

Code: 20ES1103

**I B.Tech - I Semester – Regular / Supplementary
Examinations – APRIL 2022**

**PROBLEM SOLVING TECHNIQUES
(Common to CSE & IT)**

Duration: 3 hours

Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

UNIT – I

1. a) Explain the components of a computer system with a neat diagram. Describe the importance of memory devices. 7 M
- b) Develop an algorithm for the generation of Fibonacci numbers as follows: 7 M
0,1,1,2,3,5,.....N

OR

2. a) Develop an algorithm to compute the sums for the first 'n' terms ($n \geq 0$) of the following series. 7 M
 $S=1+2+3+\dots$
 $S=1+3+5+\dots$
 $S=2+4+6+\dots$
- b) What is an algorithm? Explain the properties of algorithms. 7 M

UNIT – II

3. a) Design and implement an algorithm to iteratively compute the reciprocal of a number. 7 M

- b) How to find the square root of a given number? 7 M
Mention the sequence of constructive algorithmic steps for solving the same problem.

OR

4. a) Define factoring method. Explain the applications of factoring methods 7 M
- b) Develop algorithmic steps for solving the following problems 7 M
- i. Establish all the primes in the first n positive integers
 - ii. Find gcd of n positive non-zero integers

UNIT-III

5. a) How can you extend the single-dimensional array to a multi-dimensional array? Explain with a suitable example. 7 M
- b) Analyze the following problem and construct an algorithm 7 M
“Given a set of n students examination marks (in the range 0 to 100) make a count of the number of students that obtained passed marks 40”

OR

6. a) Find the maximum number in a set using a single dimensional array. Mention appropriate steps of the algorithm. 7 M
- b) Construct an algorithm for the removal of duplicates from an ordered array. 7 M

UNIT – IV

7. a) Illustrate various classifications of sorting algorithms with suitable examples. 7 M
- b) Develop an algorithm for linear search. 7 M

OR

8. a) Explain the procedure for a two-way merge with algorithm development for the following sample data. 7 M
A: 15, 18, 42, 51
B: 8, 11, 16, 17, 44, 58, 71, 74
- b) Illustrate the procedure for the binary search with suitable example and also develop an algorithm for binary search. 7 M

UNIT – V

9. a) Describe the techniques of text processing. Explain them with examples. 7 M
- b) Design and implement an algorithm that will search a line of text for a particular pattern or substring. 7 M

OR

10. a) Explain the concept of linear pattern search. Write the algorithm developments of linear pattern search. 7 M
- b) Design and implement a pattern search algorithm with a performance that is linearly dependent on the length of the string or text being searched. 7 M