SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattangulathur – 603 203

DEPARTMENT OF GENERAL ENGINEERING

QUESTION BANK

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II SEMESTER

1901005- Problem Solving and Python Programming

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Prepared by

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Unit 1			
ALGORITHMIC PROBLEM SOLVING, DATA TYPES Algorithms, building blocks of algorithms (statements, control flow, functions), notation (pseudo code, flow chart), Python interpreter and interactive mode, values and types: int,float, boolean, string, and list; Variables, Operatorsand expressions, statements, tuple assignment, precedence of operators, comments, Illustrative programs: Algorithm for arithmetic expression (addition and subtraction)			
Part A			
Q. No.	**Questions**	**Competence**	**BT Level**
1.	List the various control flow structures	Remember	BTL 1
2.	Define algorithm.	Understand	BTL 2
3.	Distinguish between pseudocode and flowchart.	Analyze	BTL 4
4.	Define function with an example.	Remember	BTL 1
5.	Discuss different modes of operation in python.	Understand	BTL 2
6.	Write a simple python program to perform addition of two values.	Apply	BTL3
7.	Distinguish between string and list.	Analyze	BTL 4
8.	Infer how does python interpreter work?	Evaluate	BTL 5
9.	Write an algorithm for basic arithmetic operations.	Create	BTL 6
10.	Evaluate the order of precedence of operators in python.	Evaluate	BTL 5
11.	State Tuple Assignment	Remember	BTL 1
12.	Develop an algorithm to convert Temperature in Celsius to Fahrenheit.	Create	BTL 6
13.	Define Variable.	Remember	BTL 1
14.	Show how Comment is used in python.	Remember	BTL1
15.	Examine a simple pseudo code to print n integers.	Apply	BTL 3
16.	Discuss building blocks of an algorithm.	Understand	BTL 2
17.	Classify expressions by applying different operators.	Apply	BTL 3
18.	List the basic symbols used in drawing the flowchart for sequence control structure.	Remember	BTL 1
19.	Classify different types of statements in python.	Analyze	BTL 4
20.	List the types of operators available in python.	Understand	BTL 2
Part B			
1.	Analyze the model of interpreter and explain how python works in different modes. (13)	Analyze	BTL 4
2.	Evaluate the different values (data types) and types of values that can be used in Python. (13)	Evaluate	BTL 5
3.	(i)Summarize the advantages and disadvantages of flowchart.(6) (ii) Summarize the symbols used in flowchart. (7)	Understand	BTL 2
4.	List the different operators in python and estimate the precedence of execution. (13)	Remember	BTL 1
5.	Explain pseudocode and its rules also give examples for sequence , selection and repetition type problems. (13)	Remember	BTL 1
6.	List the types of operators in python and thus explain the different expressions involved in python. (13)	Apply	BTL 3

7.	With neat sketch explain the following building blocks of algorithm: (i) Statements (5) (ii) Control flow (8)	Remember	BTL 1
8.	Analyze the need for functions and explain with an example. (13)	Analyze	BTL 4
9.	(i) Develop a flowchart to check whether the given number is a prime number or not. (7) (ii) Develop a pseudocode to perform arithmetic operations. (6)	Apply	BTL 3
10.	(i)What is an algorithm? List the characteristics of a good algorithm. (6) (ii)Write an algorithm find the square root of a number. (7)	Remember	BTL 1
11.	Design the flowchart and write that calculates salary of an employee. prompt the user to enter the Basic salary, HRA, TA and DA. Add these components to calculate the Gross salary. Also, dedust 10% salary from the Gross salary to be paid as tax. (13)	Create	BTL 6
12.	Summarize the difference between algorithm, flowchart and pseudocode. (13)	Understand	BTL 2
13.	Explain the following. (i) Tuple assignment (4) (ii) Comments (4) (iii) Statements in python (5)	Understand	BTL 2
14.	Using a simple python snippet, analyze different values, types and expression and explain them. (13)	Analyze	BTL 4
Part C			
1.	Write an algorithm, pseudocode and draw the flowchart to find the factorial of a number n. (15)	Create	BTL 6
2.	Design a calculator with python code by defining its algorithm using different notations. (15)	Create	BTL 6
3.	Write an algorithm, pseudocode and draw the flowchart to check whether the given number is palindrome or not. (15)	Evaluate	BTL 5
4.	Rate the order of execution of different expressions by evaluating them through python program. (15)	Evaluate	BTL 5

Unit 2

CONTROL FLOW STATEMENTS AND FUNCTIONS

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; functions, function definition and use. Fruitful functions: return values, parameters, local and global scope, recursion. Illustrative programs: exchange the values of two variables, square root, printing n numbers iteratively.

Part A

Q. No.	Questions	Competence	BT Level
1.	Define function and state its use.	Remember	BTL 1

2.	What does recursive function implies?	Remember	BTL 1
3.	Analyze the different kinds of arguments.	Analyze	BTL 4
4.	Evaluate the importance of fruitful functions.	Evaluate	BTL 5
5.	Analyze the need to divide a program into functions.	Analyze	BTL 4
6.	Write a program to print n numbers iteratively.	Create	BTL 6
7.	Using the concept of functions, calculate the area of a circle.	Apply	BTL 3
8.	Using the concept of tuple assignment, how will you swap two values?	Apply	BTL 3
9.	What do you mean by fruitful function?	Understand	BTL 2
10.	Outline the scope of variables.	Understand	BTL 2
11.	Write the syntax of if-else statements.	Remember	BTL 1
12.	Differentiate for loop and while loop.	Analyze	BTL 4
13.	Illustrate the flowchart of if-elif-else statements.	Apply	BTL 3
14.	How would you test the significance of for loop with else in an example.	Evaluate	BTL 5
15.	Present the flow of execution for a while statement.	Remember	BTL 1
16.	Write the syntax for function definition.	Remember	BTL 1
17.	Name the type of Boolean operators.	Remember	BTL 1
18.	Describe break statement with an example.	Understand	BTL 2
19.	Write a program to find square root of a given number.	Create	BTL 6
20.	Give the syntax for pass and continue statements.	Understand	BTL 2
Part B			
1.	Using the concept of control structuredetermine the prime numbers in given range using Python.(13)	Apply	BTL 3
2.	Write a program to determine the factorial of a given number with and without the use of recursion.(13)	Evaluate	BTL 5
3.	What does fruitful function refers to? How it can be used? Explain with an example.(13)	Understand	BTL 2
4.	Write the syntax and explain the concept of (i) recursive function with an example.(7) (ii) lambda function with an example. (6)	Remember	BTL 1
5.	List the different types of arguments with suitable examples.(13)	Remember	BTL 1
6.	Using a python program, analyze the different logic behind swapping the values between variables.(13)	Analyze	BTL 4
7.	Write a program to find the square root of a number byIterative newton's method. (13)	Create	BTL 6
8.	Explain the looping statements with an example. (13)	Understand	BTL 2
9.	List the three types of conditional statements and explain them.(13)	Understand	BTL 2
10.	Explain with an example break and continue statements using while loop.(13)	Analyze	BTL 4
11.	Write a code to print all numbers in a range (a,b)divisible by a given number (n).(13)	Apply	BTL 3
12.	What is function? How a function is defined and called in python? Explain with a simple program.(13)	Remember	BTL 1
13.	(i) Write a Python program to find the sum of N natural numbers.(9)	Remember	BTL 1

	(ii)What is the use of pass statement? Illustrate with an example.(4)		
14.	Write a Python program using function to find the sum of first 'n' even numbers and print the result.(13)	Analyze	BTL 4
	Part C		
1.	Create a user defined fruitful function to test a given year is a leap year.(15)	Create	BTL 6
2.	Write a function to determine whether a given natural number is a perfect number. A natural number is said to be a perfect number if it is the sum of its divisors.(15)	Create	BTL 6
3.	Write a function reads two numbers and evaluates whether they or co-prime or not. Two numbers are said to be co-prime if they do not have any common divisor other than one.(15)	Evaluate	BTL 5
4.	Write a function to multiply two non-negative numbers by repeated addition and evaluate the result by normal procedure.(15)	Evaluate	BTL 5

Unit 3			
LIST AND TUPLES			
Lists: list operations, list slices, list methods, list loop, mutability, list parameters; Tuples: tuple assignment, tuple as return value; comparison of lists and tuples. Illustrative programs: Selection sort, insertion sort, Quick sort.			
Part A			
Q. No.	**Questions**	**Competence**	**BT Level**
1.	Define Python list. How lists differ from Tuples.	Remember	BTL 1
2.	What are the list operations?	Remember	BTL 1
3.	What are the different ways to create a list?	Remember	BTL 1
4.	Illustrate negative indexing in list with an example.	Apply	BTL 3
5.	How to slice a list in Python?	Understand	BTL 2
6.	Point out the methods that are available with list object in Python programming.	Analyze	BTL 4
7.	Show the membership operators used in list.	Apply	BTL 3
8.	Define Python Tuple.	Remember	BTL 1
9.	Write a program to add two lists.	Create	BTL 6
10.	Classify the Python accessing elements in a Tuples.	Apply	BTL 3
11.	Point out the methods used in Tuples	Analyze	BTL 4
12.	Evaluate the difference between lists and tuples.	Evaluate	BTL 5
13.	Show how Tuples are used as return values?	Evaluate	BTL 5
14.	What does sorting refers to?	Remember	BTL 1
15.	What does the term mutability refers to?	Understand	BTL 2
16.	Write a program to create a list of even numbers in a given range.	Create	BTL 6
17.	Write the syntax for concatenating two lists in python.	Understand	BTL 2
18.	Show how Tuples are immutable?	Understand	BTL 2
19.	List the different sorting algorithms.	Remember	BTL 1
20.	With the help of a program, list the different methods in list.	Analyze	BTL 4

Part B			
1.	Discover an algorithm and write a python program to sort the numbers in ascending order using insertion sort.(13)	Analyze	BTL 4
2.	Describe the following (i) Creating the list(4) (ii) Accessing values in the lists(3) (iii) Updating the list(3) (iv) Deleting the list elements(3)	Remember	BTL 1
3.	(i) Analyze the basic list operations in detail with necessary programs.(7) (ii) Write a Python program to add two matrices.(6)	Analyze	BTL 4
4.	(i) Tell the Python list methods with examples.(8) (ii) Why it is necessary to have both the functions append and extend? What is the result of the following expression that uses append where it probably intended to use extend? >>>lst=[1,2,3] >>>lst.append([4,5,6])(5)	Remember	BTL 1
5.	Demonstrate the working of +,* and slice operators in python lists and tuples.(13)	Apply	BTL 3
6.	(i) What is a Python Tuple? What are the advantages of Tuple over list?(5) (ii)“Tuples are immutable”. Explain with example.(8)	Remember	BTL 1
7.	Illustrate the ways of creating the Tuple and the Tuple assignment with suitable programs.(13)	Apply	BTL 3
8.	(i)What are the accessing elements in a Tuple? Explain with suitable programs.(7) (ii) Explain how to return more than one value from a function with the help of a program. (6)	Remember	BTL 1
9.	(i)Explain the basic Tuple operations with examples.(6) (ii)Illustrate a program to check whether an element ‘y’ and‘a’ belongs to the tuple mytuple=(‘p’,’y’,’t’,’h’,’o’,n’) and after printing the result, delete the Tuple.(7)	Understand	BTL 2
10.	Describe the built in functions with Tuples and write a program to use Max(), Min() and sorted() methods in Tuple.(13)	Understand	BTL 2
11.	(i)Discuss a)Tuples as return values b) Variable Length Argument Tuples(6) (ii) Write a program to illustrate the comparison operators in Tuple.(7)	Understand	BTL 2
12.	Write a Python program to store ‘n’ numbers in a list and sort the list using selection sort.(13)	Evaluate	BTL 5
13.	Using the functions and methods, analyze the differences and similarities of lists and tuples with examples for each. (13)	Analyze	BTL 4
14.	Write a program to perform the logic of quick sort algorithm.(13)	Create	BTL 6
Part C			

1.	Write a function that takes a list of numbers as input from the user and produces the corresponding cumulative list. (15)	Create	BTL 6
2.	Write a function to perform sorting of given numbers and present a list of odd and even numbers separately.(15)	Create	BTL 6
3.	Write a function 'leftCirculate' that takes a list as an input and left circulates the values in the list so that in the final list, each value is left shifted by one position and leftmost value in the original list now appears as the rightmost value.(15)	Evaluate	BTL 5
4.	Write a program to delete all the duplicate elements in a list.(15)	Evaluate	BTL 5

Unit 4			
STRINGS, DICTIONARIES & SET Strings: string slices, immutability, string functions and methods, string module; Dictionaries: operations (create, access, add, remove) and methods (insert, delete). Set operation (Access, Add, Remove). Comparison of dictionary and set			
Part A			
Q. No.	**Questions**	**Competence**	**BT Level**
1.	Define dictionary.	Remember	BTL 1
2.	Examine different set functions.	Analyze	BTL 4
3.	Write a program to perform union, intersection and difference operation using set	Create	BTL 6
4.	Using the built in function update, how key value pair can be inserted?	Apply	BTL 3
5.	What does key value pair refers to?	Remember	BTL 1
6.	What is set?	Remember	BTL 1
7.	List the dictionary operations.	Remember	BTL 1
8.	List the mutable data types and immutable data types	Remember	BTL 1
9.	How to create and delete a dictionary?	Understand	BTL 2
10.	Write a python program to manipulate strings.	Create	BTL 6
11.	What will be the output of print(str[2:5]) if str='hello world!'?	Evaluate	BTL 5
12.	How to add and remove data in set?	Understand	BTL 2
13.	Describe any 4 methods used on a string.	Apply	BTL 3
14.	What does D.itemreturns? Give an example.	Apply	BTL 3
15.	Do set supports indexing. Justify the answer.	Analyze	BTL 4
16.	Are dictionary and set different. Justify your answer.	Evaluate	BTL 5
17.	Write an example for string traversal.	Understand	BTL 2
18.	Describe string module.	Understand	BTL 2
19.	What does the module mean?	Remember	BTL 1
20.	What does the function join in a string used for?	Analyze	BTL 4
Part B			
1.	(i) Define methods in a string with an example program using at least 5 methods.(10) (ii) How to access characters of a string?(3)	Remember	BTL 1
2.	Write a program to count the number of common	Apply	BTL 3

	characters in a pair of strings.(13)		
3.	Describe the methods and operations of Dictionaries.(13)	Remember	BTL 1
4.	Write a Python program to count the number of vowels in a string provided by the user.(13)	Understand	BTL 2
5.	Write a program that takes a sentence as input from the user and computes the frequency of each letter. Use a variable of dictionary type to maintain the count.(13)	Apply	BTL 3
6.	Python strings are immutable. Justify with an example program. (13)	Analyze	BTL 4
7.	(i) Analyze string slicing. Illustrate how it is done in python with an example.(6) (ii) Write a python code to search a string in the given list. (7)	Analyze	BTL 4
8.	Using the concept of dictionary, Show a dictionary of frequency of words for a given text.(13)	Remember	BTL 1
9.	Compare and contrast different functions and methods used in dictionaries and set.(13)	Analyze	BTL 4
10.	Describe set and explain its operations with suitable examples.(13)	Understand	BTL 2
11.	Describe different functions associated with sets.(13)	Understand	BTL 2
12.	Write a function that takes a string as a parameter and replaces the first letter of everyword with the corresponding uppercase letter.(13)	Evaluate	BTL 5
13.	Recollect the various dictionary operations and explain them with an example.(13)	Remember	BTL 1
14.	Create a program to determine whether a string is a palindrome or not.(13)	Create	BTL 6
Part C			
1.	(i) Write a function to find the number of common characters in two strings.(8) (ii) Write a program to reverse a string.(7)	Create	BTL 6
2.	Write a function that takes a number as an input parameter and returns the corresponding text in words, for example, on input 452, the function should return 'Four Five Two'. Use a dictionary for mapping digits to their string representation.(15)	Create	BTL 6
3.	Using a dictionary variable, estimate the frequency of each character in a sentence obtained from the user.(15)	Evaluate	BTL 5
4.	Evaluate the different operations like union, intersection and differences of list using Set and functions.(15)	Evaluate	BTL 5

Unit 5
FILES, MODULES, PACKAGES
Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file.
Part A

Q. No.	Questions	Competence	BT Level
1.	Point out different modes of file opening.	Analyze	BTL 4
2.	Define the access modes	Remember	BTL 1
3.	Distinguish between files and modules.	Understand	BTL 2
4.	Define read and write file	Remember	BTL 1
5.	Describe renaming and deleting a file in python.	Understand	BTL 2
6.	Discover the format operator available in files.	Apply	BTL 3
7.	Examine the need for exceptions using an example	Analyze	BTL 4
8.	Explain Built-in exceptions.	Evaluate	BTL 5
9.	Difference between built-in exceptions and handling exception	Remember	BTL 1
10.	Write a program to write a data in a file for both write and append modes.	Evaluate	BTL 5
11.	How to import statements?	Remember	BTL 1
12.	Find the error in the code given: **while True** print ('Hello world')	Create	BTL 6
13.	Define package.	Remember	BTL 1
14.	What are packages in Python?	Remember	BTL 1
15.	Examine buffering	Apply	BTL 3
16.	What do you mean by file isatty() method	Understand	BTL 2
17.	Discover except Clause with Multiple exception	Apply	BTL 3
18.	Create a Python script to display the current date and time.	Create	BTL 6
19.	Analyze the object as return values.	Analyze	BTL 4
20.	Discuss a modular design	Understand	BTL 2
	Part B		
1.	Write a Python program to demonstrate the file I/O operations.(13)	Analyze	BTL 4
2.	Discuss the different modes for opening a file and closing a file.(13)	Understand	BTL 2
3.	(i) Discover a program to catch a divide by zero exception. Add a finally block too.(7) (ii) Write a function to print the hash of any given file in Python.(6)	Analyze	BTL 4
4.	(i) Describe the use of try block and except block in python with syntax.(8) (ii) Describe with an example exceptions with arguments in python.(5)	Remember	BTL 1
5.	(i) Explain with example of writing a file(7) (ii) Discover syntax for reading from a file(6)	Apply	BTL 3
6.	(i) Structure Renaming a file(7) (ii) Explain about the files related methods(6)	Analyze	BTL 4
7.	(i) Describe python modules(6) (ii) Describe python packages(7)	Remember	BTL 1
8.	Write a program that will prompt the user for a string and a file name, and then print all lines in the file that contain the string. Also interpret the obtained result.(13)	Evaluate	BTL 5
9.	Identify the various methods used to delete the elements from the dictionary(13)	Remember	BTL 1

10.	Describe in detail exception handling with sample program(13)	Remember	BTL 1
11.	Illustrate a program to find the one's complement of binary number using file.(13)	Understand	BTL 2
12.	Write a program to display a pyramid. (13)	Create	BTL 6
13.	Write a program to find the number of instances of different digits in a given number. (13)	Apply	BTL 3
14.	Explain with an example to copy the contents of one file to another.(13)	Understand	BTL 2
	Part C		
1.	Create a program to compute price per unit weight of an item using try – except – else block.(15)	Create	BTL 6
2.	Write a program that reads the contents of the file text.txt and counts the number of alphabets, blank spaces, lowercase letters and uppercase letters, the number of words starting with a vowel, and the number of occurrences of the word 'is' in the file. (15)	Create	BTL 6

3.	Examine the following function percentage:
	def percentage(marks,total):
	try:
	percent=(marks/total)*100
	except ValueError:
	print('Value Error')
	except TypeError:
	print('TypeError')
	except ZeroDivisionError:
	print('ZeroDivisionError')
	except:
	print('any other error')
	else:
	print(percent)
	finally:
	print('Function percentage completed
	
	Determine the output for the following function calls:
	a) percentage(150.0,200.0)
	b) percentage(150.0,0.0)
	c) percentage('150.0','200.0')(15)
		Evaluate	BTL 5

4.	Write a function that reads a file file1 and evaluates and displays number of words and vowels in the file.(15)	Evaluate	BTL 5