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3E1204

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B.Tech. III - Sem. (Main & Back) Examination, January/February - 2024

Artificial Intelligence & Data Science

3AID4-06 Object Oriented Programming

AID, CAI, CS, IT, CCS, CDS, CIT, CSD, CSR

Time : 3 Hours

Maximum Marks : 70

*Instructions to Candidates:*

*Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.*

*Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / Calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No.205)*

#### **PART - A**

**(Answer should be given up to 25 words only)**

**ALL questions are compulsory.**

**(10×2=20)**

1. Why do we need the pre-processor directive `#include <iostream>`?
2. What are the applications of `void` data type in C++?
3. What are objects ? How are they created?
4. What is parameterized constructor?
5. Describe the syntax of Operator function.
6. What is a virtual base class?
7. What are the application of this pointer?
8. What role does the `iomanip` file play?
9. What are input and output stream?
10. What is generic programming?

## PART - B

(Analytical/Problem solving questions)

Attempt any FIVE questions.

(5×4=20)

1. How does a constant defined by **const** differ from the constant defined by the pre-processor directive statement **#define**?
2. What is a **friend** function? What are the merits and demerits of using friend function?
3. What do you mean by Dynamic initialization of ob objects?
4. A friend function cannot be used to overload the assignment operator **=**. Explain why?
5. Class D is derived from Class B. The class D does not contain any data members of its own? Does the class D require constructors? If yes, why?
6. When do we make a virtual function "pure"? What are the implications of making a function a pure virtual function?
7. A template can be considered as a kind of MACRO. Then, what is the difference between them?

## PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any THREE questions.

(3×10 =30)

1. Write a class template to represent generic vector. Include member functions to perform the following tasks:
  - a) To create the vector
  - b) To modify the value of a given element
  - c) To multiply by a scalar value
  - d) To display the vector in the form (10, 20, 30..... )
2. Write a main program that calls a deeply nested function containing an exception incorporate necessary exception handling mechanism?
3. Write a program to print a table of values of the function  $y = e^x$ .
4. Create a class **MAT** of size  $m \times n$ . Define all possible matrix operations for **MAT** type objects?
5. Write a program that reads the Name "Rajasthan Technical University" from the keyboard in to three separate string objects and then concatenate them into a new string object using **+** operator?