Master of Computer Applications
MCAC304: Operating Systems
Unique Paper Code: 223401304
Semester III
January 2024
Year of Admission: 2021

Time: Three Hours **Max. Marks: 70**

Instructions:
1. All questions are compulsory.
2. Attempt all the parts of a question **together**.

1. Distinguish between the following with the help of the suitable examples: **16**
   a) `execl()` and `execv()`
   b) `wait()` and `waitpid()`
   c) `kill()`, `exit()` and `_exit()`
   d) `setpgid()`, `setpgrp()` and `setsid()`

2. a) The cylinder sequence of requests is 72, 49, 38, 78, 96, 4, 36, 64, 76, 98, 12, 28. The head is initially at position-cylinder 50. What is the total head movement for FCFS and SSTF disk scheduling algorithms? Justify your answer. **6**

2. b) What is the difference between the SCAN and C-SCAN disk scheduling algorithm? Explain with an example. **6**

3. a) Define a wait-for graph in the context of deadlock. What property should exist in the wait-for graph for a deadlock to be present? Justify your answer. **5**

3. b) 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? Justify your answer. **5**

Processes	Allocated	Max
	A B C	**A B C**
P_0	0 1 0	7 5 3
P_1	3 0 4	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

4. a) 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**

i. Round Robin (time quantum 3 sec.)

ii. Shortest Job First (preemptive) SRTF

iii. Shortest Job First (non-preemptive)

Process	Arrival time (sec.)	Burst Time (sec.)
P1	0	6
P2	2	9
P3	4	4
P4	7	5
P5	8	2

4. b) Consider the following reference stream 4,3,2,1,2,3,4,5,2,1,5,3,6,2,1,2,3,5,6,3,2,1 with 4-page frames. How many page faults will occur while using the following page replacement algorithms. Show intermediate steps **8**

i. First-In-First-Out (FIFO)

ii. Least Recently Used (LRU)

5. Discuss process creation, process suspension and process termination related system calls in details with their signatures and examples. **12**