Graphic Era
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

End Term (Odd) Semester Examination December 2024

Roll no.....

Name of the Course and semester: BCA III

Name of the Paper: Python Programming
Paper Code: TBC 304

Time: 3 hours

Maximum Marks: 100

Note:

(i) All the questions are compulsory.
(ii) Answer any two sub questions from a, b and c in each main question.
(iii) Total marks for each question is 20 (twenty).
(iv) Each sub-question carries 10 marks.

Q1. (2X10=20 Marks)

a. Explain the use of the Python interpreter and interactive mode. Write a Python program to demonstrate the use of numeric data types, expressions, and comments in a calculation-based problem. (CO1)

b. Describe the use of Boolean values and conditional statements in Python. Write a program to check whether a given number is positive, negative, or zero using conditional (if), alternative (if-else), and chained conditional (if-elif-else) structures. (CO1)

c. Illustrate the concept of iteration in Python with examples. Write a Python program that uses a for loop to calculate the sum of even numbers between 1 and 50. Use the break and continue statements to modify the loop behavior, and explain their usage. (CO3)

Q2. (2X10=20 Marks)

a. Outline the concept of immutability in strings. Write a Python program to demonstrate string slicing, string methods, and functions such as find(), replace(), and split(). (CO1)

b. Differentiate between lists and tuples in Python with examples. Write a program that demonstrates the mutability of lists by modifying their elements. Create a tuple and use tuple assignment to unpack its values into variables. (CO2)

c. Discuss the significance of dictionaries in Python programming. Write a program to demonstrate the use of dictionary methods like keys(), values(), items(), and get(). (CO2)

Q3. (2X10=20 Marks)

a. Elaborate the concept of functions as abstraction mechanisms. Write a Python program using a top-down design approach to solve a problem, such as calculating the factorial of a number using a recursive function. (CO2)

b. Describe higher-order functions? Explain with examples, such as map(), filter(), and reduce(), in solving a problem involving list processing. (CO2)

c. Explain the concept of inheritance in Python? Create a base class Animal with a method sound (). Derive two subclasses Dog and Cat that override the sound() method. (CO1)

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Q4. (2X10=20 Marks)

a. Outline the event-driven programming in the context of GUI applications? Write a Python program to create a simple window with a label and a button. When the button is clicked, the label text should change. (CO1)

b. Discuss the role of entry fields in GUI applications for input and output of text. Write a Python program to create a GUI-based calculator. The application should allow the user to input two numbers and select an operation using buttons and display the result in an entry field. (CO2)

c. Explain how pop-up dialog boxes and image display are used in GUI programming. Create a Python program to display an image in a GUI window and include a button that, when clicked, shows a pop-up dialog box with a custom message. (CO1)

Q5. (2X10=20 Marks)

a. Explain the concept of threads and multithreading in Python. Write a Python program using the threading module to create two threads: one that prints even numbers and another that prints odd numbers. Use the sleep () function to introduce delays in thread execution. (CO1)

b. Define and explain the roles of clients, servers, IP addresses, ports, and sockets in network programming. How do they work together in a client-server model? (CO2)

c. Describe the role of synchronization in multithreaded programming. Write a Python program to demonstrate the producer-consumer problem using threads and a synchronized queue. Explain how synchronization is achieved to avoid race conditions. (CO2)