CS304P Conceptual MCQS

MCQs on C++ Programming Concepts

Inheritance and Composition

1. **Which type of inheritance allows the base class's private members to be inherited by the derived class?**
    - A) Public inheritance
    - B) Private inheritance
    - C) Protected inheritance
    - D) None of the above
      Answer: B) Private inheritance
      Explanation: In private inheritance, all the base class members become private in the derived class, including private members.
2. **In C++, which access specifier is used to prevent the derived class from accessing the base class members?**
    - A) Protected
    - B) Private
    - C) Public
    - D) None of the above
      Answer: B) Private
      Explanation: Using private inheritance prevents the derived class from accessing the base class members.
3. **Which concept represents an "IS A" relationship in object-oriented programming?**
    - A) Composition
    - B) Inheritance
    - C) Aggregation
    - D) Encapsulation
      Answer: B) Inheritance
      Explanation: Inheritance represents an "IS A" relationship where the derived class is a specialized version of the base class.

Pointers and Memory Management

4. **Which operator is used to allocate memory dynamically in C++?**

- A) malloc()
- B) new
- C) alloc()
- D) calloc()

  Answer: B) new

  Explanation: The `new` operator is used to allocate memory dynamically for objects in C++.

5. **What is the function of the `delete` operator in C++?**
   - A) To free memory allocated by `malloc()`
   - B) To delete an object created using `new`
   - C) To delete a function
   - D) To deallocate an array

     Answer: B) To delete an object created using `new`

     Explanation: The `delete` operator is used to free the memory of objects created with `new`.

Function Overloading and Overriding

6. **Which of the following is true for function overloading?**
   - A) Function overloading occurs when two functions with the same name differ only in their return type.
   - B) Function overloading occurs when functions have different names.
   - C) Function overloading requires that the functions differ in the number or types of parameters.
   - D) Function overloading cannot be done in C++.

     Answer: C) Function overloading requires that the functions differ in the number or types of parameters.

     Explanation: Function overloading occurs when two functions with the same name differ in the number or type of their parameters.
7. **Which of the following describes function overriding?**
   - A) Changing the function signature in the derived class
   - B) Changing the function body in the base class
   - C) A base class function being redefined in the derived class
   - D) Having multiple functions with the same name

     Answer: C) A base class function being redefined in the derived class

     Explanation: Function overriding occurs when a derived class provides its own implementation for a function that is already defined in the base class.

Virtual Functions

8. **What is the main purpose of virtual functions in C++?**
   - A) To allow dynamic polymorphism

- B) To make a function static
- C) To prevent a function from being overridden
- D) To optimize function calls
  Answer: A) To allow dynamic polymorphism
  Explanation: Virtual functions enable dynamic polymorphism, allowing function calls to be resolved at runtime rather than compile time.

9. **Which of the following is true for a pure virtual function?**
   - A) It is implemented in the base class
   - B) It must be implemented by the derived class
   - C) It cannot be called directly
   - D) It cannot have parameters
     Answer: B) It must be implemented by the derived class
     Explanation: A pure virtual function does not have an implementation in the base class and must be implemented in the derived class.

Constructor and Destructor

10. **Which of the following is true for constructors in C++?**

- A) Constructors can have a return type
- B) Constructors are called when an object is destroyed
- C) Constructors are automatically called when an object is created
- D) Constructors cannot be overloaded
  Answer: C) Constructors are automatically called when an object is created
  Explanation: Constructors are called automatically when an object is created, and they initialize the object's state.

11. **What is the purpose of a destructor in C++?**

- A) To initialize an object
- B) To destroy an object and release resources
- C) To copy an object
- D) To prevent memory leaks
  Answer: B) To destroy an object and release resources
  Explanation: A destructor is called automatically when an object goes out of scope or is explicitly deleted, allowing for proper resource management.

Static Members

12. **What is the primary feature of static data members in C++?**

- A) They can be accessed without an object

- B) They are unique to each object
- C) They are always constant
- D) They can only be modified by the constructor
  Answer: A) They can be accessed without an object
  Explanation: Static members are shared among all instances of a class and can be accessed without creating an object.

13. **What happens to static data members when a class is instantiated multiple times?**

- A) They are duplicated for each instance
- B) They are shared among all instances
- C) They are only accessible through pointers
- D) They are inaccessible after the first instantiation
  Answer: B) They are shared among all instances
  Explanation: Static members are shared among all instances of a class, meaning only one copy exists regardless of how many objects are created.

Exception Handling

14. **What is the purpose of `try-catch` blocks in C++?**

- A) To define a block of code that may throw exceptions
- B) To check for errors before running the code
- C) To handle exceptions after they occur
- D) To skip exception handling
  Answer: C) To handle exceptions after they occur
  Explanation: `try-catch` blocks are used to handle exceptions that may occur during program execution.

15. **Which of the following is used to throw an exception in C++?**

- A) throw
- B) catch
- C) try
- D) error
  Answer: A) throw
  Explanation: The `throw` keyword is used to raise an exception in C++.

File Handling

16. **Which header file is needed for file handling in C++?**

- A) `<fstream>`
- B) `<iostream>`
- C) `<stdio.h>`
- D) `<file.h>`
  Answer: A) `<fstream>`
  Explanation: The `<fstream>` header file provides classes for file input and output operations in C++.

17. **Which of the following is used for writing to a file in C++?**

- A) `ofstream`
- B) `ifstream`
- C) `fstream`
- D) `fileout`
  Answer: A) `ofstream`
  Explanation: The `ofstream` class is used for writing to files in C++.

Function Templates

18. **What does a function template allow you to do in C++?**

- A) To create a function that works with different data types
- B) To define a function with a fixed data type
- C) To create a new type of function
- D) To write a function only for primitive data types
  Answer: A) To create a function that works with different data types
  Explanation: A function template allows you to create a function that can work with any data type.

19. **Which of the following is a correct declaration of a function template?**

- A) `template <typename T> void func();`
- B) `template <class T> void func();`
- C) `template <T class> void func();`
- D) Both A and B
  Answer: D) Both A and B
  Explanation: Both `typename` and `class` can be used interchangeably to define template parameters.

Operator Overloading

20. **Which operator can be overloaded in C++?**

- A) `+` (addition)
- B) `[]` (array subscript)
- C) `()` (function call)
- D) All of the above
  Answer: D) All of the above
  Explanation: In C++, operators like `+`, `[]`, and `()` can be overloaded to provide custom behavior for user-defined types.

21. **Which of the following is true about operator overloading in C++?**

- A) All operators can be overloaded
- B) The operator's precedence and associativity cannot be changed
- C) Operator overloading is only allowed for binary operators
- D) Operators can only be overloaded using global functions
  **Answer

:** B) The operator's precedence and associativity cannot be changed
Explanation: While operators can be overloaded, their precedence and associativity are fixed and cannot be altered.

Dynamic Memory Allocation

22. **Which operator is used to free dynamically allocated memory in C++?**

- A) free()
- B) delete
- C) dealloc()
- D) end()
  Answer: B) delete
  Explanation: The `delete` operator is used to free memory that was allocated using `new` in C++.

Namespace and Scope

23. **What is the purpose of using `namespace` in C++?**

- A) To define global variables
- B) To avoid name conflicts in large programs
- C) To declare classes
- D) To define a new function scope
  Answer: B) To avoid name conflicts in large programs

Explanation: A `namespace` is used to organize code into logical groups to avoid name conflicts between different parts of a program.

Array and Memory Management

24. **What does the following code do?**

```
int* arr = new int[10];
```

- A) Allocates space for 10 integers on the heap
- B) Allocates space for 10 integers on the stack
- C) Creates an array of 10 integers on the heap
- D) None of the above
  Answer: A) Allocates space for 10 integers on the heap
  Explanation: The `new` operator dynamically allocates memory for an array of 10 integers on the heap.

Control Flow

25. **Which of the following is NOT a valid loop in C++?**

- A) for
- B) while
- C) do-while
- D) repeat-until
  Answer: D) repeat-until
  Explanation: C++ does not have a `repeat-until` loop. Instead, it uses `do-while` for executing code at least once.

String Manipulation

26. **Which of the following is used to find the length of a string in C++?**

- A) `strlen()`
- B) `size()`
- C) `length()`
- D) Both B and C
  Answer: D) Both B and C
  Explanation: In C++, both `size()` and `length()` functions are used to find the length of a string.

Lambda Expressions

27. **Which keyword is used to define a lambda expression in C++?**

- A) lambda
- B) anonymous
- C) []
- D) func
  Answer: C) []
  Explanation: A lambda expression in C++ is defined using `[]`, which denotes the capture list.

C++ Standard Library

28. **Which header file is required for using the `vector` container in C++?**

- A) `<iostream>`
- B) `<vector>`
- C) `<array>`
- D) `<list>`
  Answer: B) `<vector>`
  Explanation: The `<vector>` header file is required to use the `vector` container in C++.

Memory Leaks

29. **What can cause memory leaks in a C++ program?**

- A) Not freeing dynamically allocated memory
- B) Not using `delete` on objects created with `new`
- C) Forgetting to call a destructor
- D) All of the above
  Answer: D) All of the above
  Explanation: Memory leaks occur when memory is allocated dynamically but not properly freed, either by not using `delete` or not calling the destructor.

Multithreading

30. **Which of the following is used to create threads in C++?**

- A) `pthread_create()`
- B) `std::thread`
- C) `CreateThread()`
- D) `thread.start()`
  Answer: B) `std::thread`
  Explanation: In C++11 and later, `std::thread` is used to create threads.

Basic Syntax and Data Types

1. **Which of the following is the correct syntax to declare a pointer in C++?**
   - A) `int* ptr;`
   - B) `ptr* int;`
   - C) `int ptr*;`
   - D) `pointer int*;`
     Answer: A) `int* ptr;`

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2. **What is the default value of an uninitialized static variable in C++?**
   - A) 0
   - B) Undefined
   - C) NULL
   - D) Random value
     Answer: A) 0

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3. **Which data type is used to store large integer values in C++?**
   - A) int
   - B) float
   - C) double
   - D) long long
     Answer: D) long long

Operators

4. **What does the ++ operator do in C++?**
   - A) Increases a variable's value by 1
   - B) Decreases a variable's value by 1

- C) Performs bitwise NOT on the variable
- D) None of the above
  Answer: A) Increases a variable's value by 1

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5. **Which operator is used for pointer dereferencing in C++?**
   - A) *
   - B) &
   - C) ->
   - D) %
     Answer: A) *

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6. **What will be the result of the expression `5 / 2` in C++?**
   - A) 2
   - B) 2.5
   - C) 3
   - D) Compilation error
     Answer: A) 2
     Explanation: Integer division results in truncation in C++.

Control Flow

7. **Which of the following is NOT a valid C++ conditional operator?**
   - A) `if`
   - B) `else`
   - C) `switch`
   - D) `when`
     Answer: D) `when`

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8. **Which control structure allows you to execute a block of code at least once in C++?**
   - A) for
   - B) while
   - C) do-while
   - D) if
     Answer: C) do-while

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9. **Which statement will skip the current iteration of a loop in C++?**

- A) continue
- B) break
- C) return
- D) exit
  Answer: A) continue

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10. **Which statement terminates a loop prematurely in C++?**

- A) return
- B) continue
- C) break
- D) exit
  Answer: C) break

Functions

11. **What is the default return type of a function in C++ if not specified?**

- A) void
- B) int
- C) float
- D) None of the above
  Answer: B) int

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12. **Which of the following is a correct syntax for passing an array to a function in C++?**

- A) `void func(int arr[]);`
- B) `void func(int arr());`
- C) `void func(int arr[10]);`
- D) Both A and C
  Answer: D) Both A and C

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13. **Which type of function is executed when the program ends in C++?**

- A) constructor
- B) destructor
- C) main()

- D) None of the above
  Answer: B) destructor

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14. **Which keyword is used to define a function that cannot be overridden in C++?**

- A) const
- B) final
- C) virtual
- D) private
  Answer: B) final

Object-Oriented Programming

15. **What is the default access modifier for class members in C++?**

- A) private
- B) public
- C) protected
- D) None of the above
  Answer: A) private

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16. **Which keyword is used to define a base class pointer to a derived class object in C++?**

- A) friend
- B) virtual
- C) public
- D) static
  Answer: B) virtual

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17. **Which of the following is true about constructors in C++?**

- A) Constructors cannot return values
- B) Constructors have a return type of `void`
- C) Constructors are invoked explicitly
- D) Constructors can be virtual
  Answer: A) Constructors cannot return values

18. **What is the primary purpose of a destructor in C++?**

- A) Initialize an object
- B) Destroy the object and free its resources
- C) Return values from the constructor
- D) None of the above
  Answer: B) Destroy the object and free its resources

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19. **What is the purpose of `virtual` keyword in C++?**

- A) To define a virtual function
- B) To allow dynamic method resolution (polymorphism)
- C) To create a copy constructor
- D) To prevent inheritance
  Answer: B) To allow dynamic method resolution (polymorphism)

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20. **Which function is used to copy the values from one object to another in C++?**

- A) assignment operator (=)
- B) copy constructor
- C) clone()
- D) copy()
  Answer: B) copy constructor

Memory Management

21. **Which of the following is used to allocate memory dynamically in C++?**

- A) malloc()
- B) alloc()
- C) new
- D) calloc()
  Answer: C) new

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22. **Which of the following is correct to free dynamically allocated memory in C++?**

- A) free()
- B) delete
- C) dealloc()
- D) remove()
  Answer: B) delete

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23. **What is the purpose of `new[]` in C++?**

- A) To allocate memory for a single object
- B) To allocate memory for an array of objects
- C) To deallocate memory
- D) None of the above
  Answer: B) To allocate memory for an array of objects

STL and Containers

24. **Which container in C++ stores elements in a non-contiguous manner and allows efficient insertion/removal at both ends?**

- A) vector
- B) list
- C) map
- D) set
  Answer: B) list

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25. **Which function is used to insert an element at the end of a vector in C++?**

- A) insert()
- B) push_back()
- C) emplace()
- D) add()
  Answer: B) push_back()

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26. **Which of the following is used to find the position of an element in a vector in C++?**

- A) find()
- B) search()
- C) locate()

- D) position()
  Answer: A) find()

File Handling

27. **Which header file is needed to work with files in C++?**

- A) `<fstream>`
- B) `<file>`
- C) `<iostream>`
- D) `<stdio.h>`
  Answer: A) `<fstream>`

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28. **Which function is used to open a file in C++?**

- A) open()
- B) read()
- C) write()
- D) file_open()
  Answer: A) open()

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29. **Which function is used to close a file in C++?**

- A) close()
- B) end()
- C) stop()
- D) close_file()
  Answer: A) close()

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30. **Which file operation mode in C++ opens a file for both reading and writing?**

- A) ios::in
- B) ios::out
- C) ios::app
- D) ios::in | ios::out
  Answer: D) ios::in | ios::out

Good luck with your exam! Let me know if you need clarification on any topics.