B.Sc. 3rd Semester (Honours) Examination, 2023-24

COMPUTER SCIENCE

Course ID : 31511 Course Code : SH-CSC-301/C-5

Course Title : Data Structures

[Syllabus 2017-18 & 2022-23]

Time : 1 Hour 15 Minutes Full Marks : 25

The figures in the right margin indicate marks.

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

UNIT-I

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

a) Why do we use data structures?

b) What is sparse matrix?

c) Relate stack and recursion.

d) Distinguish between static and dynamic memory allocation.

e) Express the computation time of the function $f(n) = n + \log_2(n)$ using big-Oh notation

f) What is binary search tree?

g) Name an in-place sorting technique.

h) What is the worst case time complexity of hashing?

UNIT-II

2. Answer ***any two*** from the following questions: $2\times5=10$

a) Express the factorial generating function as a recurrence relation and determine its time complexity. $3+2=5$

b) What are the two primitive operations of a stack? Algorithmically represent each operation. $1+4=5$

c) Write an algorithm to reverse a linked list.

d) Write the linear search algorithm. Distinguish between linear and binary search. $2+3=5$

UNIT-III

3. Answer ***any one*** from the following questions: $1\times10=10$

a) Write an algorithm to convert an infix expression to postfix and evaluate it. $5+5=10$

b) Write an algorithm to insert a specific information carrying node into a binary search tree. Using selection sort algorithm arrange the following array in ascending order:

3, 7, 1, 10, 15, 5, 2, 6. $5+5=10$

Internal Assessment Examination-2023

B.Sc. 3rd Semester (Honours)

Computer Science (Honours)

Paper: Core-5 (Data Structure)

Full Marks: 05 Time: 30 Mins.

Answer any ***Five*** questions: 1x5=5

1. Why stack is called as ADT?
2. Write two applications of stack.
3. What is RPN? Give example.
4. Write advantages of linked list over array.
5. Why queue is called as FIFO structure?
6. What is circular queue?
7. What is time complexity?

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B.Sc. 3rd Semester (Honours) Examination, 2023-24

COMPUTER SCIENCE

Course ID : 31521 Course Code : SH-CSC-301/C-5

Course Title : Data Structures (Practical)

[Syllabus 2017-28 & 2022-23]

Time : 2 Hours Full Marks : 15

The figures in the right margin indicate marks.

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

[Problem = 10, LNB + Viva voce = 05]

1. Perform any **one** from the following experiments: 10×1=10

a) Write a program to implement a queue based on circular sequential list and show its elementary operations.

b) Write a program to delete the node carrying a specific data from an ordinary linked list.

c) Write a non recursive program to perform the binary search.

d) Write a recursive program to perform the depth first search.

e) Write a program to implement insertion sort.
