KATHMANDU UNIVERSITY
End Semester Examination [C]
April/May, 2023

Marks Scored:

Level : B.E./B.Sc./B.Tech.
Year : I

Course : COMP 116
Semester : II

Exam Roll No.:

Time: 30 mins.

F. M. : 10

Registration No.:

Date 30 APR 2023

SECTION "A"

[20Q. × 0.5 = 10 marks]

Encircle the most appropriate option.

1. Which of the following statements is **TRUE**?
   a. A friend function of a class can be inherited.
   b. There is no limit on the numbers of classes that might be present in a C++ program.
   c. There can be C++ programs without any function.
   d. A function should not always return some value.

2. Which of the following are good reasons to use an object-oriented language?
   a. We can define our own data types and operations.
   b. Program statements are simpler than in procedural languages.
   c. An Object Oriented program can be taught to correct its own errors.
   d. It is easier to conceptualize an Object Oriented program.

3. A member function can always access the data of _____.
   a. its object
   b. its class
   c. any object of its class
   d. any the public part of its class

4. Private data members of any class are accessible _____.
   a. to any function in the program
   b. only if you know the password
   c. to member functions of that class
   d. only to public members of the class

5. When an array name is passed to a function, the function _____.
   a. accesses exactly the same array as the calling program
   b. accesses a copy of the array passed by the program
   c. refers to the array using the same name from that used by the calling program
   d. refers to the array using the different name from that used by the calling program

6. Friend function of a class are those function, which can _____.
   a. be used in overloading
   b. access protected and public data members of a class
   c. access data members with every access specifier
   d. access only private data member of a class

7. Which of the following prototypes is post increment operator overloading for a class Point using friend function?
   a. Point Point++(int,Point)
   b. int Point++(int)
   c. Point operator++(Point, int)
   d. Point operator++(Point)

8. Which of the following is used for generic programming?
   a. Virtual class
   b. Virtual function
   c. Modularity
   d. Template

9. If class A is inheriting class B in a way, *class A: protected B*
   a. Public members of B becomes protected members of A
   b. Public members of A becomes protected members of B
   c. Protected members of A becomes private members of B
   d. Public members of B becomes public members of A

10. Rethrowing an exception should have _____.
   a. argument in throw keyword
   b. multiple catch section
   c. keyword used "rethrow"
   d. nested block of try and catch

11. Virtual function is used to _____.
   a. deal ambiguous scenario in subordinate class
   b. deal non-ambiguous scenario in super class
   c. achieve runtime polymorphism
   d. create abstract class

12. Private data members of the base class in inheritance are _____.
   a. inherited but they can only be accessed by public or protected methods of the base class
   b. inherited and they can be freely accessed in the derived class
   c. not inherited
   d. inherited but there is no way to access them in the derived class

13. Static function "*count()*" of a *class A* can be accessed by _____ from the *main()* function where *B* is an object of class A.
   a. B::count() b. B::count c. A::count() d. A::count

14. An inline function executes _____ than a normal function but requires _____ memory.
   a. Slower, low b. slower, high c. Faster, low d. faster, high

15. In the give code section, _____.
   a. Class X is friend of Class Y
   b. Class X is composed of Class X
   c. Class Y is friend of class Y
   d. Class Y composed of class X

```
Class Y;
class X{
};
class Y{
    X a;};
```

16. In C++, Inheritance allows us _____.
   a. Code Reusability
   b. Creating Hierarchy of class
   b. Extendibility
   d. All of the mentioned.

17. A class can have virtual _____.
   a. Constructor b. destructor c. data members d. identifier

18. If class A is friend of class B and if class B is friend of class C, which of the following is true?
   a. Class C is friend of class A
   b. Class A is friend of class C
   c. Class A is never a friend of Class C until explicitly declared
   d. Class B is a friend of class A and class C

19. Observe the following program and answer:

```
class Example{
    public:
        int a,b,c;
        Example( ) { a = a;  b = b; c = c;}   //Constructor 1
Example(int x, int y, int z ) { a = x;  b = y; c = z; }   //Constructor 2
Example(Example &E){} //Constructor 3
};
```

If we write *Example E(1,2,3); Example E1=E;* in main() function, which constructor(s) will be called?

a. Constructor 1 and Constructor 2
b. Constructor 2 and Constructor 3
c. Constructor 2
d. Generate error

20. Which of the following is an abstract class?

a. Class having virtual function
b. Derived class having definition of pure virtual base class function
c. Derived class having no definition of pure virtual base class function
d. Class having pure virtual class

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F. M. : 40

SECTION "B"
[6Q. × 4 = 24 marks]

Attempt *ANY SIX* questions.

1. Write in brief about the concept of Object-Oriented Programming? Differentiate it with structured programming. [2+2]

2. Explain the rules of two level access specifiers in inheritance with proper snippets of code.

3. Implement static member and static function in a class which calculate and display the total number of objects created. Write a well driven program.

4. Write in brief about the rules of constructor call in inheritance. What are the different ways to initialize base class data members from derived class constructors? Explain with appropriate snippets of code. [2+2]

5. Explain with appropriate examples how default arguments can be used in the constructor. Write in brief about different types of constructors. [2+2]

6. Write a class template which sorts and returns the average of values stored in an array. Implement a well driven program. [4]

7. What are exceptions in C++? What is the way to handle exceptions in C++? Explain with syntax. [1+3]

SECTION "B"
[2Q. × 8 = 16 marks]

Attempt *ANY TWO* questions.

8. Implement books issuing components of a library. Define a class "***Book***" having data members: "***name***" and "***author***" both of type string.
Derive two class "***referenceBook***" and "***issuableBook***" having following details:

genre: store genre details of the book (string)

lateReturn: store number of days of late submission of book

fine:Integer data member to store fine amount. Reference books can be issued for 1 day and a fine of Rs. 5/day after 1 day. Issuable books can be issued for 30 days and fine of Re. 1/day after 30 days.

issueID: Unique integer data member (starts with 1 and auto incremented by 1 in every issue)

Implement run time polymorphism to display information about 1 issuable book (late return by 5 days) and 1 reference book (late return by 2 days) ***[implement appropriate methods in the classes to perform the operations]*** [8]

9.

a. What is a template in C++? Write appropriate program to implement function template with multiple template type in C++. [2+2]

b. Implement a class which can represent a day in YYYY, MM and DD format. Implement operator overloading function within the class which returns the age of person at entered date. [4]

10.

a. Differentiate between virtual base class and virtual function? Explain with syntax. [4]

b. What is polymorphism? How can we achieve dynamic polymorphism in C++? Explain with appropriate syntax. [1+3]