PG/IS/MCA/104/24

MCA 1st Semester Examination, 2024

MCA

PAPER – MCA-104

Full Marks : 100

Time : 3 hours

Answer **all** questions

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

GROUP – A

Answer any **five** questions : 2×5

1. What is method overriding ?

2. Define static method.

3. What is f-string ?

4. Consider a tuple $V = (3.5, 2.0, 4.5, 6.0, 50.0, 10.0)$. How can you display first four elements and odd index elements ?

5. What is dictionary in Python ? Create a dictionary with Integer keys.

6. Write any two functions of Python shell.

7. What is the use of __init__ method, explain with example.

8. What is the use of self in Python ?

GROUP–B

Answer any **four** questions : 15×4

9. (*a*) Define single inheritance. State any two benefits of inheritance.

(*b*) Create a base class *Person* with attributes *name* and *age* in Python. Create a derived class *Student* form *Person* that adds the attribute *student_id*, and another derived class *GraduateStudent* from *Student* that adds *degree*. Define methods to display all details. 4 + (4 + 4 + 3)

10. (*a*) What is constructor ? How can we declare it in Python ?

(*b*) What is the role of __new__ method ?

(*c*) Create a class Car with a constructor that takes the make, model, and year as arguments and initializes them. Then, create two objects of the Car class and display their attributes. 5 + 2 + 8

11. (*a*) What is __str__ method ?

(*b*) Distinguish between __str__ and __repr__ methods.

(*c*) Create a class *Book* with attributes : *title*, *author*, and *price*. Implement the __str__ method to return a user-friendly string representation (e.g., "Book : [Title] by [Author]"). Then, implement the __repr__ method to return a technical string (e.g., "Book (title ='...', author ='...', price = ...)''). Finally, create an instance of the *Book* class and print the object using str ( ) and repr ( ).

2 + 3 + (2 + 3 + 3 + 2)

12. (*a*) Compare among private, protected, and public access specifier of a class.

(*b*) What are the uses of Getters and Setters in Python ?

(*c*) Write a Python program to

- Create a class *Person* with a private attribute *__age*.
- Use a getter method to access the value of *__age* and use a setter

method to update the value of *_age* while ensuring the age is a positive integer.

- Modify the setter method to raise a ValueError if the age is not a positive integer.
- Create an instance of the *Person* class and set a valid and an invalid age, observing the behavior.

2 + 2 + (2 + 4 + 2 + 3)

13. (*a*) What is polymorphism ?

(*b*) Write a user defined Python function to demonstrate Polymorphism.

(*c*) Explain polymorphism with inheritance.

2 + 6 + 7

14. (*a*) Write a program in Python to overload comparison operators.

(*b*) Distinguish between method overloading and method overriding with examples.

7 + 8

15. (*a*) What is recursive function ? Write a recursive function to find the GCD of two numbers.

(*b*) What is the syntax of *for* loop in Python ? Write a program to check whether a number is palindrome or not.

(*c*) Explain cumulative loop with example.

6 + 7 + 3

16. (*a*) Explain inheritance in python with example.

(*b*) Create a class *employee* with data members: *name*, *department* and *salary*. Create suitable methods for reading and printing employee information.

(*c*) Discuss with an example such situations where __del__ function behaves absurd.

5 + 5 + 5

[Internal Assessment — 30 Marks]