Code No. : 12426 N/O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
Accredited by NAAC with A++ Grade

B.E. (E.C.E.) II-Semester Main & Backlog Examinations, August-2023
Problem Solving through Object-Oriented Programming

Time: **3 hours**

Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO	PEO
1.	Differentiate between "structure" in C and "class" in C++.	2	1	1	1	1
2.	Match the following:	2	1	1	1	1
3.	Predict the output of the following code-segment when embedded in C++ program:	2	2	2	1, 2	1
4.	Write a C++ function "getSmall" that must accept an integer Array 'A' of 'n' items and returns the smallest value.	2	3	2	2, 3	1
5.	Construct a C++ recursive function that must return the Nth Fibonacci term.	2	3	3	2, 3	1
6.	Implement >> operator overloaded function definition to read input for "Complex" number system class with "real" and "img" as members.	2	2	3	1, 2	1

Q2. Match the following:

a)	Bitwise operator	1)	!=
b)	Scope resolution operator	2)	→
c)	Structure Member access Operator	3)	::
d)	Relational Operator	4)	&

Q3 code:

```cpp
int doChange(int &,int=15);

int doChange(int &a,int b)
 {
     a++;
     b++;
     return (a+b);
 }
void main(void)
{
    int x=10, y=20, z=0;
    z=doChange(x);
    cout<<"x="<<x<<"y="<<y<<"z="<<z;
}
```

7.	Write a generic function template that returns the smallest of the given three generic items.	2	3	4	2, 3	1
8.	Define Abstract Base Class. When do you use this?	2	1	4	2, 3	1
9.	Differentiate Stack and Queue in terms of operations and uses in Computing.	2	1	5	2, 3	1
10.	For a singly linked list with integer data, implement a function that has to accept the root node, an integer 'N' and 'K' to insert 'N' in 'Kth' place starting from the head node. [Assume that the number of elements in the list > K].	2	3	5	2, 3	1

Part-B (5 × 8 = 40 Marks)

11. a)	Mention different looping statements that are supported in C++ with their syntax & examples.	4	1	1	1, 2	1
b)	Write a C++ program to read the radius of the Sphere and display the Surface area and Volume. Use 2-digits precision.	4	2	1	2, 3	1
12. a)	Differentiate Call-by-Value and Call-by-Reference with relevant examples in C++.	4	2	2	1, 2	1
b)	Construct a C++ class by name "Rain" that must maintain the readings of rainfall in Hyderabad for 10-days in an Array as member. Later, using an appropriate member-functions: a) Print the average rainfall in the main application. b) Print on which day the maximum rainfall occurred? Use Linear Search [assume that all the readings are distinct]	4	3	2	2, 3	1
13. a)	Define Constructors and Destructors. Write "Vector" ADT class, representing a vector ($\bar{v} = a\bar{i} + b\bar{j} + c\bar{k}$), where a, b, c are integer members of the class. Implement all overloaded forms of the constructors and destructors.	4	2	3	1, 2	1
b)	Construct "Complex" C++ class, representing a complex number system to: a) Overload + operator for adding two Complex numbers, implemented as a member function. b) Overload ++ operator to increment the real and imaginary parts by 1, implemented as a friend function.	4	3	3	2, 3	1
14. a)	What is the advantage of Inheritance? Write the syntax of creating a derived class 'D' from a base class 'B'. Explain which characteristics can be inherited and which characteristics cannot be inherited?	4	1	4	1, 2	1
b)	How do you achieve Runtime Dynamic Polymorphism in public inheritance? Illustrate with an example.	4	3	4	2, 3	1

15. a)	Implement a 10-integer Stack Class with stack associated operations as member functions.	4	2	5	1, 2	1
b)	Write a singly linked list 'Node' structure with integer 'x'. Construct a C++ menu-driven application to maintain the Singly Linked List with the following options: a) Creating a Head Node b) Adding a Node at End c) Displaying the List d) Terminating the application.	4	3	5	2, 3	1
16. a)	Write a C++ program to print all Palindrome numbers up to 'N'.	4	2	1	1, 2	1
b)	How do you declare a Matrix in a program. Develop a C++ application to read a Matrix 'A' of order m x n and later display it and its Transpose in the form of Matrices.	4	3	2	2, 3	1
17.	Answer any *two* of the following:					
a)	What is the significance of Array of Pointers? Illustrate with any two appropriate examples.	4	3	3	2, 3	1
b)	What is Hybrid Inheritance? Mention the problem associated with it. Propose the solution.	4	2	4	1, 2	1
c)	Define exception. Demonstrate how do you handle the exceptions in C++ with an example.	4	2	5	1, 2	1

M : Marks;   L: Bloom's Taxonomy Level;   CO; Course Outcome;   PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%

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