

END TERM EXAMINATION

FOURTH SEMESTER [BCA] MAY-JUNE 2026

Paper Code: BCA-202T

Subject: Operating Systems

Time: 3 Hours

Maximum Marks: 60

Note: Attempt all questions as directed. Internal choice is indicated.

Q1 Attempt any Four of the following questions: (4×5=20)

- (a) What is an Operating System? List and briefly explain any four major functions of an OS.
- (b) Differentiate between Multi programmed Batch Systems and Time-Sharing Systems with suitable examples.
- (c) Explain the architecture of the Linux Operating System with a neat diagram description.
- (d) Differentiate between Logical and Physical Address Space. Why is this distinction important in memory management?
- (e) What is Deadlock? State the four necessary conditions for deadlock to occur (Coffman's conditions).
- (f) Explain the concept of a File and its various Access Methods with examples.

Q.2 Explain the following types of Operating Systems with their characteristics and a real-world example each: (i) Distributed Systems (ii) Real-Time Systems (iii) Parallel Systems (10)

OR

Q.3 Describe the three modes of the vi editor. Explain how to write, save, and execute a shell script using the vi editor. Also explain the basic directory structure of Linux with the purpose of key directories. (10)

Q.4 Consider the following set of processes with burst times: P1=6ms, P2=3ms, P3=7ms, P4=5ms (all arriving at time 0). Calculate the Average Waiting Time and Average Turn around Time using: (i) FCFS (ii) SJF (Preemptive) (iii) Round Robin (Time Quantum = 4ms). Show Gantt charts for each. (10)

OR

Q.5 Explain the Producer-Consumer problem as a classical problem of process synchronization. Provide a solution using Semaphores with the necessary data structures and pseudocode. (10)

Q.6 Explain the concept of Paging in memory management. How does the OS translate a logical address to a physical address using a page table? (10)

OR

Q.7 What is Deadlock? Explain Banker's Algorithm for Deadlock Avoidance. (10)

Q.8 Explain the Directory and Disk Structure used in file systems. Describe the following directory structures with diagrams: (i) Single-Level Directory (ii) Two-Level Directory (iii) Tree-Structured Directory. (10)

OR

Q.9 Explain Linux File Security in detail. What are the three types of permissions and three categories of users? Demonstrate changing permissions using both the symbolic method and the numeric (octal) method with examples each using the chmod command. (10)
