PG Even Semester Examination, September, 2023

COMPUTER SCIENCE

(8th / 2nd Semester)

Course No.: MCS-552

(Python Programming)

Full Marks: 70

Pass Marks: 28

Time: 3 hours

The figures in the margin indicate full marks for the questions.

Answer any five questions, taking one from each unit.

UNIT-I

1. (a) Explain comments and Doc strings in Pyhton. 2+2=4

   (b) What are Python pass, range statement and assert statements? 2x3=6

   (c) Explain none type in Python with relevant example. 4

2. (a) Explain bool and complex data types in Python. 4

   (b) What are the bin(arg), oct(arg) and hex(org) functions in Python? Explain with examples. 2x3=6

(c) Write a Python program to convert numbers from octal, binary and hexadecimal system to decimal number system. 4

UNIT-II

3. (a) What are formal and actual parameters of a function? 2

 (b) Explain Python's scope rules by taking a suitable example. What is the role of a symbol table in scoping? 6+2=8

 (c) Explain the following operators : 4

 in, not in, is, is not

4. (a) Write a function to find prime numbers upto 100. 3

 (b) Write a function to find all factors of a number. 3

 (c) Write a function to show how functions can be passed to a function. 3

 (d) What is a module in Python? Create an Employee module which has the following functions 1+4=5

 DA = 40% of basic

 HRA = 15% of basic

 PF = 12% of basic

 I Tax = 10% of gross

 Write a Python program to calculate the gross (basic + DA + HRA) & Net (gross- PF - Itax) salary of an employee using the Employee module.

UNIT-V

9. (a) Describe the following packages of Python: 2x3=6

 Numpy, Matplotlib, Pandas

 (b) Explain the following with relevant examples: 2x4=8

 (i) Adding and subtracting matrices in numpy

 (ii) Matrix multiplication in Numpy

 (iii) Dot product of two vectors in Nampy

 (iv) Reshaping and Indexing Numpy Array

10. (a) Explain the following functions of Mataplotlib with revelant exampels : 2x4=8

 (i) Bars

 (ii) Scatter

 (iii) Pie

 (iv) x label and y label

 (b) Explain the following with relevant examples in the context of Pandas : 2x3=6

 (i) Data Frames

 (ii) CSV files and how to read CSV files in Pandas

 (iii) Analysing Data Frames in Pandas

****

UNIT-IV

7. (a) Explain, with suitable examples, data abstraction, information hiding and inheritance in Python. 2x3=6

(b) What is a class variable in Python? How does it differ from the data variables of an object? 3

(c) Create a person class with data attributes name & birthdate. The sorting should be done on last name and if the last name is empty then on the fullname. Include methods to set name, get name, set birthdate and a method which returns whether a person is older / younger than another person in age. 5

8. (a) What are interators and generators in Python? How does a generator differ from a normal Python function? 4

(b) Explain, with relevant example, how a for loop works in any interable object in Python. 3

(c) (i) Why is a genetator function considered to be memory efficient? 2

(ii) Write a generator function to print out the series 0,5, 10, ...2 upto the 10th number in the series. 2

(iii) Write an iterator class for printing out n***2 for a maximum of 5 times. (n & max are data attributes of the interater class). 3

UNIT-III

5. (a) Write a Python program to find out the maximum and minimum elements in a list of elements. 3

(b) (i) Suppose L1= [1, 2, 3, 4]. What is the difference between L1[:] and new L1= L1.1.

(ii) Explain, with an example, why cloning is necessary when a hit gets mutated while iterating over it. 3+3=6

(c) Consider a tuple definition given below 5

test = ((1, “a”), (3, “b”), (2, “a”), (7, “b”))

Write a function that returns a tuple which contains the min, max number in test and also unique words in test.

6. (a) Explain the following functions of Python : lambda, map, filter. 4

(b) Write a Python program to find the product of too different lists using map and lambda functions. 3

(c) What are the advantage of list comprehension over map and filter? Write a Python program using list comprehension for the Pythagorean theorem with tripples x, y, z below 100 and no duplicates. 1+4=5

(d) Explain, with example, how map, generator and filter can be combined in list comprehension. 2