**********"Polymorphism"**********

1. Which among the following best describes polymorphism?
a) It is the ability for a message/data to be processed in more than one form
b) It is the ability for a message/data to be processed in only 1 form
c) It is the ability for many messages/data to be processed in one way
d) It is the ability for undefined message/data to be processed in at least one way
View Answer

Answer: a
Explanation: It is actually the ability for a message / data to be processed in more than one form. The word polymorphism indicates many-forms. So if a single entity takes more than one form, it is known as polymorphism.
2. What do you call the languages that support classes but not polymorphism?
a) Class based language
b) Procedure Oriented language
c) Object-based language
d) If classes are supported, polymorphism will always be supported
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Answer: c
Explanation: The languages which support classes but doesn't support polymorphism, are known as object-based languages. Polymorphism is such an important feature, that is a language doesn't support this feature, it can't be called as a OOP language.
3. Which among the following is the language which supports classes but not polymorphism?
a) SmallTalk
b) Java
c) C++
d) Ada
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Answer: d
Explanation: Ada is the language which supports the concept of classes but doesn't support the polymorphism feature. It is an object-based programming language. Note that it's not an OOP language.

4. If same message is passed to objects of several different classes and all of those can respond in a different way, what is this feature called?
a) Inheritance
b) Overloading
c) Polymorphism
d) Overriding
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Answer: c
Explanation: The feature defined in question defines polymorphism features. Here the different objects are capable of responding to the same message in different ways, hence polymorphism.
5. Which class/set of classes can illustrate polymorphism in the following code?

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```
abstract class student
{
   public : int marks;
   calc_grade();
}
class topper:public student
{
    public : calc_grade()
    {
        return 10;
    }
};
class average:public student
{
     public : calc_grade()
     {
         return 20;
     }
};
class failed{ int marks; };
```

a) Only class student can show polymorphism
b) Only class student and topper together can show polymorphism
c) All class student, topper and average together can show polymorphism
d) Class failed should also inherit class student for this code to work for polymorphism
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Answer: c
Explanation: Since Student class is abstract class and class topper and average are inheriting student, class topper and average must define the function named calc_grade(); in abstract class. Since both the definition are different in those classes, calc_grade() will work in different way for same input from different objects. Hence it shows polymorphism.

6. Which type of function among the following shows polymorphism?
a) Inline function
b) Virtual function
c) Undefined functions
d) Class member functions
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Answer: b
Explanation: Only virtual functions among these can show polymorphism. Class member functions can show polymorphism too but we should be sure that the same function is being overloaded or is a function of abstract class or something like this, since we are not sure about all these, we can't say whether it can show polymorphism or not.

7. In case of using abstract class or function overloading, which function is supposed to be called first?
a) Local function
b) Function with highest priority in compiler
c) Global function
d) Function with lowest priority because it might have been halted since long time, because of low priority
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Answer: b
Explanation: Function with highest priority is called. Here, it's not about the thread scheduling in CPU, but it focuses on whether the

function in local scope is present or not, or if scope resolution is used in some way, or if the function matches the argument signature. So all these things define which function has the highest priority to be called in runtime. Local function could be one of the answer but we can't say if someone have used pointer to another function or same function name.

8. Which among the following can't be used for polymorphism?

a) Static member functions
b) Member functions overloading
c) Predefined operator overloading
d) Constructor overloading

View Answer

Answer: a
Explanation: Static member functions are not property of any object. Hence it can't be considered for overloading/overriding. For polymorphism, function must be property of object, not only of class.

9. What is output of the following program?

```
class student
{
    public : int marks;
      void disp()
      {
            cout<<"its base class"
      };
      class topper:public student
      {
            public :
            void disp()
            {
                  cout<<"Its derived class";
            }
      }
      void main() { student s; topper t;
      s.disp();
      t.disp();
}
```

a) Its base classIts derived class
b) Its base class Its derived class
c) Its derived classIts base class
d) Its derived class Its base class

View Answer

Answer: a
Explanation: You need to focus on how the output is going to be shown, no space will be given after first message from base class. And then the message from derived class will be printed. Function disp() in base class overrides the function of base class being derived.

10. Which among the following can show polymorphism?

a) Overloading ||
b) Overloading +=
c) Overloading <<
d) Overloading &&

View Answer

Answer: c
Explanation: Only insertion operator can be overloaded among all the given options. And the polymorphism can be illustrated here only if any of these is applicable of being overloaded. Overloading is type of polymorphism.

11. Find the output of the following program.

```
class education
{
      char name[10];
      public : disp()
      {
            cout<<"Its education system";
      }
      class school:public education
      {
            public: void dsip()
            {
                  cout<<"Its school education system";
            }
    };
      void main()
      {
                  school s;
                  s.disp();
      }
}
```

a) Its school education system
b) Its education system
c) Its school education systemIts education system
d) Its education systemIts school education system
View Answer

Answer: a
Explanation: Notice that the function name in derived class is different from the function name in base class. Hence when we call the disp() function, base class function is executed. No polymorphism is used here.
12. Polymorphism is possible in C language.
a) True
b) False
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Answer: a
Explanation: It is possible to implement polymorphism in C language, even though it doesn't support class. We can use structures and then declare pointers which in turn points to some function. In this way we simulate the functions like member functions but not exactly member function. Now we can overload these functions, hence implementing polymorphism in C language.
13. Which problem may arise if we use abstract class functions for polymorphism?
a) All classes are converted as abstract class
b) Derived class must be of abstract type
c) All the derived classes must implement the undefined functions
d) Derived classes can't redefine the function
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Answer: c
Explanation: The undefined functions must be defined is a problem, because one may need to implement few undefined functions from abstract class, but he will have to define each of the functions declared in abstract class. Being useless task, it is a problem sometimes.
14. Which among the following is not true for polymorphism?
a) It is feature of OOP
b) Ease in readability of program

c) Helps in redefining the same functionality
d) Increases overhead of function definition always
View Answer

Answer: d
Explanation: It never increases function definition overhead, one way or another if you don't use polymorphism, you will use the definition in some other way, so it actually helps to write efficient codes.
15. If 2 classes derive one base class and redefine a function of base class, also overload some operators inside class body. Among these two things of function and operator overloading, where is polymorphism used?
a) Function overloading only
b) Operator overloading only
c) Both of these are using polymorphism
d) Either function overloading or operator overloading because polymorphism can be applied only once in a program
View Answer

Answer: d
Explanation: Both of them are using polymorphism. It is not necessary that polymorphism can be used only once in a program, it can be used anywhere, any number of times in a single program.

**********"Encapsulation"**********

1. Which among the following best describes encapsulation?
a) It is a way of combining various data members into a single unit
b) It is a way of combining various member functions into a single unit
c) It is a way of combining various data members and member functions into a single unit which can operate on any data
d) It is a way of combining various data members and member functions that operate on those data members into a single unit
View Answer

Answer: d
Explanation: It is a way of combining both data members and member functions, which operate on those data members, into a single unit. We call it a class in OOP generally. This feature have helped us modify the structures used in C language to be upgraded into class in C++ and other languages.
2. If data members are private, what can we do to access them from the class object?
a) Create public member functions to access those data members
b) Create private member functions to access those data members
c) Create protected member functions to access those data members
d) Private data members can never be accessed from outside the class
View Answer

Answer: a
Explanation: We can define public member functions to access those private data members and get their value for use or alteration. They can't be accessed directly but is possible to be access using member functions. This is done to ensure that the private data doesn't get modified accidentally.

3. While using encapsulation, which among the following is possible?
a) Code modification can be additional overhead
b) Data member's data type can be changed without changing any other code
c) Data member's type can't be changed, or whole code have to be changed
d) Member functions can be used to change the data type of data members
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4. Which feature can be implemented using encapsulation?
a) Inheritance
b) Abstraction
c) Polymorphism
d) Overloading
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Answer: b
Explanation: Data abstraction can be achieved by using encapsulation. We can hide the operation and structure of actual program from the user and can show only required information by the user.
5. Find which of the following uses encapsulation?
a) void main(){ int a; void fun(int a=10; cout<<a); fun(); }
b) class student{ int a; public: int b;};
c) class student{int a; public: void disp(){ cout<<a;} };
d) struct topper{ char name[10]; public : int marks; }
View Answer

Answer: c
Explanation: It is the class which uses both the data members and member functions being declared inside a single unit. Only data members can be there in structures also. And the encapsulation can only be illustrated if some data/operations are associated within class.
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6. Encapsulation helps in writing _____ classes in java.
a) Mutable
b) Abstract
c) Wrapper
d) Immutable
View Answer

Answer: d
Explanation: Immutable classes are used for caching purpose generally. And it can be created by making the class as final and making all its members private.
7. Which among the following should be encapsulated?
a) The data which is prone to change is near future
b) The data prone to change in long terms
c) The data which is intended to be changed
d) The data which belongs to some other class
View Answer

Answer: a
Explanation: The data prone to change in near future is usually encapsulated so that it doesn't get changed accidentally. We encapsulate the data to hide the critical working of program from outside world.
8. How can Encapsulation be achieved?
a) Using Access Specifiers
b) Using only private members

c) Using inheritance
d) Using Abstraction
View Answer

Answer: a
Explanation: Using access specifiers we can achieve encapsulation. Using this we can in turn implement data abstraction. It's not necessary that we only use private access.
9. Which among the following violates the principle of encapsulation almost always?
a) Local variables
b) Global variables
c) Public variables
d) Array variables
View Answer

Answer: b
Explanation: Global variables almost always violates the principles of encapsulation. Encapsulation says the data should be accessed only by required set of elements. But global variable is accessible everywhere, also it is most prone to changes. It doesn't hide the internal working of program.
10. Which among the following would destroy the encapsulation mechanism if it was allowed in programming?
a) Using access declaration for private members of base class
b) Using access declaration for public members of base class
c) Using access declaration for local variable of main() function
d) Using access declaration for global variables
View Answer

Answer: a
Explanation: If using access declaration for private members of base class was allowed in programming, it would have destroyed whole concept of encapsulation. As if it was possible, any class which gets inherited privately, would have been able to inherit the private members of base class, and hence could access each and every member of base class.
11. Which among the following can be a concept against encapsulation rules?
a) Using function pointers
b) Using char* string pointer to be passed to non-member function
c) Using object array
d) Using any kind of pointer/array address in passing to another function
View Answer

Answer: d
Explanation: If we use any kind of array or pointer as data member which should not be changed, but in some case its address is passed to some other function or similar variable. There are chances to modify its whole data easily. Hence Against encapsulation.
12. Consider the following code and select the correct option.

```
class student
{
     int marks;
     public : int* fun()
     {
          return &marks;
     }
};
main()
```

```
{
    student s;
    int *ptr=c.fun();
    return 0;
}
```
a) This code is good to go
b) This code may result in undesirable conditions
c) This code will generate error
d) This code violates encapsulation
View Answer

Answer: d
Explanation: This code violates the encapsulation. By this code we can get the address of the private member of the class, hence we can change the value of private member, which is against the rules.
13. Consider the code and select the wrong choice.

```
class hero
{
     char name[10];
     public : void disp()
     {
          cout<<name;
     }
};
```
a) This maintains encapsulation
b) This code doesn't maintain encapsulation
c) This code is vulnerable
d) This code gives error
View Answer

Answer: a
Explanation: This code maintains encapsulation. Here the private member is kept private. Outside code can't access the private members of class. Only objects of this class will be able to access the public member function at maximum.
14. Encapsulation is the way to add functions in a user defined structure.
a) True
b) False
View Answer

Answer: b
Explanation: False, because we can't call these structures if member functions are involved, it must be called class. Also, it is not just about adding functions, it's about binding data and functions together.
15. Using encapsulation data security is _____
a) Not ensured
b) Ensured to some extent
c) Purely ensured
d) Very low
View Answer

Answer: b
Explanation: The encapsulation can only ensure data security to some extent. If pointer and addresses are misused, it may violate encapsulation. Use of global variables also makes the program vulnerable, hence we can't say that encapsulation gives pure security.

**********"Abstraction"**********
***

1. Which among the following best defines abstraction?
a) Hiding the implementation
b) Showing the important data
c) Hiding the important data
d) Hiding the implementation and showing only the features
View Answer

Answer: d
Explanation: It includes hiding the implementation part and showing only the required data and features to the user. It is done to hide the implementation complexity and details from the user. And to provide a good interface in programming.
2. Hiding the implementation complexity can _____
a) Make the programming easy
b) Make the programming complex
c) Provide more number of features
d) Provide better features
View Answer

Answer: a
Explanation: It can make programming easy. The programming need not know how the inbuilt functions are working but can use those complex functions directly in the program. It doesn't provide more number of features or better features.
3. Class is _____ abstraction.
a) Object
b) Logical
c) Real
d) Hypothetical
View Answer

Answer: b
Explanation: Class is logical abstraction because it provides a logical structure for all of its objects. It gives an overview of the features of an object.

4. Object is _____ abstraction.
a) Object
b) Logical
c) Real
d) Hypothetical
View Answer

Answer: c
Explanation: Object is real abstraction because it actually contains those features of class. It is the implementation of overview given by class. Hence the class is logical abstraction and its object is real.
5. Abstraction gives higher degree of _____
a) Class usage
b) Program complexity
c) Idealized interface

d) Unstable interface
View Answer

Answer: c
Explanation: It is to idealize the interface. In this way the programmer can use the programming features more efficiently and can code better. It can't increase the program complexity, as the feature itself is made to hide it.
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6. Abstraction can apply to _____
a) Control and data
b) Only data
c) Only control
d) Classes
View Answer

Answer: a
Explanation: Abstraction applies to both. Control abstraction involves use of subroutines and control flow abstraction. Data abstraction involves handling pieces of data in meaningful ways.
7. Which among the following can be viewed as combination of abstraction of data and code.
a) Class
b) Object
c) Inheritance
d) Interfaces
View Answer

Answer: b
Explanation: Object can be viewed as abstraction of data and code. It uses data members and their functioning as data abstraction. Code abstraction as use of object of inbuilt class.
8. Abstraction principle includes_____
a) Use abstraction at its minimum
b) Use abstraction to avoid longer codes
c) Use abstraction whenever possible to avoid duplication
d) Use abstraction whenever possible to achieve OOP
View Answer

Answer: c
Explanation: Abstraction principle includes use of abstraction to avoid duplication (usually of code). It this way the program doesn't contain any redundant functions and make the program efficient.
9. Higher the level of abstraction, higher are the details.
a) True
b) False
View Answer

Answer: b
Explanation: Higher the level of abstraction, lower are the details. The best way to understand this is to consider a whole system that is highest level of abstraction as it hides everything inside. And next lower level would contain few of the computer components and so on.
10. Encapsulation and abstraction differ as _____
a) Binding and Hiding respectively
b) Hiding and Binding respectively
c) Can be used any way
d) Hiding and hiding respectively
View Answer

Answer: a
Explanation: Abstraction is hiding the complex code. For example, we directly use cout object in C++ but we don't know how is it actually implemented. Encapsulation is data binding, as in, we try to combine a similar type of data and functions together.
11. In terms of stream and files _____
a) Abstraction is called a stream and device is called a file
b) Abstraction is called a file and device is called a stream
c) Abstraction can be called both file and stream
d) Abstraction can't be defined in terms of files and stream
View Answer

Answer: a
Explanation: Abstraction is called stream to provide a level of complexity hiding, for how the files operations are actually done. Actual devices are called file because in one way or another, those can be considered as single entity and there is nothing hidden.
12. If two classes combine some private data members and provides public member functions to access and manipulate those data members. Where is abstraction used?
a) Using private access specifier for data members
b) Using class concept with both data members and member functions
c) Using public member functions to access and manipulate the data members
d) Data is not sufficient to decide what is being used
View Answer

Answer: c
Explanation: It is the concept of hiding program complexity and actual working in background. Hence use of public member functions illustrates abstraction here.
13. A phone is made up of many components like motherboard, camera, sensors and etc. If the processor represents all the functioning of phone, display shows the display only, and the phone is represented as a whole. Which among the following have highest level of abstraction?
a) Motherboard
b) Display
c) Camera
d) Phone
View Answer

Answer: d
Explanation: Phone as a whole have the highest level of abstraction. This is because the phone being a single unit represents the whole system. Whereas motherboard, display and camera are its components.
14. Which among the following is not a level of abstraction?
a) Logical level
b) Physical level
c) View level
d) External level
View Answer

Answer: d
Explanation: Abstraction is generally divided into 3 different levels, namely, logical, physical and view level. External level is not defined in terms of abstraction.
15. Using higher degree of abstraction _____
a) May get unsafe
b) May reduce readability
c) Can be safer

d) Can increase vulnerability
View Answer

Answer: c
Explanation: It will make the code safer. One may think it reduces the readability, but the fact is, it actually helps us understand the code better. We don’t have to read the complex code which is of no use in understanding the program.