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Question No: 37 (Marks: 2)
Write three important features of virtual functions.
Answer:- **Click here for detail**
These are one of the core components of C++ and enable different specializations of a base class. An important feature of the virtual function mechanism is that it is truly dynamic with respect to the resolution of the correct method to be called.

Question No: 38 (Marks: 5)
There are some errors in the code given below, you have to Indicate the line no. with error/s
Give the reason for error/s
Correct the error/s.

```
1. #include <iostream>
2. #include <stdlib.h>

3. using namespace std;
4. template <typename T>
5. class MyClass{
6. public:
7. MyClass(){
8. cout<<"This is class1"<<endl;
9. }
10. };
11.
```

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```
12. template <typename T>
13. class MyClass<int*>{
14. public:
15. MyClass(){
16. cout<<"This is class2"<<endl;
17. }
18. };
19.
20. int main(int argc, char *argv[])
21. {
22. MyClass<int> c1;
23. MyClass<int*> c2;
24. system("PAUSE");
25. return 0;
26. }
```

Answer: Correct Code

```
#include <iostream>
#include <stdlib.h>

using namespace std;
template <typename T>
class MyClass{
public:
MyClass(){
cout<<"This is class1"<<endl;
}
};

template <typename T>
class MyClasss{ // class MyClass<int*>{ templates we do not specify type in definition.
public:
MyClasss(){
cout<<"This is class2"<<endl;
}
};

int main(int argc, char *argv[])
{
MyClass<int> c1;
MyClasss<int> c2;*
system("PAUSE");
return 0;
}
```

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Question No: 39 (Marks: 5)
What is random iterator? What is its relation with vectors?
Answer:-
Random Access Iterators:-
They have all the capabilities of bidirectional Iterators plus they can directly access any element of a container.

You can think of vectors as smart arrays. They manage storage allocation for you, expanding and contracting the size of the vector as you insert or erase data. You can use vectors much like arrays, accessing elements with the [] operator. Such random access is very fast with vectors. as we can access any element of vector using its index so we can use random access iterator

It's also fast to add (or push) a new data item onto the end (the back) of the vector. When this happens, the vector's size is automatically increased to hold the new item.

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Create a vector array of length 8,and also initialize the elements of this array with values 0 1 2 3 4 5 6 7 (5 mark)

Suppose base class and derive class have a member function with same signature. Now call that member function through pointer to a base class object. Now what determines that the base class member function or derived class will be called? (mark 5)

Describe the salint feature of abstract class (mrk3)

Answer:- (Page 230)

Abstract class's objects cannot be instantiated they are used for inheriting interface and/or implementation, so that derived classes can give implementation of these concepts.
In C++, we can make a class abstract by making its function(s) pure virtual. Conversely, a class with no pure virtual function is a concrete class

Give the C++ code of template function to print the values of any type of array I int.this function will take 2 parameters one will be pointer and other will be will be size of array (mrk3)

Answer:- (Page 257)

```
template< typename T >
void printArray( T* array, int size )
{
for ( int i = 0; i < size; i++ )
cout << array[ i ] << ", "; // here data type of array is T
}
```

Give the name of three operation that a corsor or itrator generally provide (mrk3)

Answer:- (Page 305, 309)

- T* first()
- T* beyond()
- T* next(T*)

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What do you know about function Template?
(Answer: Page 262)
Function templates are used when we want to have exactly identical operations on different data types in case of function templates we cannot change implementation from data type to data type however we can specialize implementation for a particular data type.

Give the basic difference between iterator and cursors?
Answer:- (Page 308)
cursors were external pointer that we accessing internal data of any container like vector, it is against the principle of data hiding as we can access any container data using cursors so it is not good programming practice to given access in container for the use of cursors (first, next, beyond methods) we have alternate to cursors in the form of Iterators which are that traverse a container without exposing its internal representation.

The least one advantage and Disadvantage of Template
Answer:- (Page 300)
Advantages:
Templates provide
• Reusability
• Writability

Disadvantages:
• Can consume memory if used without care.

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1-define composition and give its example with coding

Answer:- (Page 53)

An object may be composed of other smaller objects, the relationship between the "part" objects and the "whole" object is known as Composition.

Example

Ali is made up of different body parts; They can't exist independent of Ali.

2-what are container classes? How many types of container classes are there?

Answer:- (Page 312)

Container is an object that contains a collection of data elements like we have studied before now we will study them in detail.

STL provides three kinds of containers,

1. Sequence Containers
2. Associative Containers
3. Container Adapters

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3-what is virtual inheritance?

Answer:- (Page 253)

In virtual inheritance there is exactly one copy of the anonymous base class object

4-can a constructor throw exception? If it fails, how should this error be handled?

Answer:- **Click here for detail**

One-stage constructors should throw if they fail to fully initialize the object. If the object cannot be initialized, it must not be allowed to exist, so the constructor must throw.

5-define inheritance and give its example.

Answer:- (Page 29)

- Derived class inherits all the characteristics of the base class
- Besides inherited characteristics, derived class may have its own unique characteristics
- Major benefit of inheritance is reuse

7-what is constructor?

Answer:- (Page 74)

Constructor is used to **initialize** the objects of a class. Constructor is used to ensure that object is in well defined state at the time of creation.

8-define static and dynamic binding.

Answer:- (Page 227)

Static binding means that target function for a call is selected at compile time

Dynamic binding means that target function for a call is selected at run time

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Q1) Fill in the blanks below with public, protected or private keyword.

a. Public members of base class are _____ members of derived class
b. Protected members of base class are _____members of derived class.

Answer:-
a. Public members of base class are _____ **public** _____ members of derived class
b. Protected members of base class are _____ **protected** _____members of derived class.

Q2) Can a constructor throws an exception? How to handle the error when the constructor fails?
Answer:- Repeated

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Q3) What is the difference (if any) between the two types of function declarations?
template function_declaration;
template function_declaration;

Answer:- **Click here for detail**
The format for declaring function templates with type parameters is:

template <class identifier> function_declaration;
template <typename identifier> function_declaration;

The only difference between both prototypes is the use of either the keyword class or the keyword typename. Its use is indistinct, since both expressions have exactly the same meaning and behave exactly the same way.

Q4) State any two reasons why the virtual methods can not be static?
Answer:- **Click here for detail**
The virtual method implies membership, so a virtual function cannot be a nonmember function. Nor can a virtual function be a static member, since a virtual function call relies on a specific object for determining which function to invoke. A virtual function declared in one class can be declared a friend in another class.

Q5) Give three advantages that Iterators provide over Cursors.
Answer: - (Page 311)
a. With Iterators more than one traversal can be pending on a single container
b. Iterators allow to change the traversal strategy without changing the aggregate object
c. They contribute towards data abstraction by emulating pointers

Q6) Consider the code given below explain what kind of association exists between class A and class B. Justify your answer as well.

```
class A{

private:
int a,b,c;

public:
....
};

class B{

private:
int d,e,f;
A obj1;

public:
```

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....
};

Q7) If we declare a function as friend of a template class will it be a friend for a particular data type or for all data types of that class.

Q8) Is it possible to have Virtual Constructor? Justify your answer.
Answer: - http://r4r.co.in/answer.php?id=1966&option=C++%20Subjective
There is nothing like Virtual Constructor. The Constructor cant be virtual as the constructor is a code which is responsible for creating a instance of a class and it cant be delegated to any other object by virtual keyword means.

Q9) Explain the difference between static member variables with Non-static member variables of a class with the help of example.

Q10) There are some errors in the code given below, you have to
1. Indicate the line no. with error/s
2. Give the reason for error/s
3. Correct the error/s.

```
1. #include (header extension is missing
2. #include
3. using namespace std;
4. template
5. class MyClass{
6. public:
7. MyClass(){
8. cout"This is class1"endl;
9. }
10. };
11. template
12. class MyClass{
13. public:
14. MyClass(){
15. cout"This is class2"endl;
16. }
17. };
18. int main(int argc, char *argv[])
19. {
20. MyClass c1;
21. MyClass c2;
22. system("PAUSE");
23. return 0;
}
```

Answer: - Repeated

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Q11) What is a container class? What are the types of container classes?
Answer: - Repeated

Q12) What is a Virtual Destructor? Why we use Virtual Destructors.
Answer: - Repeated

1.What are container requirements (5)
Answer:- Repeated

2. Give the name of two cases when you MUST use initialization list as opposed to assignment in constructors. 5
Answer:- Click here for detail
Both non-static const data members and reference data members cannot be assigned values; instead, you should use initialization list to initialize them.

3. In which situation do we need to implement Virtual inheritance? explain with an example (5 marks)
Answer:-
In multiple inheritance while solving diamond problem virtual inheritance need to implement. The solution of avoid this problem is virtual inheritance so that in multiple inheritance only one copy of base class is generated as shown below instead of two separate copies.

In virtual inheritance there is exactly one copy of the anonymous base class object
Example:

```
class Vehicle{
protected:
int weight;
};
class LandVehicle :
public virtual Vehicle{
};
class WaterVehicle :
public virtual Vehicle{
};
Example
class AmphibiousVehicle:
public LandVehicle,
public WaterVehicle{
public:
AmphibiousVehicle(){
weight = 10;
}
```

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};

4. What is random iterator? what is th relation between Random iterator and vector?
Answer:- rep

5. Give C++ code of template function to print the values of any type of array.. 3Marks
[Hint: this function will take teo parameters, one will be array pointer and other will be size of the array]

6. if iter is an iterator to a container. Write an expression that will have the value of the object pointed to by iterator, and will then cause iterator to point to the next element. (3marks)
Answer:-
*iter++

7. Describe three problems with multiple inheritance (3 marks)
Answer:- (Page 248)

- If more than one base class have a function with same signature then the child will have two copies of that function
- Calling such function will result in ambiguity

8. Name two types of template (2 Marks)
Answer:- (Page 256)
a. Function Templates (in case we want to write general function like printArray)
b. Class Templates (in case we want to write general class like Array class)

9. Sort data in the order in which compiler searches a function. Complete specialization, generic template, Partial specialization, Ordinary function. (2Marks)
Answer:- (Page 286)
a. First of all compiler looks for complete specialization
b. If it can not find any required complete specialization then it searches for some partial specialization
c. In the end it searches for some general template

10. Give the names of two types of containers basically known as first class containers.(2 Marks)
Answer:- (Page 317)
Sequence and associative containers are collectively referred to as the first-class containers

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