Master of Operational Research (MOR)
SEM I, 2022
Course – MOR105, Paper Title - Python Programming (223601105)
(N.C.: - Admission of 2019 and onwards)
Time: 3 Hours   **Maximum Marks: 50**
(Write your Roll No. On the top immediately on the receipt of this question paper)
(Answer any four questions.)

1.   (a) Write a program to plot a bar chart in python to display the pass percentage of Department of Operational Research for five consecutive years for the given data: -

Year	Pass Percentage
2018	98.50
2019	70.25
2020	55.20
2021	90.50
2022	96.58

(3)

(b) Differentiate between a run-time error, semantic error and syntax error. Give one example of each. (3)

(c) Explain the use of Lambdas in Python with an example. (3)

(d) What is the difference between deep and shallow copy? (2.5)

(e) What do you mean by indentation in python? Is indentation required in python? (1)

2. (a) What are the counter controlled and sentinel-controlled loops? (2)
(b) What does *args, **kwargs mean? Why would we use them? (2)
(c) Assume, you are given two lists:
        a = [1,2,3,4,5]
        b = [6,7,8,9]
   Write a command to create a list which has all the elements of a and b in one dimension. (2)
(d) Write a programme that takes a positive integer n and produce in line of output as shown below:
        1
        2   3
        4   5   6
        7   8   9   (2.5)
(e) What advantages do NumPy arrays offer over Python lists? (2)
(f) What is the importance of user defined module? Discuss different in-built modules of Python. (2)

3. (a) Looking at the below code, write down the final values of A0, A1, …An.   (3)

```
A0 = dict(zip(('a','b','c','d','e'),(1,2,3,4,5)))
A1 = range(10)
A2 = sorted([i for i in A1 if i in A0])
A3 = sorted([A0[s] for s in A0])
A4 = {i:i*i for i in A1}
A5 = [[i,i*i] for i in A1]
print(A0,A1,A2,A3,A4,A5)
```

(b) Observe the following Python code carefully and obtain the output, which will appear on the screen after execution of it.

```
i , j , k , n = 5,6,7,3
print(i + j * k - k % n)
print(i // n)
```
(2)

(c) Give the difference between the type casting and automatic type conversion. Also, give a suitable Python code to illustrate both. (3)

(d) What do you understand by local and global scope of variables? How can you access a global variable inside the function, if function has a variable with same name? (2.5)

(e) What will be the output of the following Python code?

(i)
(2)
```
class A:
        def __init__(self,x):
                self.x = x
        def count(self,x):
                self.x = self.x+1
  class B(A):
        def __init__(self, y=0):
                A.__init__(self, 3)
                self.y = y
        def count(self):
                self.y += 1
  def main():
        obj = B()
        obj.count()
        print(obj.x, obj.y)
  main()
```

4. (a) Write a python program that simulates a traffic light. The program should consist of the following: (5)

i. A user defined function trafficLight ( ) that accepts input from the user, displays an error message if the user enters anything other than RED, YELLOW, and GREEN. Function light () is called and following is displayed depending upon return value from light ().

  --*"STOP, your life is precious"* if the value returned by light() is 0.
  --*"Please WAIT, till the light is Green* "if the value returned by light () is 1
  --*"GO! Thank you for being patient"* if the value returned by light() is 2.

ii. A user defined function light() that accepts a string as input and returns 0 when the input is RED, 1 when the input is YELLOW and 2 when the input is GREEN. The input should be passed as an argument.

iii. Display " SPEED THRILLS BUT KILLS" after the function trafficLight( ) is executed.

(b) Define a class Employee. Display the personal salary details of three employees using single inheritance. (3)

(c) What is the utility of indexing and slicing in tuple? (2.5)

(d) Differentiate between search() and match() found in "re" module. (2)

5. (a) Create a module named area having four functions named triangle, square, rectangle, and circle. All these functions takes arguments according to their shape; compute and returns the area of the shape. Import the module in the main program and call the respective function depending on the user requirement and compute the area of respective shape. (3)

(b) Discuss at-least 4 different ways to create a dictionary. (2)

(c) Find the errors in code given below: (2)

```
i) def minus(total, decrement)          ii) define check( )
      output = total – decrement              N=input('Enter N:')
      print(output)                           i=3
      return(output)                          answer = 1+i**4/N
                                              return answer
```

(d) The record of a student (Name, Roll No., Marks in five subjects and percentage of marks) is stored in the following list:

stRecord = ['Ahana','A-36',[56,98,99,72,69], 78.8] (2.5)

Write Python statements to retrieve the following information from the list stRecord.
   i) Percentage of the student
   ii) Marks in the fifth subject
   iii) Maximum marks of the student
   iv) Roll no. of the student
   v) Change the name of the student from 'Ahana' to 'Aavya'

(e) Using an example, explain the significance of the __init__ method. (2)

(f) What does PIP stands for? Why is it utilized? (1)

6. (a) Create a class called library with data attributes like acc_number, publisher, title and author. The methods of the class should include
   i). read() – acc_number, title, author.
   ii). compute() - to accept the number of days late, calculate and display the fine charged at the rate of $1.50 per day.
   iii). display the data. (4.5)

(b) Write a program to input your friends' names and their Phone Numbers and store them in the dictionary as the key-value pair. Perform the following operations on the dictionary: (3)
   i) Display the name and phone number of all your friends
   ii) Add a new key-value pair in this dictionary and display the modified dictionary
   iii) Delete a particular friend from the dictionary
   iv) Modify the phone number of an existing friend

v) Check if a friend is present in the dictionary or not

vi) Display the dictionary in sorted order of names

(c) Write short notes on: (3)

i) Keyword Arguments

ii) Default Arguments

iii) Variable length Arguments

(d) What do you mean by right shift and left shift operator? Write binary equivalent of the following numbers and perform the right and left shift on both of them. (2)

(i) 23 (ii) 40