Master in Data Science
Mid-term Examination

Course Title: Data Structures and Algorithms (MDS502) Time: 2 Hrs.
Full Marks: 45 Pass Marks: 22.5

Group A
Attempt all questions. (5 × 3 = 15)

1. What is data structure? Explain dynamic memory allocation in brief. (1 + 2)
2. Convert ((A - B) $ C - (D - E)) $ (F + G) to prefix and postfix. (1.5 + 1.5)
3. What is priority queue? Explain.
4. Explain recursive algorithm with example. What is iteration? (2 + 1)
5. Compare linked list with array. What is circular linked list? (2 + 1)

Group B
Attempt all questions. (5 × 6 = 30)

6. Define stack. How do you implement push and pop operations in Stack? Explain. (1 + 5)

   OR

   How do you implement stack using linked list? Explain. (6)
7. Explain algorithm to convert an infix expression to postfix. Use this algorithm to convert the infix expression (A + B) * C – D to postfix. (3 + 3)

   OR

   Define queue. How do you implement queue operations in array data structure? Explain. (1 + 5)
8. Define time complexity. What is asymptotic notation? Explain big-oh, omega, and theta notations. (1 + 2 + 3)
9. How do you insert and remove nodes in singly linked list? Explain. (6)
10. Define tail recursion. Explain tail recursion using suitable program. (1.5 + 4.5)