

**SECOND SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2024**

**(Regular/Improvement/Supplementary)**

**COMPUTER SCIENCE AND MATHEMATICS (DOUBLE MAIN)**

**GDCS2B02T: DATA STRUCTURE AND OPERATING SYSTEM**

**Time: 2 Hours**

**Maximum Marks: 60**

**SECTION A: Answer the following questions. Each carries *two* marks.**

**(Ceiling 20 Marks)**

1. Define data structures.
2. Write the condition for QUEUE FULL in circular queue.
3. Draw Process State Diagram.
4. Write the need for Virtual Memory.
5. Define Process.
6. Write four functions of Operating System.
7. List different types of Operating Systems.
8. Summarize Swapping.
9. Explain Paging.
10. Draw the Structure of the Process Control Block.
11. Write the need for Process Synchronization.
12. List the characteristics of Multilevel Feedback Queue Scheduling.

**SECTION B: Answer the following questions. Each carries *five* marks.**

**(Ceiling 30 Marks)**

13. List the two main operations in Stack. Write algorithms for performing them.
14. Construct a binary tree for the following elements: 10,5,20,3,8,15,20.  
Write in order, preorder and post order traversals of the tree.
15. Differentiate between Directed and Undirected Graphs with example.
16. Demonstrate Depth-First-Traversal of a Graph.
17. Explain any one Page Replacement Algorithm.
18. Differentiate Logical and Physical Address Space.
19. Explain Critical Section Problem.

**SECTION C: Answer any *one* question Each carries *ten* marks.**

20. Write the steps for insertion and deletion in a circular linked list. Explain with an example.
21. Compare preemptive and non-preemptive scheduling algorithms in detail.

**(1 x 10 = 10 Marks)**