

BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-IV Computer Science & Engineering AI & ML : SUMMER : 2025
SUBJECT: OPERATING SYSTEMS

Day : Tuesday
Date : 27/05/2025

S-29283-2025

Time : 10:00 AM-01:00 PM
Max. Marks : 60

NB :

1. All questions are COMPULSORY.
2. Figures to the right indicate FULL marks for the question.
3. Draw neat labelled diagrams WHEREVER necessary.
4. Assume suitable data, if necessary.

Q.1 Why is operating systems developed with two important components "SHELL" and "KERNAL"? Explain following types of Operating Systems (10)
DISTRIBUTED OS, and "NETWORK OS".

OR

Q.1 How does a "STORED PROGRAM" concept increases efficiency of an Operating System. Explain its feature, relative advantages and drawback. (10)

Q.2 Why the following parameters are defined in "PROCESS CONTROLL BLOCK"? Explain function of each of them. (10)
1: Number of Open Files 2: Pointers 3: Memory Limit 4: PID

OR

Q.2 What do you mean by CONTEXT Switching? Evaluate two different types of applications whose attributes are mentioned and find out which of the application will have more CONTEXT SWITCHING. (10)
Application-1: Uses nested branching and looping constructs
Application-2: Uses recursive call of user defined functions.

Q.3 Apply Round Robin CPU scheduling algorithm and find out average waiting time for all processes. Assume Time Quantum=3 units. (10)

| Process | Arrival Time | Burst Time |
|---------|--------------|------------|
| P0 | 4 | 10 |
| P1 | 3 | 8 |
| P2 | 1 | 6 |
| P3 | 0 | 4 |

OR

Q.3 What are the benefits of MULTI-LEVEL Feedback scheduling used in CPU scheduling? Give related block diagrams and explain its working. (10)

Q.4 What do you mean by SAFE, UNSAFE and DEAD-LOCK state of a system. What are the main techniques to handle DEAD LOCK? Explain each one of them. (10)

OR

Q.4 What are the 04 necessary conditions for DEAD-LOCK? Explain with reference to RIVER CROSSING classical example. (10)

Q.5 Consider a system having 05 memory frames with a page string indicating demand of the pages in a sequence starting from LEFT. (10)

5 6 8 6 5 4 9 7 5 4 3 1 9 7 8

Calculate total page fault for OPTIMAL Page replacement algorithm.

OR

Q.5 In view of memory management explain the following terms. (10)
1: Logical Address 2: Physical Address 3: Memory frames 4: HIT Rate 5: PAGE FAULT 6: DIRTY Pages 7: Valid - Invalid bits 8: Cache Coherence 9: Compaction 10: Demand Paging

Q.6 Compare LINKED and INDEXED allocation of file space with relative advantages and drawback. Give diagrams to support your answer. (10)

OR

Q.6 An application requires disk access for following BLOCKS. Apply SCAN algorithm and find total seek time. Assume initial head position at 75th block and moving towards lower blocks. (10)

Disk access requested 44 52 87 34 69 38 61 56 22 99
