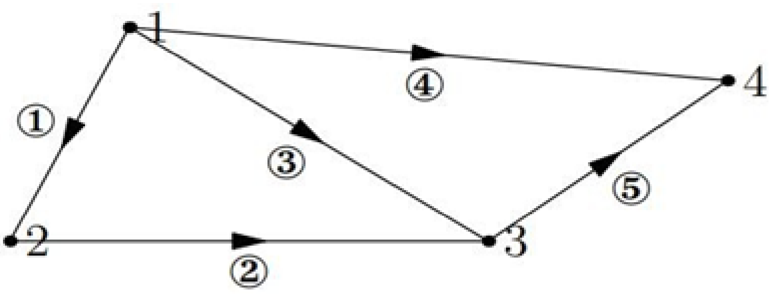
Name:
Enrolment No:

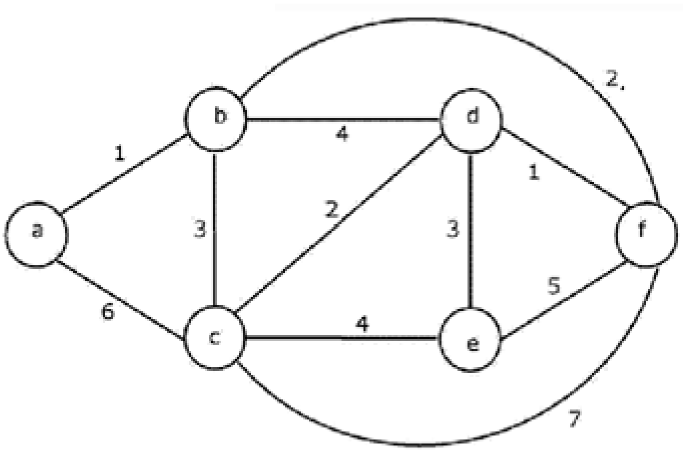
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, July 2020

Programme Name: B.Tech. (CSE), G&G **Semester : II**
Course Name : Advance Data Structures **Time : 02 hrs**
Course Code : CSEG1004 **Max. Marks : 100**
Nos. of page(s) : 11
Instructions: Attempt all the questions.

Q1.	 Find the order of the Incidence Matrix for the above graph. [CO5] **1. 5 x 4** 2. 5 x 5 3. 4 x 5 4. 4X4	[2] [CO5]
Q2.	If a class contains pure virtual function, then it is termed as ______. 1. Virtual class 2. Static Class **3. Abstract Class** 4. Local Class	[1] [CO2]
Q3.	A binary search tree is generated by inserting in order the following integers: 50, 15, 62, 5, 20, 58, 91, 3, 8, 37, 60, 24 The number of the node in the left sub-tree and right sub-tree of the root, respectively, is 1. (4, 7) **2. (7, 4)** 3. (8, 3) 4. (3, 8)	[3] [CO4]
Q4.	If a node having two children is to be deleted from binary search tree, it is replaced by its 1. In-order predecessor **2. In-order successor** 3. Pre-order predecessor 4. Both (a) and (b)	[1] [CO4]

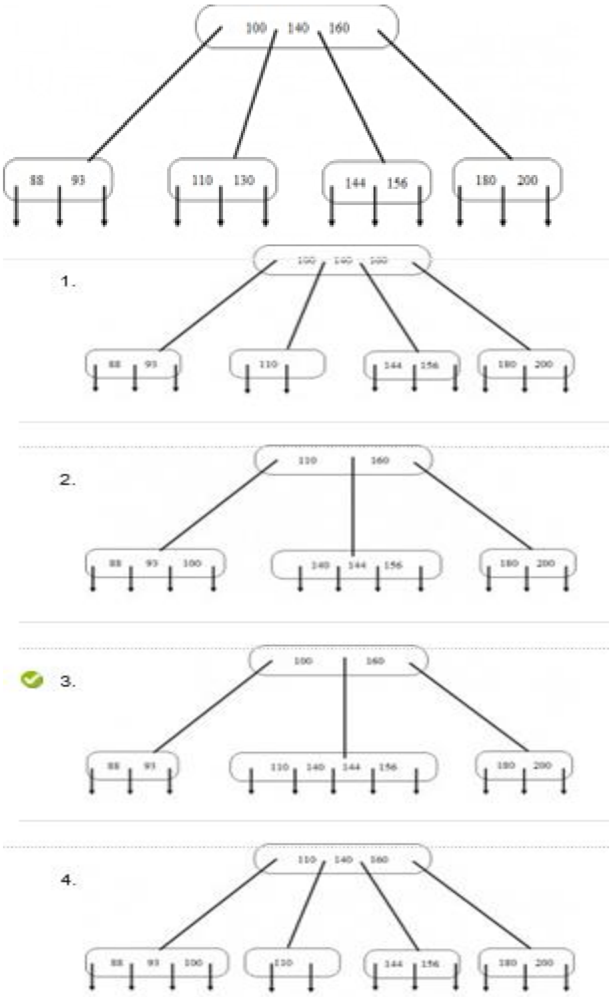
Q5.	To perform File I/O operations, we must use **______**header file. 1. < ifstream> **2. < fstream>** 3. < iostream> 4. < stream>	[1] [CO3]
Q6.	Which type of traversal of binary search tree outputs the value in sorted order? 1. pre-order 2. post-order **3. In-order** 4. None	[1] [CO4]
Q7.	Which of the following is the correct operator to compare two variables? **1. ==** 2. = 3. := 4. equal	[1] [CO1]
Q8.	'new' operator returns **______**value if dynamic memory allocation is unsuccessful. 1. False **2. Null** 3. Zero 4. None	[1] [CO1]
Q9.	A BST has numbers between 1 and 1000. Which of the following sequence could not be the sequence of the node examined to search for the number 363? 1. 2, 252, 401, 398, 330, 344, 397, 363 2. 924, 220, 911, 244, 898, 258, 362, 363 **3. 925, 202, 911, 240, 912, 245, 258, 363** 4. 2, 399, 387, 219, 266, 382, 381, 278, 363	[3] [CO4]
Q10.	A Simple graph has no loops. What other property should a simple graph have? 1. It must have atleast one vertex 2. It must be not be undirected 3. It must be not be unweighted **4. It must have not have any multi-edge**	[1] [CO5]
Q11.	A base class will 1. offer more specific objects than its derived classes **2. be a generalized version of its derived classes** 3. correspond to something in the rest of the program 4. None	[1] [CO1]
Q12.	A class whose definition depends on a user-specified type is called **1. template** 2. enumerated class 3. polymorphic class 4. none	[1] [CO1]
Q13.	A graph can be represented using 1. Vertex List and Edge List 2. Vertex List and Adjancency Matrix 3. Vertex List and Adjacency List **4. All**	[1] [CO4]
Q14.	A priority queue is implemented as a Max-Heap. Initially, it has 5 elements. The level- order traversal of the heap is: 10, 8, 5, 3, 2. Two new elements 1 and 7 are inserted into the heap in that order. The level-order traversal of the heap after the insertion of the elements is: **1. 10, 8, 7, 3, 2, 1, 5** 2. 10, 8, 7, 2, 3, 1, 5	[3] [CO4]

<table>
<tr><td></td><td>3. 10, 8, 7, 1, 2, 3, 5
4. 10, 8, 7, 5, 3, 2, 1</td><td></td></tr>
<tr><td>Q15.</td><td>A virtual function that has no definition within the base class is called .
1. Pure virtual function
2. virtual function
3. Friend function
4. Pure static function</td><td>[1]
[CO1]</td></tr>
<tr><td>Q16.</td><td>Question A[(i + f(j))mod N] where is used for j = 0, 1, 2, ... and f(j) $=j^2$
1. Linear Probing
2. Quadratic Probing
3. Double Hashing
4. Multiple Hashing</td><td>[2]
[CO3]</td></tr>
<tr><td>Q17.</td><td>At what position the number 72 gets inserted in the following table?
<table>
<tr><td>Index</td><td>Key</td></tr>
<tr><td>0</td><td>22</td></tr>
<tr><td>1</td><td>34</td></tr>
<tr><td>2</td><td></td></tr>
<tr><td>3</td><td></td></tr>
<tr><td>4</td><td></td></tr>
<tr><td>5</td><td>56</td></tr>
<tr><td>6</td><td></td></tr>
<tr><td>7</td><td>18</td></tr>
<tr><td>8</td><td>41</td></tr>
<tr><td>9</td><td></td></tr>
<tr><td>10</td><td></td></tr>
</table>
1. 2
2. 4
3. 6
4. 9</td><td>[2]
[CO3]</td></tr>
<tr><td>Q18.</td><td>Compile time polymorphism in C++ language are
1. Operator overloading
2. Function overloading
3. Function overriding
4. Function overloading and Operating overloading both</td><td>[1]
[CO2]</td></tr>
<tr><td>Q19.</td><td>Question Consider a binary max-heap implemented using an array. Which one of the following array represents a binary max-heap?
1. 25,12,16,13,10,8,14
2. 25,12,16,13,10,8,14
3. 25,14,16,13,10,8,12
4. 25,14,12,13,10,8,16</td><td>[2]
[CO4]</td></tr>
<tr><td>Q20.</td><td>Consider the following array of elements. The minimum number of interchanges needed to convert it into a max-heap is
⟨89, 19, 50, 17, 12, 15, 2, 5, 7, 11, 6, 9, 100⟩.
1. 4
2. 5
3. 2
4. 3</td><td>[3]
[CO4]</td></tr>
<tr><td>Q21.</td><td>Consider the following graph:</td><td>[3]</td></tr>
</table>

	 Which one of the following cannot be the sequence of edges added, in that order, to a minimum spanning tree using Kruskal's algorithm? 1. (a—b),(d—f),(b—f),(d—c),(d—e) 2. (a—b),(d—f),(d—c),(b—f),(d—e) 3. (d—f),(a—b),(d—c),(b—f),(d—e) **4. (d—f),(a—b),(b—f),(d—e),(d—c)**	[CO5]
Q22.	Directed graph can also be called as 1. Bigraph 2. Direct graph 3. Bigraph and Direct Graph **4. None**	[1] [CO5]
Q23.	False statements about function overloading is 1. Defining multiple functions with same name in a class is called function overloading 2. Overloaded function must differ in their order and types of arguments. **3. Overloaded functions should be preceded with virtual keyword** 4. No statement is false	[1] [CO2]
Q24.	Find the wrong statement/s about Abstract Class. 1. We cannot create its objects. **2. We cannot create pointers to an abstract class.** 3. It contains at least one pure virtual function. 4. We can create references to an abstract class.	[1] [CO1]
Q25.	Following keyword is used before a function in a base class to be overridden in derived class in C++ 1. override **2. virtual** 3. void 4. static	[1] [CO2]
Q26.	Given graph G = (V, E) where V = {A, B, C, D, E, F, G} and E = {(A, D), (B, A), (B, C), (C, D), (C, F), (C, G), (E, C), (E, D), (F, A), (F, E), (G, B)}. Edge (s) is unused during the BFS traversal starting at node B. 1**. (C,D), (E,C), (E,D), (F,A), (G,B)** 2. (C,F), (E,C), (E,D), (F,A), (G,B) 3. (C,D), (E,C), (E,D), (F,E), (G,B) 4. (A,D), (C,D), (E,C), (F,A), (G,B)	[2] [CO5]
Q27.	How many access specifiers are present in C++? 1. 4 2. 1 **3. 3**	[1] [CO1]

	4. 2	
Q28.	How many distinct BSTs can be constructed with 3 distinct keys? 1. 4 **2. 5** 3. 6 4. 9	[2] [CO3]
Q29.	How many times a constructor is called in the life-time of an object? **1. Only once** 2. Twice 3. Depends on the way of creation of object 4. Thrice	[1] [CO1]
Q30.	In an undirected graph, the path <A,B,E,H,D,A,C> and <A,B,F,H,E,B,A,D> is called as **1. Trail and Walk** 2. Walk and simple Path 3. Walk and Path 4. Path and Trail	[1] [CO5]
Q31.	In a binary tree possible traversing is/are 1. Inorder 2. Preorder 3. Postorder **4. All of the above**	[1] [CO4]
Q32.	Linear Probing: We try to insert Item = (k, e) into bucket A[i] and find it full so the next bucket we try is: 1. A[(i + 1) mod N] 2. A[(i + i) mod N] 3. A[(i*i + 1) mod N] 4. A[(i + 1) mod N] then try A[(i + 2) mod N], etc.	[2] [CO3]
Q33.	Number of external nodes in a full binary tree with n internal nodes is? 1. n **2. n+1** 3. 2n 4. 2n+1	[2] [CO4]
Q34.	Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty binary search tree. The binary search tree uses the usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree? 1. 7 5 1 0 3 2 4 6 8 9 2. 0 2 4 3 1 6 5 9 8 7 **3. 0 1 2 3 4 5 6 7 8 9** 4. 9 8 6 4 2 3 0 1 5 7	[3] [CO4]
Q35.	The natural mapping of heap tree is 25,14,16,13,10,8,12. What is the content of the array after two delete operations? 1. 14,13,12,10,8 2. 14,12,13,8,10 3. 14,13,8,12,10 **4. 14,13,12,8,10**	[3] [CO4]
Q36.	What is direct addressing? **1. Distinct array position for every possible key** 2. Fewer array positions than keys 3. Fewer keys than array positions 4. Same array position for all keys	[1] [CO3]

Q37.	When a BST node having two children is deleted, it is replaced by its **1. Inorder Successor** 2. Inorder Predecessor 3. Preorder Successor 4. Postorder Successor	[1] [CO4]
Q38.	When a base class pointer points to derived class object .... **1. It can access only base class members** 2. It can access only derived class members 3. it can access both base class & derived class members 4. None	[1] [CO1]
Q39.	Which of the following concepts of OOPS means exposing only necessary information to client? 1. Encapsulation 2. Abstraction 3. Data binding **4. Data hiding**	[1] [CO1]
Q40.	Which of the following is a self-adjusting or self-balancing Binary Search Tree 1. Binary Search Tree **2. AVL Tree** 3. Threaded BST 4. m-way Tree	[1] [CO3]
Q41.	Which of the following is false with respect to inheritance? 1. When a base class is privately inherited, public members of the base class becomes private members of the derived class. 2. When a base class is publicly inherited, public members of the base class becomes public members of derived class. **3. When a base class is privately inherited, a private member of base class becomes private member of derived class.** 4. When a base class is publicly inherited, protected members of base class becomes protected members of derived class.	[1] [CO2]
Q42.	Which of the following is called when an object goes out of scope? 1. Constructor **2. Destructor** 3. Constructor and Destructor 4. Virtual function	[1] [CO1]
Q43.	Which of the following is not used to seek file pointer? **1. ios::set** 2. ios::end 3. ios::cur 4. ios::beg	[1] [CO3]
Q44.	Which of the following is used in hash tablesto determine the index of any input record? **1. hash function** 2. hash tree 3. hash chaining 4. none	[1] [CO3]
Q45.	Which of the following keyword is used to overload an operator? 1. overload **2. operator** 3. friend 4. virtual	[1] [CO2]
Q46.	Which of the following true about FILE *fp **1. FILE is a structure and fp is a pointer to the structure of FILE type**	[1] [CO3]

	2. FILE is a buffered stream 3. FILE is a keyword in C for representing files and fp is a variable of FILE type 4. FILE is a stream	
Q47.	Which of the following statement is correct? 1. A constructor of a derived class can access any public and protected member of the base class. 2. Constructor cannot be inherited but the derived class can call them. 3. A constructor of a derived class cannot access any public and protected member of the base class. **4. Both A and B.**	[1] [CO2]
Q48.	While inserting the elements 71, 65, 84, 69, 67, 83 in the sequence shown, the element in the in an empty binary search tree (BST) lowest level (leaf)is 1. 65 **2. 67** 3. 69 4. 83	[3] [CO3]
Q49.	ios::app is used for, If the file is opened for output operations and it already existed, it content is deleted and replaced by the new one True **False**	[1] [CO3]
Q50.	Figure shown below is B-tree of order 5. What is the result of deleting 130 from the tree? 	[3] [CO4]

Q51.	A B-tree of order 4 and of height 3 will have a maximum of keys. **1. 255** 2. 63 3. 127 4. 188	[2] [CO4]

Q52.	What will be the output of the following C++ code?
	#include <iostream>
	#include <string>
	using namespace std;
	class complex {
	int i; int j; public:
	complex(){}
	complex(int a, int b)
	{ i = a;
	j = b;
	} complex operator+(complex c)
	{ complex temp;
	temp.i = this->i + c.i; temp.j = this->j + c.j; return temp;
	}
	void show()
	{
	cout<<"Complex Number: "<<i<<" + i"<<j<<endl;
	}
	};
	int main(int argc, char const *argv[])
	{
	complex c1(1,2); complex c2(3,4);
	complex c3 = c1 + c2; c3.show();
	return 0;
	}
	1. Complex Number: 4 + i6
	2. Complex Number: 4 + i2
	3. Error
	4. Segmentation fault
		[2]
		[CO2]

Q53.	What will be the output of the following C++ code?
	#include <iostream>
	using namespace std;
	int main()
	{
	char *ptr;
	char Str[] = "abcdefg";
	ptr = Str;
	ptr += 5;
	cout << ptr;
	return 0;
	}
	1. fg
	2. cdef
	3. defg
	4. abcd
		[2]
		[CO2]

Q54.	What will be the output of the following C++ code? #include <iostream> using namespace std; class BaseClass	[2] [CO2]

```
{
protected:
int i;
public:
BaseClass(int x)
{
i  =  x;
}
~BaseClass()
{
}
};
class  DerivedClass:  public  BaseClass
{
int j;
public:
DerivedClass(int x, int y): BaseClass(y)
{
j  =  x;
}
~DerivedClass()
{
}
void  show()
{
cout  <<  i  <<  "  "  <<  j  <<  endl;
}
};
int  main()
{
DerivedClass  ob(3,  4);
ob.show();
return  0;
}
```

1. 4 3
2. 3 4
3. 3
4. 4

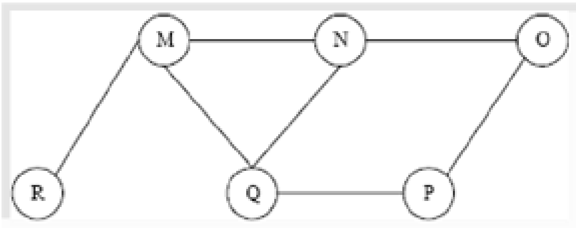
Q55. What will be the output of the following C++ code? [2] [CO1]

```
#include <iostream>
using namespace std;
class Box
{
double width;
public:
friend void printWidth( Box box );
void setWidth( double wid ); 9.          };
void  Box::setWidth(  double  wid  )
{
width  =  wid;
}
void  printWidth(  Box  box  )
{
box.width  =  box.width  *  2;
cout << "Width of box : " << box.width << endl;
```

	}
	int main( )
	{
	Box box;
	box.setWidth(10.0);
	printWidth(box);
	return 0;
	}
	1. 20
	2. 10
	3. 40
	4. 30	

Q56.	Predict the output of following C++ progran
	using namespace std;
	int i;
	class A
	{
	public:
	~A()
	{
	i=10;
	}
	};
	int foo()
	{
	i=3;
	A ob;
	return i;
	}
	int main()
	{
	cout << foo() << endl;
	return 0;
	}
	1. 3
	2. 0
	3. 10
	4. 5
		[2]
		[CO2]

Q57.	Assume that an integer takes 4 bytes and there is no alignment in following classes, predict the output.
	#include<iostream>
	using namespace std;
	class base {
	int arr[10];
	};
	class b1: public base { }
	class b2: public base { };
	class derived: public b1, public b2 {};
	int main(void)
	{
	cout << sizeof(derived);
	return 0;
	}
	1. 80
	2. 40
		[2]
		[CO1]

	3. 0 4. 4	
Q58.	Given the following input (4322, 1334, 1471, 9679, 1989, 6171, 6173, 4199) and the hash function x mod 10, which of the following statements are true? i. 9679, 1989, 4199 hash to the same value ii. 1471, 6171 has to the same value iii. All elements hash to the same value iv. Each element hashes to a different value 1. i only 2. ii only **3.i and ii only** 4. iii or iv	[3] [CO3]
Q59.	The Breadth First Search algorithm has been implemented using the queue data structure. One possible order of visiting the nodes of the following graph is  **1. QMNPRO** 2. MNOPQR 3. NQMPOR 4. QMNPOR	[3] [CO5]
Q60.	The Postorder Traversal pattern for a BST is 0, 2, 4, 6, 5, 3, 1, 8, 10, 9, 7. Find the inorder traversal pattern. 1. 7, 1, 0, 3, 2, 5, 4, 6, 9, 8, 10 2. 10, 8, 9, 6, 4, 5, 2, 3, 0, 1, 7 **3. 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10** 4. 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0	[3] [CO4]