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B.Tech. DEGREE EXAMINATION, NOVEMBER 2023

Third Semester

18AIC203J - OBJECT ORIENTED DESIGN AND PROGRAMMING

(For the candidates admitted during the academic year 2020-2021 & 2021-2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

Part - A (20 × 1 = 20 Marks)
Answer **all** Questions

		Marks	BL	CO
1.	Which of the following statements are true for this command : int f(float) (A) f is a function taking an argument of type int and returning a floating point number (B) f is a function taking an argument of type float and returning an integer (C) f is a function of type float (D) f is a function of type int	1	1	1
2.	How can Encapsulation be achieved? (A) Using Access Specifiers (B) Using only private members (C) Using inheritance (D) Using Abstraction	1	1	1
3.	This access specifier allows the user to inherit the private members of a class, it is: (A) Public (B) Protected (C) Default (D) Private	1	1	1
4.	Which among the following doesn't come under OOP concept? (A) Data hiding (B) Message passing (C) Platform independent (D) Data binding	1	1	1
5.	Predict the output of the following code class Con{ int Con(){ cout<<"Constructor"; return 0; }}; int main() { Con obj; return 0; } (A) 0 (B) Constructor (C) Compilation error (D) Run time error	1	2	2
6.	Determine the output displayed on the screen? class B { public: B() { cout<<"Hello "; } ~B() { cout<<"Destructor1 "; } }; class D: public B { public: D() { cout<<"C++ ";} ~D() { cout<<"Destructor2 "; } }; int main() { D o; return 0; } (A) Hello C++ Destructor2 Destructor1 (B) Hello Destructor1 C++ Destructor2 (C) Hello Destructor2 C++ Destructor1 (D) Hello C++ Destructor1 Destructor2	1	2	2
7.	The interactive behaviour of a system is represented in UML by ____ and _____ diagrams (A) Sequence, Collaboration (B) Use Case, Sequence (C) Collaboration, Use Case (D) Use Case, interaction	1	1	2

8. Which of the following statement is true about Constructors? 1 1 2
   1. A class can have more than one constructor.
   2. They can be inherited.
   3. Their address can be referred.
   4. Constructors cannot return values.

   (A) 1, 2, and 4 (B) 1 and 2 only
   (C) 1, 3 and 4 (D) 1 and 4 only

9. If class A and class B are derived from class C and class D, then _____ 1 1 3
   (A) Those are 2 pairs of single inheritance (B) That is multilevel inheritance
   (C) Those is enclosing class (D) Those are all independent classes

10. Single level inheritance supports _____. 1 1 3
    (A) Runtime polymorphism (B) Compile time polymorphism
    (C) Multiple inheritance (D) Language independency

11. Single level inheritance is safer than _____ 1 1 3
    (A) Multiple inheritance (B) Interfaces
    (C) Implementations (D) Extensions

12. What is the output? 1 2 3

```
#include<iostream>
using namespace std;
class A{
public:
  virtual void abc()=1;};
class B: public A{
  public:
    void abc()    {
cout<<"Output correct: "<<endl;    }};
int main(){
  B b;
b.abc();
  return 0;}
```

    (A) Output correct (B) Token error
    (C) No output (D) Garbage value

13. What is meant by the template parameter? 1 1 4
    (A) It can be used to pass a type as an argument (B) It can be used to evaluate a type
    (C) It can of no return type (D) It can be used to delete a type

14. Identify the correct statement about throw(type). 1 1 4
    (A) A function can throw any type of exceptions (B) A function can throw an exception of certain type only
    (C) A function can't throw any type of exception (D) A function can catch all types of exceptions

15. What do you mean by "No exception specification"? 1 1 4
    (A) It throws nothing (B) It can throw anything
    (C) It can catch anything (D) It can try anything

16. In most cases, _____ diagrams are used in conjunction with deployment diagrams to show how physical modules are distributed on various hardware platforms. 1 1 5
    (A) Activity (B) Use case
    (C) Sequence (D) Component

17. Identify the output in the following code: 1 3 6

```
#include
#include
 using namespace std;
 int main()
 {
   vector v;
    for (int i = 1; i <= 5; i++)
      v.push_back(i);
    vector :: const_iterator i;
        for (i = v.begin(); i != v.end(); ++i)
      cout << *i << " ";
   cout<
    return 0;
 }
```

(A) 1 2 3 4 5 (B) 1 3 5
(C) 1 4 5 (D) Error

18. What are the containers? 1 1 6
(A) Containers store objects and data (B) Containers stores all the algorithms
(C) Containers contain overloaded functions (D) Containers contain set of Iterators

19. _____an ability to automatically resize when appending elements. 1 1 6
(A) Array (B) Dynamic Array
(C) Vector (D) Container

20. State the return type for open method(). 1 2 6
(A) int (B) char
(C) float (D) bool

Part - B (5 × 4 = 20 Marks) Marks BL CO

Answer **any 5** Questions

21. HackerLand University has the following grading policy: Every student receives a grade in the inclusive range from 0 to 100. Any grade less than 40 is a failing grade. Sam is a professor at the university and likes to round each student's grade according to these rules: 4 3 1
If the difference between the grade and the next multiple of 5 is less than 3, round grade up to the next multiple of 5.
If the value of grade is less than 38, no rounding occurs as the result will still be a failing grade.
Examples
grade = 84 round to 85 (85 - 84 is less than 3)
garde = 29 do not round (result is less than 40)
grade = 57 do not round (60 - 57 is 3 or higher)
Given the initial value of grade for each of Sam's n students, write code to automate the rounding process.

22. Construct a C++ program to create a class Worker with data members as worker-name, worker_id, no-of-hours-worked, pay-rate, DOJ. Write necessary member functions such as get employee details and Calculate method to calculate and Display Employee Details to display the salary of worker.(Use default value for pay-rate).Display the employee those who are getting more than 20000 per months. Try to automate this software by satisfying all the necessary constraints. 4 3 1

23.	Create a class named 'Triangle' with two data members-' base' and 'height' and a member function 'area' to calculate the area of the triangle. The class has three constructors which are: 1. Having no parameter - values of both members are assigned zero. 2. Having two numbers as parameters - the two numbers are assigned as base and height respectively. 3. Having one number as parameter - both length and breadth are assigned that number. Create objects of the 'Triangle' class having none, one and two parameters and print their areas.	4	2	2
24.	Rohit loves numbers consisting of n digit's , and Rahul likes number that are divisible by t. Construct a C++ program using pure function where the output should print positive number without leading zeroes, if there are multiple possible answer's allowed to print any of them.	4	3	4
25.	Salman has conducted a test for his student's recently. The number of paper's he has corrected last night was a huge number. He didn't have time to prepare result statement. Write a C++ program using inheritance to implement by getting marks of the student and displaying whether passed or failed in that subject.	4	3	3
26.	A University conducts examinations and the results are announced. Prepare a report for the following: · Print the marks in the register number order semester wise for each department · Print the Arrear list semester wise. · Prepare a Rank list for each department. · Prepare the final aggregate mark list for final year students. Identify the problem statement and Design the component for each sequence Draw UML component diagrams, and Explain all notations in component diagrams.	4	4	5
27.	Write a C++ program containing a possible exception. Use a try block to throw it and a catch block to handle it properly.	4	3	6

Part - C (5 × 12 = 60 Marks)

Answer **all** Questions

		Marks	BL	CO
28.	a. Construct a C++ program to create a class Worker with data members as worker-name, no-of-hours-worked, pay-rate. Write necessary member functions to calculate and display the salary of worker. Write necessary member functions to calculate and display the salary of worker. (Use default value for pay-rate) **(OR)** b. Define a major use case for a credit card processing system (credit card payment gateway) and design a neat use case diagram. Scenario: The merchant submits a credit card transaction request to the credit card payment gateway on behalf of a customer. Bank which issued customer's credit card is actor which could approve or reject the transaction. If transaction is approved, funds will be transferred to merchant's bank account.	12	3	1

29. a. The math assignment says you will be given numbers, mostly with imaginary additions, that means complex numbers, and you need to add them and tell the answer in your answer script. You told to your friend named as john that you dont know the addition of complex number, so john will write a program ,through which you can write in order to get the results of addition of complex numbers. Limitation:1<=a,b,c<=10^5.With the help of three inputs, print your result in such a way as, 12 3 2

1.First Print the complex number
(i) z1 as in the form a+bi
(ii) a+bi + c as z2
Finally as z2 + a + bi.

(OR)

b. One of the famous Indian Hockey player has admitted in hospital due to stress injury in his back and opted out of upcoming worldcup in Australia. Since the player is one of the icon the Indian player , he has been given with best facilities available in the hospital. The player was admitted in the hospital for more than a week so hospital wanted to calculate the bill for rooms and medicines every week. Draw the sequence and collaboration diagram for the above scenario and explain the components in that. The following are examples of class objects used in this UML Iteration Diagrams of a Hospital Management System:

30. a. Construct a C++ program using class and object to implement Fibonacci series of given number using recursion concept and abstract class concept but the condition is program has to refer function in cache memory and not from main memory. 12 4 3

(OR)

b. Construct Activity diagram for Airport Security Check Screening System using the following function requirement.

· When someone checks in online the system automatically lifts the electronic tickets of those passengers.
· Passengers checked-in online will automatically show in the Airport Departure Control System.
· Online Boarding Pass to be collected.
· The passenger should display the boarding pass image before boarding the flight.
· By providing an online check-in service to your passengers you can reduce the processing time at the airport as well as reducing the staff required at check-in desks.
· Improving the service to your customers as well as reducing overheads.

31. a. Ram and shiva are working as accountants in bank. They need to know all the arithmetic operations to verify the accounts. Since they are weak in mathematics, they found difficulty in doing such arithmetic operations. Help them to check accounts by applying arithmetic operations including add, subtract, multiply and divide using class template. 12 3 4

(OR)

b. Draw UML Package and Component diagram for Library Management System. A Library lends books and magazines to members, who are registered in the system. It also maintains the purchase of new books and magazines for the Library. A member can reserve a book or magazine that is not currently available in the library, so that when it is returned or purchased by the library, that person is notified. The library can easily create, replace and delete information about the books, members, and reservations in the system. The book's transactions are stored in the database. The fine list while the member returns the book after the due date must be generated. Analyze the users and actors of this system, and the interactions between them must be depicted.

32. a. Write an application that prompts the user to enter a number to use as an array size, and then attempt to declare an array using the entered size. If the array is created successfully, display an appropriate message. Otherwise generates a NegativeArraySizeException if you attempt to create an array with a negative size, and it creates a NumberFormatException if you attempt to create an array using a non-numeric value for the size. Use a catch block that executes if the array size is nonnumeric or negative, displaying a message that indicates the array was not created. 12 4 6

(OR)

b. Assuming that a text file named FIRST.TXT contains some text written into it, write a function named vowelwords(), that reads the file FIRST.TXT and creates a new file named SECOND.TXT, to contain only those words from the file FIRST.TXT which start with a lowercase vowel (i.e., with 'a', 'e', 'i', 'o', 'u'). For example, if the file FIRST.TXT contains Carry umbrella and overcoat when it rains Then the file SECOND.TXT shall contain umbrella and overcoat it

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