lt; " ";            } };  class D : public B { int n;   public: D(){count- -;            n = count;            cout &lt;&lt; n &lt;&lt; " ";            } };  int B::count = 5;</pre>	4	CO2

	<pre> int main() { B *basePtr = new D[2]; delete [] basePtr; return 0; } </pre> <p><b>Output of the Code is:</b></p> <p>a) 1 2 2 1  b) 1 2 3 4  c) 6 7 8 9  d) 6 5 6 5</p>		
(b)	Define class & object with the help of an example.	4	CO2
(c)	<i>A class can be called as polymorphic if it contains:(Multiple Choice Question)</i>  a. Virtual functions of its own b. Virtual functions of base classes c. Pure virtual functions d. Member functions and Virtual functions	4	CO1, CO2
(d)	Fill up the missing code segment by following the comments below such that output matches the test cases.  <pre> #include &lt;iostream&gt; using namespace std;  /* Write the function header and body of display() which takes single generic parameter and prints it's value */  _____ // Provide suitable template signature  void display(____ x) // Make x as a generic parameter { cout &lt;&lt; x &lt;&lt; " "; }  /* Write overladed display() which takes two generic parameters and prints the values */  _____ // Provide suitable template signature </pre>	8	CO2

	<pre> void display(____ x, ____ y) // Make x and y as generic parameters { cout &lt;&lt; x &lt;&lt; " " &lt;&lt; y &lt;&lt; endl; }  int main() { double d; int i; char c; cin &gt;&gt; i; cin &gt;&gt; d; cin &gt;&gt; c;  display(c); display(i, d); display(c, d);  return 0; } </pre>		
<p><b>Q 11.</b></p>			
<p><b>(a)</b></p>	<p>Write a program in the Python language using an if else statement in combination with a while loop to calculate the sum of natural numbers upto “num”(to be decided by the user).</p> <p style="text-align: center;"><b>OR</b></p> <p>Differentiate between the operational and structural functionality of C++ and PYTHON language.</p>	<p><b>10</b></p>	<p><b>CO3</b></p>
<p><b>(b)</b></p>	<p>Distinguish between the keywords, “new” and malloc() function. Write a program in C++ to overload operator “new” via actively utilizing the malloc() function.</p> <p style="text-align: center;"><b>OR</b></p> <p>Write the adequate comment(s) against the expression(s) of the undermentioned code of Exception Handling:</p> <pre> #include&lt;iostream&gt; using namespace std; int main() </pre>	<p><b>10</b></p>	<p><b>CO2</b></p>



```

{
    int p,c,m,err=0;
    string name;

    do
    {
        try //C1;
        {
            cout<<"Enter studentname : ";
            cin>>name;
            cout<<"Enter physics marks : ";
            cin>>p;

            if(!(p>=0 && p<=100)) //C2
            {
                throw(p); //C3
            }
            cout<<"Enter chemistry marks : ";
            cin>>c;

            if(!(c>=0 && c<=100)) //C4
            {
                throw(c); //C5
            }

            cout<<"Enter mathsmarks : ";
            cin>>m;

            if(!(m>=0 && m<=100)) //C6
            {
                throw(m); //C7
            }
            err=0; //C8
        }

        catch(int e)
        {
            cout<<"Invalid Marks"<<endl; //Showing error;
            err=1; //C9
        }

    }while(err); //C10
}

```

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**SECTION A [20 Marks]**

S. No.		Marks	C
Q 1.	<p><b>Choose the correct option(s):</b></p> <p><b>A. Which special symbol is/are not allowed in a variable name?</b> a) ! b)   c) * d) _</p> <p><b>B. Which one is the binary operator in C++?</b> a) * b) ++ c) -- d) ?:</p> <p><b>C. Which of the following statement is false about the function add?</b></p> <pre>void add(double x, double y) {     x- -;     y- -;     return (x+y); }</pre> <p>a) The sum of x and y b) The sum of the decremented value of x and y c) returns a pointer to the sum of the decremented value of x and y d) <b>Compilation Error: return value type does not match the function type</b></p>	[1+1+2 ]	CC CC

Q 2.

This program takes two matrices of order ( $r \times c$ ) and stores it in two-dimensional array. Suggest the expected output of the following code:

```
#include <iostream>
using namespace std;

int main()
{
    int r, c, a[100][100], b[100][100], sum[100][100], i, j;

    cout << "Enter number of rows (between 1 and 100): ";
    cin >> r;

    cout << "Enter number of columns (between 1 and 100): ";
    cin >> c;

    cout << endl << "Enter elements of 1st matrix: " << endl;

    // Storing elements of first matrix entered by user.

    for(i = 0; i < r; ++i)
        for(j = 0; j < c; ++j)
        {
            cout << "Enter element a" << i + 1 << j + 1 << " : ";
            cin >> a[i][j];
        }

    // Storing elements of second matrix entered by user.

    cout << endl << "Enter elements of 2nd matrix: " << endl;
    for(i = 0; i < r; ++i)
        for(j = 0; j < c; ++j)
        {
            cout << "Enter element b" << i + 1 << j + 1 << " : ";
            cin >> b[i][j];
        }

    // Adding Two matrices

    for(i = 0; i < r; ++i)
        for(j = 0; j < c; ++j)
            sum[i][j] = a[i][j] + b[i][j];

    // Displaying the resultant sum matrix.
```

	<pre> cout &lt;&lt; endl &lt;&lt; "Sum of two matrix is: " &lt;&lt; endl; for(i = 0; i &lt; r; ++i)     for(j = 0; j &lt; c; ++j)     {         cout &lt;&lt; sum[i][j] &lt;&lt; " ";         if(j == c - 1)             cout &lt;&lt; endl;     }  return 0; } </pre>		
Q 3.	<pre> #include &lt;iostream&gt; using namespace std;  inline int SQR(int s) { return s * s; }  int main() {     int a , b, c;     a = 20, b = 11; b = SQR(a);     cout &lt;&lt; b &lt;&lt; " ";     c = SQR(- a);     cout &lt;&lt; c &lt;&lt; endl;     return 0; } </pre> <p> a. 400 121  b. Compilation Error: invalid function definition  c. 400 400  d. Compilation Error: invalid function parameter </p>	4	CC
Q 4.	<p>Define Lambda function in the PYTHON language. How this function could be exploited to enable user as a powerful tool?</p>	4	CC
Q5. (a)	<p>Guess the output of the following programme:</p> <pre> #include &lt;iostream&gt; using namespace std;  class programming </pre>	2+2	CC CC

```

    {
    public:
    void output(); //function declaration
    };

    void programming::output()
    {
    cout << "Function defined outside the class.\n";
    }

    int main() {
    programming x;
    x.output();

    return 0;
    }

```

(b)

```

#include<iostream>

using namespace std;

int main()
{
    int a[20],n,x,i,pos=0;
    cout<<"Enter size of array:";
    cin>>n;
    cout<<"Enter the array in ascending order:\n";

    for(i=0;i<n;++i)
        cin>>a[i];

    cout<<"\nEnter element to insert:";
    cin>>x;

    for(i=0;i<n;++i)
        if(a[i]<=x&&x<a[i+1])
        {
            pos=i+1;
            break;
        }

    for(i=n+1;i>pos;--i)
        a[i]=a[i-1];

    a[pos]=x;

```

	<pre> cout&lt;&lt;"\n\nArray after inserting element:\n";  for(i=0;i&lt;n+1;i++)     cout&lt;&lt;a[i]&lt;&lt;" ";  return 0; } </pre>		
--	---------------------------------------------------------------------------------------------------------------------------------------	--	--

**SECTION B [40 Marks]**

<p><b>Q 6.</b></p>	<p><b>Go through the following code and try to get the output for the same:</b></p>	<p><b>5+5</b></p>	<p><b>CC</b> <b>CC</b></p>
<p><b>(a)</b></p>	<pre> #include &lt;iostream&gt;  using namespace std;  long add(long, long); float add(float, float);  int main() {     long a, b, x;     float c, d, y;      cout &lt;&lt; "Enter two integers\n";     cin &gt;&gt; a &gt;&gt; b;      x = add(a, b);      cout &lt;&lt; "Sum of integers: " &lt;&lt; x &lt;&lt; endl;      cout &lt;&lt; "Enter two floating point numbers\n";     cin &gt;&gt; c &gt;&gt; d;      y = add(c, d);      cout &lt;&lt; "Sum of floats: " &lt;&lt; y &lt;&lt; endl;      return 0; }  long add(long x, long y) {     long sum; </pre>		

	<pre> sum = x + y;  return sum; }  float add(float x, float y) { float sum;  sum = x + y;  return sum; }  (b) #include &lt;iostream&gt;  using namespace std;  /* Number of arguments are different */  void display(char []); // print the string passed as argument void display(char [], char []);  int main() { char first[] = "C programming"; char second[] = "C++ programming";  display(first); display(first, second);  return 0; }  void display(char s[]) { cout &lt;&lt; s &lt;&lt; endl; }  void display(char s[], char t[]) { cout &lt;&lt; s &lt;&lt; endl &lt;&lt; t &lt;&lt; endl; } </pre>		
Q 7.	“If you allocate memory using ‘new’, then it will remain allocated until the program exits unless you explicitly deallocate with ‘delete’.”	10	CC

	Keeping in mind the aforementioned statement, write a code in C++ to depict the similar behavior and fetch the desired offshoot.		
Q 8.	Write the prototype/syntax for the following in C++:  (f) new operator (g) Pure virtual function (h) Overloading delete operator (i) Run time binding for an array of size [16] of any data type (j) A reference to the pointer of double type	10	CC CC
Q 9.	Write a program in C++ to implement the abstract class such that all its essential features are illustrated. Include the appropriate header files (if required).  OR  Define arrays in python. Find minimum number in a given array of 07 (Seven) elements.	10	CC  CC
<b>SECTION-C [40 Marks]</b>			
Q 10.			
(a)	Enlist the intrinsic properties of Operator overloading.	4	CC
(b)	Write a code in C++ using exit() function( when called) to terminate any program.	4	CC
(c)	Write a program in C++ to depict the behavior of dominating a data member and over-riding a member function using the concept of “class”. Also, indicate the adequate comment against each expression.	10	CC
(d)	Consider the following code segment. Assume that the sizeof(double)= 8. What will be the size of the object derived?  class base { double arr[5]; }; class base1 : public base { }; class base2: public base { }; class derived: public base1, public base2 { };	02	CC CC



	<p>a) 40  b) 20  c) 80  d) 88</p>		
Q 11.			
(a)	<p>A number is said to be palindrome if it is equal to its reverse. For example 121, 555, etc are palindrome while 124, 367, etc are not.</p> <p>Write a Python Program to Check whether the entered number is Palindrome?</p> <p style="text-align: center;"><b>OR</b></p> <p>Write a code in PYTHON to calculate a Fibonacci series for a user defined input.</p>	<b>10</b>	<b>CC</b>
(b)	<p>Ambiguity usually occurs during Multiple Inheritance. State the reason of this ambiguity and write a program in C++ to resolve this ambiguity via following:</p> <ol style="list-style-type: none"> <li>1. Using Scope Resolution Operator</li> <li>2. Using virtual Base class</li> </ol> <p style="text-align: center;"><b>OR</b></p> <p>There are some standard exceptions in C++ under &lt;exception&gt; which we can use in our programs.  Elaborate the following Exception(s):</p> <ol style="list-style-type: none"> <li>I. std::exception</li> <li>II. logic_error</li> <li>III. domain_error</li> <li>IV. invalid_argument</li> <li>V. out_of_range</li> <li>VI. length_error</li> <li>VII. runtime_error</li> <li>VIII. range_error</li> <li>IX. overflow_error</li> <li>X. underflow_error</li> </ol>	<b>10</b>	<b>CC</b>