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Master of Computer Applications
Subject:- Operating Systems
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Max. Marks: 70

Time: Three Hours

Instructions:

1. All questions are compulsory.
2. Attempt all the parts of a question **together**
3. You must document your code properly for full credits.

Q1. (i) The cylinder sequence of requests is 86, 98, 147, 183, 91, 37, 177, 122, 94, 65, 124, 67. The head is initially at position-cylinder 65. What is the total head movement for FCFS and SSTF disk scheduling algorithm. (6)

Q1. (ii) Write a program to create two threads, Thread1 and Thread2. Thread1 performs addition of two numbers where Thread2 performs multiplication of the same two numbers. (4)

Q2. (i) Discuss the solution of producer-consumer problem using semaphores. (5)

Q2. (ii) Discuss the steps involved in handling a page fault with the help of a diagram. (5)

Q3 (i) For the given set of processes, find the average waiting time and average turnaround time using GANTT Chart for the following CPU scheduling methods: (12)

a) Round Robin (time quantum 3 sec.)

b) Shortest Job First (preemptive)

c) Shortest Job First (non-preemptive)

Process	Arrival time (sec.)	Burst Time (sec.)
P_1	0	8
P_2	2	9
P_3	4	2
P_4	6	5
P_5	9	3

Q3 (ii) What is critical section? What requirement should be satisfied for a solution to the critical section problem? (3)

Q4 (i). Consider the following reference stream 1,2,3,4,5,2,1,5,3,6,2,1,2,3,5,6,3,2,1,2,3,6. How many page faults while using First-In-First-Out (FIFO) and Least Recently Used (LRU) using 4 frames? (5)

Q4 (ii) What is paging? Explain the paging hardware with TLB? (5)

Q5 (i) Discuss various solutions for critical section problem with example. (6)

Q5 (ii) Consider the following snapshot of a system. If a request from thread P_0 arrives for (0,2,0) and available resources are 2,3,0. Can the request be granted immediately while using the banker's algorithm? (4)

Allocation	Need	Max
A B C	A B C	A B C
P_0	0 1 0	7 5 3
P_1	3 0 2	3 2 2
P_2	3 0 2	9 0 2
P_3	2 1 1	2 2 2
P_4	0 0 2	4 3 3

Q6 Discuss process creation, process suspension and process termination related system calls in details. (15)