A–1266

Total Pages : 4 **Roll No. .....**

BCA-10

Bachelor of Computer Application (BCA)

Operating System

Examination February, 2026

Time : 2:00 Hrs. Max. Marks : 70

Note* :–** This paper is of Seventy (70) marks divided into Two (02) Sections 'A' and 'B'. Attempt the questions contained in these Sections according to the detailed instructions given therein. ***Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

Section–A

(Long Answer Type Questions) (2×19=38)

***Note* :–** Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any *two* (02) questions only.

1. Explain in detail the evolution of Operating Systems. Discuss how time-sharing systems and personal computer operating systems differ in architecture and resource management. Provide suitable diagrams.

2. Discuss the Producer-Consumer Problem using semaphores and show how deadlock can occur if semaphores are misused.

3. Explain File System Implementation Techniques. Discuss methods of file alfocation-Contiguous, Linked, and Indexed allocation. Provide diagrams and compare their advantages and disadvantages.

4. Explain the basic concepts of CPU scheduling. Differentiate between preemptive and non-preemptive scheduling. Also, name any two CPU scheduling algorithms commonly used in operating systems.

5. Consider the following page reference string :

   2, 5, 1, 2, 4, 1, 5, 6, 2, 1, 7, 5, 7, 8, 6, 2, 4, 6, 5, 3, 2

   How many page faults would occur for the following replacement algorithms, assuming four (4) and six (6) frames respectively ?

   (a) Optimal Page Replacement

   (b) FIFO Page Replacement

Section–B

(Short Answer Type Questions) (4×8=32)

Note **:–** Section 'B' contains Eight (08) Short-answer type questions of Eight (08) marks each. Learners are required to answer any *four* (04) questions only.

1. Explain the concept of deadlock avoidance in operating systems. Discuss in detail the working principles of Banker's Algorithm.

2. Explain the functions and requirements of a Multiprocessor Operating System. Also discuss multiprocessor synchronization.

3. What is Distributed Shared Memory ? Explain its structure and advantages. How does it differ from message-based communication ?

4. Define Interprocess Communication (IPC). Explain message-passing and shared-memory models with examples.

5. What are race conditions ? Explain the critical-section problem and its requirements.

6. Explain different CPU scheduling algorithms : FCFS, SJF, Priority Scheduling, and Round Robin.

7. What is Cryptography ? Explain symmetric and asymmetric cryptography with suitable examples.

8. Write short notes on the following :

   (a) File attributes

   (b) Page replacement algorithms

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