Reg. No. :

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

Third Semester

Artificial Intelligence & Data Science

R21UAD303- OBJECT ORIENTED PROGRAMMING USING PYTHON

(Regulations R2021)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Which of the following is not a type of inheritance?   CO1- U

    (a) Double level   (b) Single level   (c) Multiple   (d) Multi-level

2. What type of inheritance is illustrated in the following Python code?   CO2- App

    ```
    class A():
    pass
    class B(A):
    pass
    class C(B):
     pass
    ```
    (a) Multi-level inheritance   (b) Multiple inheritance
    (c) Hierarchical inheritance   (d) Single level-inheritance

3. In multiple inheritance, if class C inherits two classes A and B as   CO2- App
    follows, which class constructor will be called first?
    ```
    class A{};
    class B{};
    class C:public A, public B{};
    ```
    (a) A()   (b) B()   (c) C()   (d) Can't be determined

4.   Which keyword is used for function in Python language?   CO1- U
    (a) Function   (b) def   (c) Fun   (d) Define

5. What will be the output of the following Python code?   CO2- App
    ```
    sentence ='we are humans'
    matched =re.match(r'(.*) (.*?) (.*)', sentence)
    print(matched.group())
    ```
    (a) ('we', 'are', 'humans')   (b) (we, are, humans)
    (c) ('we', 'humans')   (d) 'we are humans'

PART – B (5 x 3= 15 Marks)

6. Create a class Student with attributes name and marks. Write methods to assign marks and to display the student's details. Instantiate an object of Student, assign marks, and display the details.   CO2-App

7. Create a class called Person with attributes name and age. Encapsulate these attributes using getters and setters. Instantiate a Person object, set their name and age using the setters, and then retrieve and print these values using the getters.   CO2-App

8. What is Polymorphism?   CO1-U

9. Differentiate Exceptions from Errors with example   CO1-U

10. List any four special characters used in regular expressions with its meaning.   CO1-U

PART – C (5 x 16= 80 Marks)

11. (a) Explain the four fundamental principles of Object-Oriented Programming.   CO1-U   (16)

Or

    (b) Compare Classes and Objects and also Illustrate with an example   CO1-U   (16)

12. (a) Write a Python program that uses abstract classes to represent different food items. The Food abstract class should have an abstract method prepare () that doesn't have any implementation. Create two concrete classes, Pizza and Salad that inherit from the Food abstract class. Implement the prepare ()method in both Pizza and Salad classes to describe the steps to prepare a pizza and a salad, respectively. Give the explanation of Abstraction.   CO2- App   (16)

Or

    (b) Create a Student class. A student is identified by his/her name, Roll no, marks. Display the academic performance of a student Ragu. Make all attributes private and Methods public. Use constructor to initialize.   CO2- App   (16)

13. (a) Briefly Explain about Polymorphism and its Types   CO1-U   (16)

Or

    (b) Can you briefly explain class relationships and provide a suitable example to illustrate them?   CO1-U   (16)

R3E03

14. (a) Consider a scenario in a payment processing system where you have a base class Payment Method with a method process Payment (). Derived classes Credit Card Payment, PayPal Payment, and Bank Transfer Payment override the process Payment () method. Write a function that accepts a Payment Method object and processes the payment regardless of the specific payment method type. CO2- App (16)

Or

(b) Write a program where a constructor throws an exception if invalid parameters are provided. For example, create a Bank Account class with a constructor that throws an Illegal Argument Exception if the initial balance is negative. Ensure that the exception is caught and handled when an object of this class is created. CO2- App (16)

15. (a) Write a Python program to identify and extract all substrings that match the pattern 1(0+)1 in a given string using Python's regex capabilities. CO2-App (16)

Or

(b) Develop a python program to find all the patterns of "1(0+)1" in a given string using python regex. CO2-App (16)

R3E03

R3E03