



MGM University
Aurangabad-431003
First Term Exam A.Y. 2021-22

Program : **Information Technology**
Course : **Object Oriented Programming using C++**
Course Code : **BITPCC303**

Sem –III
Marks : 60

Instructions to the students

1. Each question carries 10 marks.
 - 2 All questions are compulsory
 3. Illustrate your answers with neat programs and diagram etc wherever necessary
 4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly
-

Marks

Q1. Solve any two

- a)1. In C++, a function contained within a class is called
 - A. a member function.
 - B. an operator.
 - C. a class function.
 - D. a method.
2. Who provides instruction to run and launch programs?
 - A. Hardware oriented procedure
 - B. Software oriented procedure
 - C. Internal procedure
 - D. All of these
3. Bundling data and functions together is called _____.
 - A. Object-oriented paradigm
 - B. Data hiding
 - C. Encapsulation
 - D. Polymorphism
4. C++ feature by which one object can interact with another object is:
 - A. Data transfer
 - B. Data binding
 - C. Message passing
 - D. Message Reading
5. In UML, Behavioural diagrams are
 - A. Class, Object, Component, deployment
 - B. Use case, activity, State chart
 - C. Both 1 and 2
 - D. none

- (5)
- b) 1. State and explain whether the following statement is TRUE or FALSE?
In object-oriented programming, all data are shared by all functions.
 2. What is the purpose of a system software?
 3. State any two differences between a compiler and an interpreter.
 4. _____ commands are stored in the computer list in the form of files.
 - A. Internal

- B. External
- C. Both 1 & 2
- D. None

5. Which of the following statement is true ?

- A. Compiler generates error message after scanning the whole program.
- B. Interpreter generates intermediate object code.
- C. Interpreter takes a source program and runs it line by line.
- D. Both 1 and 3

c) Construct UML, class diagram and Use case diagram for an Airlines management system. (5)

Q2. Solve any two

a) Design and write a program in C++ using for loop that displays all even numbers from 10 to 20. (5)

b) Describe a class. Write a program in C++ to define a class for student details like: PRN No., Name, Marks. Write functions to read, calculate result and display. (5)

c) What is the purpose of array of objects. Demonstrate its usage with an example. (5)

Q3. Solve any two

a) What is a constructor? Demonstrate different types of constructor and its use with a program. (5)

b) Explain the purpose, usage and differences between the constructor and destructor. (5)

c) #include <iostream>
using namespace std;
class construct

```
{
    public:
        int a, b;
        construct()
        {
            a = 10;
            b = 20;
        }
};
int main()
{
    construct c;
    cout << "a: " << c.a << endl << "b: " << c.b;
    return 1;
}
```

What will be the output of the program? (5)

Q4. Solve any two

a) Describe characteristics and types of inheritance. Write syntax to implement inheritance. (5)

b) Describe the situation when a friend function should be used. Write a program to demonstrate. (5)

c) Explain the role of public, private and protected access modes in inheritance. (5)

Q5. Solve any two

a) Which object-oriented characteristic is achieved using polymorphism? Describe types of polymorphism. (5)

- b) Demonstrate function overloading with a program. (5)
- c) Describe rules to implement operator overloading. Write the syntax to overload a unary operator (5)

Q6. Solve any two

- a) Describe different types of error that can occur in a program. (5)
- b) What is an exception? Describe types of exception and which can be handled by a C++ program. (5)
- c) Write a program to detect and report an exception using try catch block (5)

End of paper



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Second Term Exam A.Y. 2021-22

Program : **Information Technology**

Sem -IV

Course : **Data Structures**

Marks : 60

Course Code : **20UIT403D**

Instructions to the students

1. Each question carries 10 marks.
- 2 All questions are compulsory
3. Illustrate your answers with neat programs and diagram etc. wherever necessary
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

Marks

Q1. Solve any two

a)

(5)

1. Performance measurement of an algorithm depends on
 - A. Processor & Memory
 - B. Complexity and capacity
 - C. Time and space
 - D. Date and space
2. Linked list are best data structures
 - A. for relatively permanent collections of data
 - B. for the size of the structure and the data in the structure are constantly changing
 - C. Both A & B
 - D. None
3. Static memory allocation has following feature
 - A. fixed memory space
 - B. variable memory space
4. An algorithm can have zero or more inputs
 - A. True
 - B. False
5. The time complexity is a measure of
 - A. Input size
 - B. Output size
 - C. Only A
 - D. both A & B

b) Compute time complexity for the given code:

(5)

```
Algorithm AddNum(A,n)
{
for(i=1: i<=n; i++)
{
    Sum = sum+ A[i];
}
}
```

c) Write an algorithm to find even numbers from a set of numbers.

(5)

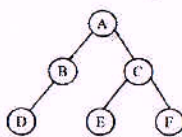
- a) What is the working principle of a queue. Write an algorithm to demonstrate operations on a queue. (5)
- b) Convert the given expression into prefix and postfix
 $A+B*C+(E*F/G)$ (5)
- c) Demonstrate the steps to evaluate a postfix expression using a stack. (5)

Q3. Solve any two

- a) Write an algorithm to perform following operations on a singly linked list (5)
 1. Insert node at end
 2. Search a node
- b) Write an algorithm to perform following operations on a doubly linked list (5)
 1. Insert node at start
 2. Delete a node from start
- c) Demonstrate polynomial subtraction operations using linked list (5)

Q4. Solve any two

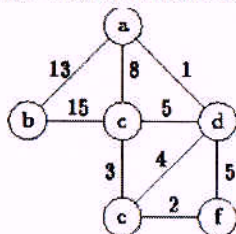
- a) Define a binary search tree? Represent the given tree using available methods (5)



- b) Construct a maximum heap tree for given data: (5)
 $\{ 50, 25, 45, 15, 55, 30, 20, 50, 110, 125, 45\}$
- c) Traverse the constructed tree in question 4(b) in postorder and preorder (5)

Q5. Solve any two

- a) Describe graph data structure. Explain graph adjacency list representation (5)
- b) Write an algorithm for graph traversal method DFS (5)
- c) Find the minimum cost spanning tree for the given graph (5)



Q6. Solve any two

- a) Sort the given set of numbers using insertion sort (5)
 $\{ 25, 10, 20, 35, 45, 30, 45, 22\}$
- b) Sort the set of numbers given in 6 (a) using heap sort (5)
- c) Write an algorithm for binary search method. (5)

End of paper