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Question Paper Code : 30122

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Fourth Semester

Computer Science and Engineering

CS 3451 – INTRODUCTION TO OPERATING SYSTEMS

(Common to : Information Technology)

(Regulations 2021)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define operating system.

2. List the services of OS.

3. State the critical section problem.

4. Name the four conditions for deadlock.

5. What is swapping?

6. Define thrashing.

7. What is a sequential-access file?

8. Define an immutable shared file.

9. What is a virtual machine?

10. Write a note on Android.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the functions performed by an operating system.   (13)

Or

(b) What is a system call? Elaborate on the types of system calls.   (13)

12. (a) (i) With a neat sketch, explain the different states of a process. (5)

    (ii) How process synchronization is achieved using semaphores? Give an example. (8)

Or

(b) Write Bankers algorithm for deadlock avoidance. Explain with an example. (13)

13. (a) What is paging? Elaborate paging with an example and a diagram. (13)

Or

(b) Explain first-in, first-out page replacement algorithm and optimal page replacement algorithm with an example and diagrams. (13)

14. (a) What is a directory? Outline a tree-structured directory structure and an acyclic-graph directory structure with appropriate examples. (13)

Or

(b) Explain contiguous allocation and linked allocation of disk space with an examples. (13)

15. (a) Present an outline of the types of virtual machines. Explain in detail. (13)

Or

(b) Outline the operating system aspects of virtualization in the context of operating system functions scheduling, I/O and memory management. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Consider the following five processes that arrive at time 0, with the length of the CPU burst time given in milliseconds.

Process	CPU BURST TIME
P_1	10
P_2	29
P_3	3
P_4	7
P_5	12

Consider the First Cum First Serve (FCFS), non-preemptive Shortest Job First (SJF), Round Robin (RR) (quantum = 10 milliseconds) scheduling algorithms. Illustrate the scheduling using Gantt chart. Which algorithm will give the minimum average waiting time? (15)

Or

(b) Consider, a disk queue with requests for I/O to blocks on cylinders in the following order: (15)

98, 183, 37, 122, 14, 124, 65, 67

The disk head pointer is initially at cylinder 53. Outline first-come, first served disk scheduling algorithm, SCAN disk scheduling algorithm and shortest-seek- time-first disk scheduling algorithm with a diagram.

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