B.Tech.
(SEM IV) THEORY EXAMINATION 2022-23
PYTHON PROGRAMMING

Total Marks: 100

Time: 3 Hours

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

2 x 10 = 20

1. **Attempt *all* questions in brief.**

   a. Define the programming cycle for Python.
   b. Describe the use of class `__init__()` method.
   c. Explain features of any two Python IDEs.
   d. Discuss the purpose of the break and continue statement in loops.
   e. Explain mutable sequences in Python.
   f. Explain the output of following function.
   ```
   defprintalpha (abc_list, num_list):
       for char in abc_list:
           for num in num_list:
               print(char, num)
       return
   printalpha (['a', 'b', 'c'], [1, 2, 3])
   ```
   g. Discuss the special methods __le__ and __ne__.
   h. Discuss various file opening modes of python.
   i. Compare assert, try-except and raise statements.
   j. Write python function to perform linear search.

SECTION B

10x3=30

2. **Attempt any *three* of the following:**

   a. Write Python code snippet to display n terms of Fibonacci series using recursion.
   b. Write and explain an algorithm through python code to generate prime numbers.
   c. Compare list and tuple data structure with suitable examples. Explain the concept of list comprehension.
   d. Explain the python implementation of stack ADT.
   e. Describe python program to implement selection sort. Simulate your code on the following data
   2,52,1,5,2,54,62,64.

SECTION C

3. **Attempt any *one* part of the following:**   10x1=10

   a. Discuss various categories of operators in python. Find and explain stepwise solution of following expressions if a=3, b=5, c=10.

      i)   a &b<<2//5**2+c^b
      ii) b>>a**2<<2 >> b**2^c**3

   b. Discuss why python is interpreted language. Explain history and features of python while comparing python version 2 and 3.

4. **Attempt any *one* part of the following:**   10x1=10

   a. Write a python program to count the vowels present in given input string. Explain the output of program through example.

   b. Write a program that accepts sequence of lines as input and prints the lines after making all characters in the sentence capitalized.

      e.g. If Input:
      Hello world
      Practice makes perfect
      Then, Output:
      HELLO WORLD
      PRACTICE MAKES PERFECT

5. **Attempt any *one* part of the following:**   10x1=10

   a. Discuss list data structure of python. Explain various inbuilt methods of list with suitable example of each.

   b. Compare list and dictionary data structure. Explain various dictionary methods with suitable examples of each.

6. **Attempt any *one* part of the following:**   10x1=10

   a. Discuss the concept of Iterators in python. Explain, how we can create text file in python? Describe python program to write the number of letters and digits in given input string into a File object.

   b. Illustrate through examples, how we can implement different type of inheritance in python? Explain the static, instance and class method through suitable example.

7. **Attempt any *one* part of the following:**   10x1=10

   a. Explain the Tower of Hanoi problem and its recursive solution in Python.

   b. Write python program to implement merge sort algorithm. Discuss, how we can compare the time complexity of two algorithms?