

(FOR THE CANDIDATES ADMITTED

25UAI205

DURING THE ACADEMIC YEAR 2025 ONLY)

REG.NO. :

N.G.M. COLLEGE (AUTONOMOUS): POLLACHI

END-OF-SEMESTER EXAMINATIONS: MAY 2026

B.Sc. CS with AI & ML

MAXIMUM MARKS: 75

SEMESTER: II

TIME: 3 HOURS

PART - III

25UAI205 – OPERATING SYSTEMS

SECTION – A

(10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

(K1)

1. Which of the following is NOT a primary function of an operating system?
A. Process scheduling B. Memory management
C. File management D. Compiler design
2. Which data structure contains all the information needed to manage a process in an operating system?
A. Scheduling Queue B. Stack
C. Process Control Block (PCB) D. Semaphore
3. Which of the following is NOT a necessary condition for deadlock?
A. Mutual exclusion B. Hold and wait
C. Preemption D. Circular wait
4. Which of the following file allocation methods suffers from external fragmentation?
A. Contiguous allocation B. Linked allocation
C. Indexed allocation D. Extent-based allocation
5. Which disk scheduling algorithm gives minimum average seek time but may cause starvation?
A. FCFS B. SCAN
C. SSTF D. C-SCAN

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES

(K2)

6. Define an Operating System.
7. Define a Process. List any two states in the process state diagram.
8. What is Deadlock?
9. Define file attributes.
10. What is a bit map?

SECTION – B**(5 X 5 = 25 MARKS)****ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)**

11. a) Interrupt the Process Management in an Operating System.
(OR)
b) Explain the role of an operating system in Memory Management.
12. a) Explain the Critical Section problem. How does Peterson's solution ensure mutual exclusion?
(OR)
b) Discuss Semaphores as a synchronization tool. Explain how semaphores solve the Readers–Writers problem.
13. a) Explain the Banker's Algorithm. Illustrate how it avoids deadlock with a suitable example.
(OR)
b) Differentiate between paging and segmentation and discuss the merits and demerits of each.
14. a) Analyze different directory structures used in file systems. How does file system mounting work in UNIX?
(OR)
b) Discuss file allocation methods. Compare contiguous, linked, and indexed allocation techniques.
15. a) Explain disk scheduling algorithms. Illustrate the working of SCAN scheduling algorithm with a suitable example.
(OR)
b) Infer the mechanisms used for Swap- Space management in the I/O System.

SECTION – C**(5 X 8 = 40 MARKS)****ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.(K4 (Or) K5)**

16. a) Discuss the structure of an Operating System. Explain the different Operating System generations with neat diagrams.
(OR)
b) Discuss the different types of system calls and explain how they help in operating system operations.
17. a) Define Process state and Process Control Block. Analyze the Multithreaded programming in detail.
(OR)
b) Compare UNIX and Windows operating systems with respect to process management, thread management, and synchronization mechanisms.
18. a) Discuss deadlock detection and recovery mechanisms in detail. Explain how deadlock can be prevented using appropriate strategies.
(OR)
b) Compare demand paging with simple paging. Discuss their impact on memory usage and system performance.
19. a) Evaluate directory implementation techniques and their impact on file access time.
(OR)
b) Examine and evaluate the security and protection strategies implemented by file systems in multi-user operating systems.
20. a) Illustrate the I/O system of an operating system in detail
(OR)
b) Illustrate the file allocation methods and free-space management techniques used in file systems.
