B.Sc. Semester-IV Examination, 2022-23

COMPUTER SCIENCE [Honours]

Course ID : 41511 **Course Code : SH/CSC/401/C-8**

Course Title : Analysis and Design of Algorithms

Time : 1 Hour 15 Minutes Full Marks : 25

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

UNIT–I

1. Answer any **five** of the following questions: $1 \times 5 = 5$

a) When do you use empirical approach for determining computational complexity?

b) State whether time complexity is platform dependent or not.

c) Which design paradigm do we use in quick sort algorithm?

d) Name an algorithm that employs Greedy paradigm.

e) Name a sorting algorithm which yields the same time complexity both in average case and worst case.

f) Name a linear time sorting technique.

g) What is AVL tree?

h) Why do we use KMP technique?

UNIT–II

2. Answer any **two** of the following questions: $5 \times 2 = 10$

a) Show that $\log (1+1/i) = 1/i - 1/2i^2 + 1/3i^3 - 1/4i^4 + 1/5i^5 + \ldots\ldots\ldots\ldots$ is $\Theta (\log n)$

b) Why do we use amortised analysis? Distinguish between amortised and average case analysis.

c) State some important properties of red-black tree. What is the main advantage of using red-black tree?

d) Discuss breath first search algorithm in brief with a suitable example.

UNIT–III

3. Answer any **one** of the following questions: $10 \times 1 = 10$

a) Write quick sort algorithm and use it to sort the file 2, 7, 9, 1, 11, 6, 5, 43, 12, 10

b) What is the precondition for applying binary search algorithm? Write binary search algorithm and determine its time complexity.
