GUJARAT TECHNOLOGICAL UNIVERSITY

BE-6 SEMESTER – OLD PAPER – S22 TO W25 – QUESTION BANK

Subject Name & Code:

OBJECT ORIENTED PROGRAMMING (3160922)

Unit 1: OOP Concepts

Repeated Questions:

1. **What are the benefits/advantages of Object-Oriented Programming?** (S22 - Q2a, 03 marks) (W23 - Q1a, 03 marks) (S25 - Q1c, 07 marks) (W25 - Q1c, 07 marks)
2. **What is Object-Oriented Programming (OOP)? How is it different from procedure-oriented programming? / Identify difference between Object Oriented Programming and Procedure Oriented Programming?** (S22 - Q1a) (S23 - Q1a) (W23 - Q1a)
3. **Enlist Distinguishing features of Object-oriented programming, and justify any two of the features.** (S25 - Q1c, 07 marks) (W24 - Q1c, 07 marks)
4. **Explain three pillars of OOP. / Write a short note on three pillars of Object-Oriented Programming.** (S23 - Q1c, 07 marks) (W23 - Q1c)

Other Important Questions:

1. What is object-oriented programming? What are the advantages of an object-oriented programming paradigm? (W25 - Q1a, 04 marks)
2. Explain the concept of data abstraction and encapsulation in OOP. (W25 - Q1b, 04 marks)
3. Write a short note on three pillars of the Object- Oriented Programming. (S23 - Q1c, 07 marks)
4. Distinguish between the following terms: (a) Objects and classes, (b) Data Abstraction and data encapsulation, (c) Inheritance and polymorphism, (d) Dynamic binding and message passing (S22 - Q1d, 07 marks) [Also appears in S25 Q2 OR and W24 Q2 OR]

Unit 2: Expression and Statements

Repeated Questions:

1. **Explain identifier and constants with examples. / Define identifier and its use. Write down the rules to follow while defining the identifiers.** (S22 - Q1b, 04 marks) (S23 - Q1b, 04 marks) (W23 - Q1b)
2. **Explain 'if... else...' conditional statement with proper/suitable example.** (W23 - Q1b, 04 marks) (S24 - Q1b, 04 marks) (W25 - Q3a, 03 marks)
3. **Define type casting and give a suitable example.** (S23 - Q2a, 03 marks) (W23 - Q2a, 03 marks)
4. **Explain numerical data types with example.** (S23 - Q2b, 04 marks) (W23 - Q2b, 04 marks)

Other Important Questions:

1. Explain the "for" loop statement with suitable example in C++. (W25 - Q3 OR a, 03 marks)
2. What is an expression? Explain their types with example. (W25 - Q2c, 07 marks)
3. Enlist the various operators used in C++. Explain any three of them. (W25 - Q2 OR c, 07 marks)
4. Discuss arithmetic operators in C++ programming. (S25 - Q1a, 03 marks) (W24 - Q1a, 03 marks)
5. What is dynamic initialization of a variable? Give an example. (W25 - Q3b, 04 marks) (S22 - Q2b, 04 marks)
6. Write a program to demonstrate the basic arithmetic operations using switch statement in C++ language. Consider any error in calculation for special case. (S23 - Q2c, 07 marks) (W23 - Q2c, 07 marks)

Unit 3: Arrays and Functions

Repeated Questions:

1. **What do you mean by call by value and call by reference? Justify your answer with suitable example.** (S22 - Q3c, 07 marks) (W23 - Q2 OR c, 07 marks) (S24 - Q2 OR c, 07 marks)
2. **Explain inline function with suitable example. / Describe inline function. / Elaborate INLINE Function.** (W25 - Q4b, 04 marks) (S22 - Q3a, 03 marks) (S24 - Q3a, 03 marks) (S23 - Q4b, 04 marks)
3. **What is function overloading? Explain with a suitable example. / Demonstrate the use of function overloading with at least one example.** (W24 - Q3b, 04 marks) (S23 - Q3c, 07 marks) (W23 - Q3c)

Other Important Questions:

1. Write a program to arrange/sort an array of N elements into ascending order using OOP in C++. (S22 - Q2c, 07 marks) (S23 - Q2 OR c, 07 marks)
2. Write a program in C++ using to swap the values of a pair of integers. (S22 - Q2 OR c, 07 marks)
3. Write a program to sort array of N elements in descending order using OOP in C++. (W23 - Q2 OR c, 07 marks)
4. Explain function polymorphism? Explain it with an appropriate C++ program. (W25 - Q3c, 07 marks)
5. Explain the terms with suitable examples: call by value and call by reference? (W25 - Q3 OR c, 07 marks)
6. Explain function call by value, call by pointer and call by reference. (S25 - Q3 OR b, 04 marks)
7. What do you mean by function prototype, function call, function arguments and function return type. (S25 - Q3 OR c, 07 marks) (W24 - Q4b, 04 marks)
8. Write a function for finding the minimum value from an array and main program which can call the above function and print the minimum value. (S24 - Q3 OR c, 07 marks)
9. Write a program using C++ which calculates squares of all even numbers. (S25 - Q3c, 07 marks)

Unit 4: Classes

Repeated Questions:

1. **Explain Object and Class. / Distinguish between Objects and classes.** (W25 - Q2b, 04 marks) (S22 - Q1d-i) [Appears in distinction list]
2. **Explain 'this' pointer with example.** (S22 - Q3 OR a, 03 marks) (S24 - Q3 OR a, 03 marks) (W24 - Q5a, 03 marks) (W25 - Q4 OR a, 03 marks)
3. **What is friend function? Explain with a suitable example / Explain the need of friend function.** (S24 - Q3 OR b, 04 marks) (S25 - Q3b, 04 marks) (W24 - Q3 OR b, 04 marks) (S22 - Q3c, 07 marks) (W25 - Q4 OR a, 03 marks)
4. **Explain the use of static variables and static functions with a program. / Explain static data member and static member function with a suitable program code.** (S24 - Q3c, 07 marks) (S25 - Q3a, 03 marks)
5. **Explain differences between structure and class.** (S24 - Q2a, 03 marks) (W23 - Q2a, 03 marks)
6. **Explain constructor and destructor. / Define constructor and destructor regards to class and object. / Discuss the application of Constructor & Destructor.** (S23 - Q3 OR a, 03 marks) (W23 - Q3 OR a, 03 marks) (W24 - Q3c, 07 marks)
7. **What is operator overloading? State the case when we require operator overloading.** (S23 - Q3b, 04 marks) (W23 - Q3b)
8. **Explain inline function with suitable example.** (Already listed in Unit 3 due to high frequency, also relevant here) (W25 - Q4b, 04 marks)

Other Important Questions:

1. Explain the use of C++ operators: new and delete. (W25 - Q2a, 03 marks)
2. Describe arrays of object with suitable example. (W25 - Q3 OR b, 04 marks) (S22 - Q4b, 04 marks)
3. Explain basic to class type conversion with appropriate example. (W25 - Q4a, 03 marks)
4. What is a constructor? Explain different types of constructors with an appropriate example. (W25 - Q4c, 07 marks)
5. Explain the purpose of destructor in C++ with a suitable example. (W25 - Q4 OR b, 04 marks)
6. What is an operator overload? Write a program to overload binary "+" operator as a member function. (W25 - Q4 OR c, 07 marks)
7. Compare between private and public members of a Class. Give any example. (S23 - Q3a, 03 marks) (W23 - Q3a)
8. What is class? How class accomplish the task of data hiding? (S22 - Q3 OR b, 04 marks)
9. Explain the different types of data members of the class. (S22 - Q3b, 04 marks)
10. Write a program to demonstrate the use of scope resolution operator :: with variable name. (S23 - Q3 OR c, 07 marks) (W23 - Q3 OR c)
11. Discuss new and delete keywords. / Explain New and delete operator, along with sample program. Also differentiate it with C language equivalent implementation. (S24 - Q5 OR a, 03 marks) (S25 - Q2c, 07 marks)
12. Discuss the application of Destructors and give example for the same. (S25 - Q3 OR a, 03 marks)
13. Write a program depicting operator overloading. (W24 - Q3a, 03 marks)
14. Write down the rules for implementing operator overloading. (S25 - Q5b, 04 marks) (W24 - Q5b, 04 marks)
15. List various access specifiers of C++ language, and explain all of them in short. (S25 - Q5 OR a, 03 marks) (W24 - Q5 OR b, 04 marks)
16. What are the characteristics of constructor in C++? (S22 - Q4 OR a, 03 marks)
17. Explain static data members. (S22 - Q4 OR b, 04 marks)

Unit 5: Overloading

Repeated Questions:

1. **Explain function overloading with a suitable example.** (Already listed in Unit 3, also core to this unit) (W24 - Q3b, 04 marks) (S23 - Q3c, 07 marks)
2. **What is operator overloading? State the case when we require operator overloading.** (Already listed in Unit 4, also core to this unit) (S23 - Q3b, 04 marks) (W23 - Q3b)

Other Important Questions:

1. Write a program of multiplying numbers, using the function overloading phenomenon of C++. (W24 - Q4 OR c, 07 marks)
2. Write a C++ program that overloads + operator to add two complex numbers. (S24 - Q4 OR c, 07 marks)
3. Create a class time with hours and minutes as two data members. Get the data of two-time objects from user and overload function with + operator to add both time objects and display the result. (S22 - Q4 OR c, 07 marks)
4. Enlist the rules for overloading operators. (S22 - Q5a, 03 marks)

Unit 6: Inheritance

Repeated Questions:

1. **Explain different types of Inheritance with example. / Classify different types of Inheritance and explain in short each of them.** (S22 - Q4a, 03 marks) (S24 - Q4c, 07 marks) (S23 - Q4c, 07 marks) (W23 - Q4c)
2. **What is inheritance? Explain single inheritance with an example. / What do you mean by inheritance? Give classification for the same. / Explaining single level inheritance using a C++ program.** (W24 - Q4b, 04 marks) (S25 - Q4b, 04 marks) (S25 - Q4 OR c, 07 marks)
3. **Explain polymorphism with an example. / Define polymorphism with an example.** (S23 - Q4a, 03 marks) (W23 - Q4a)
4. **What is protected members in inheritance?** (S24 - Q5a, 03 marks) (W23 - Q5a)

Other Important Questions:

1. What are the various forms of inheritance? Explain any one type of them with an appropriate program in C++. (W25 - Q5c, 07 marks)
2. Distinguish the abstract class and virtual base class. (S24 - Q3b, 04 marks)
3. How is polymorphism achieved during compile time and run time? (S24 - Q4b, 04 marks)
4. Explain Poly- Morphism in detail? (W24 - Q4a, 03 marks)
5. Write a program for finding the volume of various objects, demonstrating the polymorphism phenomenon in Constructors. (S23 - Q5b, 04 marks) (W23 - Q5b)

Unit 7: Exception Handling

Repeated Questions:

1. **What is Exception handling in C++? Explain with suitable program / using an example.** (W25 - Q5a, 03 marks) (S22 - Q5 OR b, 04 marks) (S24 - Q5 OR c, 07 marks) (S23 - Q3b, 04 marks) (W23 - Q3 OR b)
2. **With suitable examples, explain try, catch and throw. / Demonstrate the use of try, catch and throw using a program.** (S22 - Q5c, 07 marks) (S23 - Q5c, 07 marks) (W23 - Q5c)
3. **Enlist different types of exception in C++ programming.** (S23 - Q5a, 03 marks) (W23 - Q5a)

Other Important Questions:

1. Explain the exception handling of C++ language. (S25 - Q5 OR b, 04 marks) (W24 - Q5 OR a, 03 marks)

Unit 8: I/O and File management

Repeated Questions:

1. **Classify IO Stream Library.** (S25 - Q2a, 03 marks) (W24 - Q2a, 03 marks)
2. **Give the applications of any one Manipulators in file operation.** (S25 - Q2b, 04 marks) (W24 - Q2b, 04 marks)
3. **Distinguish between the following terms: (a) Objects and classes, (b) Data abstraction and data encapsulation, (c) Inheritance and polymorphism, (d) Dynamic binding and message passing** (This conceptual question appears in OOP Concepts but is often asked in papers with I/O questions as an OR option) (S25 - Q2 OR, 07 marks) (W24 - Q2 OR, 07 marks)

Other Important Questions:

1. What is a stream? Explain different stream classes for console I/O operations in C++. (W25 - Q5 OR c, 07 marks)
2. Define stream in C++ programming. (S23 - Q5 OR a, 03 marks) (W23 - Q5 OR a)
3. What are manipulators? (S23 - Q5 OR b, 04 marks) (W23 - Q5 OR b)
4. Describe different ways to open file with suitable example. (S22 - Q5b, 04 marks)
5. List out various file management functions for formatted and unformatted output. (S23 - Q5 OR c, 07 marks) (W23 - Q5 OR c)
6. Describe the various approaches by which we can detect the end of file condition. (S24 - Q5b, 04 marks)
7. Explain the use of binary files in C++ with a program. (S24 - Q5c, 07 marks)
8. Enlist any 7 Major differences between C++ and C programming language. / Identify any 6 Major differences between C++ and C language. (W24 - Q2c, 07 marks) (S23 - Q1a, 03 marks)

Programming Problems / Case Studies (Often span multiple units)

Repeated Problems:

1. **Fibonacci Series:** Write a program in C++ to generate the Fibonacci series (up to 20 terms) using class Fibonacci. (W25 - Q1c, 07 marks) (S24 - Q1c, 07 marks) (W23 - Q1c)
2. **Complex Number Addition:** Write a C++ program that overloads + operator to add two complex numbers. (S24 - Q4 OR c, 07 marks) (W25 - Q4 OR c is a generic binary + overload, often used for complex numbers)
3. **Volume Calculation (Polymorphism):** Write a program using C++ exhibiting constructors usage for initializing volume parameters and function polymorphism for calculating volume of cube, cylinder, and rectangular box. (S25 - Q4c, 07 marks) [Related to S23 Q5b & W23 Q5b]
4. **Student/Bank Class:** Create a class with data members (like Name, Roll No., Marks OR Account details) and member functions to input, process (calculate min, deposit/withdraw), and display data. Write a main() to test it. (S25 - Q5c, 07 marks) (W24 - Q5c, 07 marks) (S22 - Q5 OR c, 07 marks)
5. **Time Addition:** Write a program in C++ for addition of two time frames given in HH:MM:SS stored in objects t1 and t2. (S25 - Q5 OR c, 07 marks) [Related to S22 Q4 OR c]
6. **Distance/Time Class with Addition:** Create a class distance with feet/inches or time with hours/minutes. Add two objects using member function or operator overloading. (S22 - Q4c, 07 marks) (S22 - Q4 OR c, 07 marks)

Other Important Problems:

1. Write a program using C++ which calculates area of square, rectangle, and circle. (W24 - Q3 OR c, 07 marks)
2. Create a class called ITEM with item number and cost. Include member functions setdata(), getdata(), putdata(). (S22 - Q5 OR c, 07 marks) (W24 - Q5 OR c, 07 marks)
3. Write a simple program that multiplies two numbers and then also divides the two numbers. (Use Inline functions). (S23 - Q4c, 07 marks) (W23 - Q4c)
4. Explain >> and << operators. (S24 - Q2b, 04 marks)
5. Explain User Defined Data type in details. (S24 - Q2c, 07 marks)
6. Explain the difference between two statements: Date D2(D1) and Date D2=D1; where D1 and D2 are objects of Date class. (S24 - Q4 OR b, 07 marks)
7. Explain copy constructor and its use by giving an example. (S22 - Q5 OR a, 03 marks)
8. Explain virtual functions. / Demonstrate the application of virtual functions with a suitable program. (S25 - Q4b, 04 marks) (W25 - Q5 OR b, 04 marks) (W24 - Q4a, 03 marks)
9. Explain pure virtual functions with example. / What is pure virtual function? (W25 - Q5b, 04 marks) (S24 - Q4a, 03 marks)
10. What is namespace? What is "namespace std" explain it in detail and also elaborate the concept by creating your own namespace. (S25 - Q1b, 04 marks)
11. Discuss the programming structure of C++ language. (W24 - Q1b, 04 marks)

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