Big Data Analytics BDA – 12 IBA
Fundamentals of Python Language Total Marks 108

[Problem -1] [8]

1. Define the role of compiler/interpreter in programming language
2. How Programming Language editors help (built points)
3. What advantages we can get from programming language
4. How Python is different from the other programming languages

[Problem-2] [27]

Mathematical Expression Questions:

1. Write Python code to solve the quadratic equation $ax^2 + bx + c = 0$ Take inputs for a, b, and c from the user as an integer or decimal.

2. Write Python code to calculate the value of the following expression for a given x:
$f(x) = 3x^3 + 2x^2 - 5x+7$

3. Write Python code to solve the following expression: $\frac{(a+b)^2-(c-d)^2}{e+f}$ given that a = 0.5, b= 7.5, c = 12.0 d=13.5, e = 4.2 and f = 15.2

4. Write Python code to find the sum of the first nth terms of an arithmetic progression a, a+d, a+2d, … nth
where a, d, and n are inputs

5. Write Python code to calculate the area and circumference of a circle for a given radius using the formula, where r is the radius of the circle as input from the user.
$A = \pi r^2 \;\; C = 2\pi r$

6. Write Python code to solve the expression $e^x + \frac{1}{e^x}$ where x is a random number generated from Python.

7. Write Python code to evaluate the expression $\log(a + b) + \sin(c) - \frac{1}{y}$ where a, b, and c are suitable hard cod values in the Python program.

8. Write Python code to calculate the compound interest using the formula $A = P(1 + \frac{r}{n})^{nt}$, Where P, r, n, and t are the hard-coded values in Python code.

9. solve the long equation

$$f(x,y) = \frac{(x^3 + 2y^2) \times (\sin(x) + \log(y+1))}{\sqrt{x^2 + y^2}} + \frac{e^x - \cos(y)}{x + y}$$

Where x and y are the 3,6.5 respectively.

[Problem-3]

1. Write Python code to calculate the greatest common divisor (GCD) of two numbers using the Euclidean algorithm.

2. Write Python code to calculate the least common multiple (LCM) of two numbers.

3. Write Python code to convert an infix mathematical expression to postfix notation

4. Write Python code to evaluate a postfix expression.

5. Write Python code to calculate the length of the hypotenuse of a right triangle given the lengths of the other two sides.

[Problem – 4] LOOP, IF, AND ARRAY [40]

1. Create a random 1-D array of size 50. Write Python code to reverse the array.

2. Create a random 2-D array of size 5x5. Write Python code to transpose the matrix.

3. Create a list of 30 random integers. Write Python code to find the largest and smallest elements.

4. Generate a random list of 20 floating-point numbers. Write Python code to round each number to two decimal places.

5. Create a 1-D array of size 25. Write Python code to find the sum of the odd-indexed elements.

6. Create a random 2-D array of size 6x6. Write Python code to find the sum of all diagonal elements

7. Write Python code to flatten a 2-D array of size 4x5 into a 1-D array.

8. Generate a random list of 15 integers. Write Python code to find and count the number of even and odd numbers in the list.

9. Create a list of 100 random numbers. Write Python code to sort the list in descending order.

10. Create a 1-D array of size 20. Write Python code to calculate the cumulative sum of the array elements.

11. Write Python code to create a 1-D array and remove all duplicate elements.

12. 8Create a random 1-D array of size 50. Write Python code to find the index of the first occurrence of a specified element.

13. Create a random 2-D array of size 4x4. Write Python code to rotate the array 90 degrees clockwise.

14. Create a random 1-D array of size 25. Write Python code to replace all negative values with 0.

15. Create a 2-D array of size 5x5. Write Python code to find the maximum element in each row.

16. Create a random 2-D array of size 7x7. Write Python code to extract and print the border elements of the array.

17. Write Python code to create a 2-D array of size 3x3 and check if it is a magic square (sum of rows, columns, and diagonals are equal).

18. Create a 1-D array of 10 random numbers between 1 and 100. Write Python code to count how many numbers are divisible by 5.

19. Generate a random list of 40 integers. Write Python code to group the elements by even and odd numbers.

20. Create a random 3-D array of size 3x3x3. Write Python code to compute the mean of all elements across the three dimensions.

[Problem-5] LOOP [33]

1. Write Python code to print all prime numbers between 1 and 100 using loops and if conditions.

2. Write Python code to check if a given number is a palindrome using loops and if conditions.

3. Write Python code to print the multiplication table of a given number using loops.

4. Write Python code to calculate the factorial of a number using loops and if conditions.

5. Write Python code to print the Fibonacci sequence up to a given number of terms using loops.

6. Write Python code to check if a given number is an Armstrong number using loops and if conditions.

7. Write Python code to find the greatest common divisor (GCD) of two numbers using loops and conditional statements.

8. Write Python code to reverse a given number using loops and if conditions.

9. Write Python code to count the number of vowels and consonants in a given string using loops and conditional statements.

10. Write Python code to calculate the sum of digits of a given number using loops.

11. Write Python code to find the sum of all even numbers between 1 and 100 using loops and conditional statements.