

SE Sem-IV (CMPN) (- Scheme KT Winter 2025 .

Duration: 3hrs

[Max Marks:80]

- N.B.: (1) Question No 1 is Compulsory.
 (2) Attempt any three questions out of the remaining five.
 (3) All questions carry equal marks.
 (4) Assume suitable data, if required and state it clearly.

- 1 Attempt any **FOUR** [20]
 a Explain the different types of directory structures used in operating systems with examples.
 b What is a Process Control Block (PCB)? What information does it contain?
 c Explain how the frame size in memory management affects the overall performance of the operating system.
 d What is mutual exclusion? Give its significance
 e What is a system call? Explain any two types of system calls with examples
- 2 a Explain file allocation methods in detail [10]
 b What is Multithreading? Give its advantages and disadvantages. [10]
- 3 a Consider the page reference string :-2,3,4,2,1,3,7,5,4,3,2,3,1 with frame size 3. Calculate page hit and page miss for LRU, FIFO and Optimal page replacement algorithm. [10]
 b What is the role of semaphore in process synchronization? How do counting semaphores and binary semaphores differ? [10]
- 4 a Explain Translation Lookaside Buffer (TLB) of memory management in detail. [10]
 b Differentiate between monolithic, microkernel and layered structure of operating system [10]
- 5 a Explain the different methods of recovering a system from deadlock with suitable examples. [10]
 b Consider the following set of processes, assuming all are arrived at time 0. Calculate average waiting time and turnaround time for FCFS, SJF, Priority and RR(Q=2) [10]
- | Process | Burst time | Priority |
|---------|------------|----------|
| P1 | 2 | 2 |
| P2 | 1 | 1 |
| P3 | 8 | 4 |
| P4 | 4 | 5 |
| P5 | 5 | 3 |
- 6 a Discuss various disk scheduling algorithms with examples. [10]
 b Explain different types of memory fragmentations with example [10]