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Question Paper Code: R4D03

B.E./B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Fourth Semester

R21UCB403- OPERATING SYSTEM

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

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| 1. Define multitasking. | CO1- U |
| 2. What are the different types of operating systems? | CO1- U |
| 3. Define Concurrency. | CO1- U |
| 4. How does process communication solve producer-consumer problem? | CO1- U |
| 5. What is thrashing? Explain the cause and solution for thrashing. | CO1- U |
| 6. Define Deadlock and state out its characterization. | CO1- U |
| 7. Define low level formatting. | CO1- U |
| 8. Discuss the relative advantages of sector sparing and sector slipping. | CO1- U |
| 9. State the difference between System call and Application Programming Interface. | CO1- U |
| 10. Define the role of Virtual Memory Manager. | CO1- U |

PART – B (5 x 16= 80 Marks)

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| 11. (a) What is OS? Describe the different types of Operating Systems with the examples. | CO1-U | (16) |
| Or | | |
| (b) Discuss the potential conflicts that can arise in a system with DMA-enabled devices and how they are managed. | CO1-U | (16) |

12. (a) Using semaphores, design a solution to manage clients access to five banking tellers given the following operation scenario: The bank has a space with 15 chairs and a standing area that can accommodate up to 10 clients. Hence, the maximum number of clients allowed to enter the bank branch is 25. A client needs to wait for an empty chair before sitting. A client will not be served except after receiving a ticket. To obtain a ticket, the client needs to enter his ID. When a teller is available, one. CO2- App (16)
- Or
- (b) A barbershop consists of a waiting room with n chairs and the barber room containing the barber chair. If there are no customers to be served, the barber goes to sleep. If a customer enters the barbershop and all chairs are occupied, then the customer leaves the shop. If the barber is busy but chairs are available, then the customer sits in one of the free chairs. If the barber is asleep, the customer wakes up the barber. Apply process synchronization technique to coordinate the barber and the customers CO2- App (16)
13. (a) Explain the basic scheme of Page Replacement Algorithm and about the various page replacement algorithms with examples. CO1-U (16)
- Or
- (b) Explain in detail about Bankers algorithm with example in deadlock. CO1-U (16)
14. (a) Consider the following disk request sequence for a disk with 90 tracks 12, 34, 52, 14, 25, 68, 39 R/W head is starting at 53. Find the number of movements using the various disk scheduling algorithms. CO2- App (16)
- Or
- (b) Consider a disk with 200 tracks and the queue has random requests from different processes in the order:
55, 58, 39, 18, 90, 160, 150, 38, 184
Initially arm is at 100. Find the Average Seek length and the total distance that the disk arm moves to satisfy all pending requests using FIFO, SSTF, SCAN, and LOOK algorithm. CO2- App (16)

15. (a) Explain the architecture of Google's Android, detailing its components and their interactions. CO1- U (16)
- Or
- (b) Discuss the process for booting an operating system. CO1- U (16)

