

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION (S), FEBRUARY 2024

(2020 SCHEME)

Course Code : 20CST443

Course Name: Python for Engineers

Max. Marks : 100

Duration: 3 Hours

PART A

(Answer all questions. Each question carries 3 marks)

1. Explain type conversion in Python.
2. List and explain any three basic arithmetic operations supported in Python for numeric data types.
3. What is the difference between local and global variable scopes in Python?
4. How can you concatenate two lists in Python?
5. What are abstract classes and interfaces? How are they implemented in Python?
6. What is a static method in Python? How is it defined inside a class?
7. Explain any three types of plots offered by Matplotlib.
8. Explain the difference between the read(), readline(), and readlines() methods.
9. Explain the concept of grouping in Pandas DataFrame.
10. What advantages do NumPy arrays offer over regular Python lists for numerical computations?

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Explain how logical operators (and, or, not) can be used in if-else statements. Provide examples. (7)
b) Write a Python program using nested if-else to determine grades for students based on their scores. (7)

OR

12. a) Write a Python program that asks the user to guess a number between 1 and 100 using a while loop. Provide hints like the guessed number is too high or too low. (10)
b) Explain the use of break and continue statements in for loops. (4)

MODULE II

13. a) Compare list comprehension with traditional for loop approach in terms of readability and efficiency. (4)

- b) Write a Python function that takes a list of words as input and returns a new list containing the lengths of these words. (10)

OR

14. a) How does the lifetime of a variable inside a function differ from that of a variable declared outside all functions? Explain with example. (7)
- b) Provide an example function that has default parameters and explain how it behaves when called with different arguments. (7)

MODULE III

15. a) Explain the concept of class inheritance in Python. (6)
- b) Create a class Animal with a method make_sound(). Create a subclass Cat that inherits from Animal and overrides the make_sound() method to print "Meow!". (8)

OR

16. a) Explain the concept of exceptions and their importance in handling errors in Python programs. (4)
- b) Write a Python program with a try-except block that handles both IndexError, ValueError, ImportError, ZeroDivisionError and NameError. Provide examples of situations where these exceptions might occur. (10)

MODULE IV

17. a) Write a Python program that reads a list of strings from a text file ("input.txt") and writes to another text file ("output.txt") such that each string is written on a new line. (8)
- b) Provide an example of appending a new line of text to an existing file ("data.txt") (6)

OR

18. a) Create a list of dictionaries containing product data (name, price, quantity). Write this data to a new CSV file named "products.csv" with headers included. (8)
- b) What is the purpose of the sys, os, getopt module in Python? Explain each with an example. (6)

MODULE V

19. a) Write code to concatenate two NumPy arrays vertically and horizontally. (7)
- b) Describe how NumPy supports linear algebra operations. (7)

OR

20. a) Explain how the Pandas library can be used for reading and writing CSV files. (4)
- b) Read a CSV file containing sales data into a Pandas DataFrame. Use Pandas to filter out sales records where the sales amount is above a certain threshold and save the filtered data to a new CSV file. (10)
