K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May June 2024
B. Tech Program: Computer Engineering Scheme : II B
Examination: SY Semester: IV
Course Code: CEC404 and Course Name: OPERATING SYSTEM
Date: 21/5/24 Duration: 2.5 Hours Max. Marks: 60

Instructions:
(1) All questions are compulsory.
(2) Draw neat diagrams wherever applicable.
(3) Assume suitable data, if necessary.

		Max. Marks	CO	BT level
Q 1	**Solve any six questions out of eight:**	**12**		
i)	State the functions of the operating system?	2	CO1	U
ii)	Explain the significance of fork () and wait () system calls?	2	CO1	U
iii)	Compare process and threads.	2	CO2	U
iv)	State the Principles of Concurrency.	2	CO3	U
v)	State the necessary conditions for Deadlock.	2	CO4	U
vi)	Explain any two types of file sharing methods.	2	CO4	U
vii)	Draw a neat and labeled diagram of segmentation.	2	CO5	U
viii)	Define Seek time and Transfer time.	2	CO6	U
Q.2	**Solve any four questions out of six.**	**16**		
i)	Differentiate between Microkernel and Monolithic architecture of operating system.	4	CO1	U
ii)	Draw and explain the Process Life cycle.	4	CO2	U
iii)	Explain Inter-Process Communication with various methods used.	4	CO3	U
iv)	Given Logical address space = 4GB, physical address space = 64MB and page size = 4KB. Find out the number of pages, number of frames, and number of entries in the page table and size of the page table.	4	CO4	A
v)	Explain File directories with the help of an example.	4	CO5	U
vi)	Explain C-LOOK disk scheduling algorithm using an example	4	CO6	U
Q.3	**Solve any two questions out of three.**	**16**		
i)	Given 6 processes with their Arrival Time and Burst Time as follows. Calculate Average Waiting Time and Average Turnaround	8	CO2	An

	Time for FCFS (Non-Preemptive) and Shortest Job First (Preemptive) scheduling algorithm. Compare and justify your results. **PID / ARRIVAL TIME / BURST TIME** P1 0 3 P2 2 6 P3 4 4 P4 6 5 P5 8 2			
ii)	Discuss the concept of semaphore for solving producer consumer problem	8	CO3	Ap
iii)	Consider the following snapshot for understanding the banker's algorithm. Calculate the content of the need matrix? Check if the system is in a safe state? Determine the total sum of each type of resource? **PROCESS / ALLOCATION A B C / MAX A B C / AVAILABLE A B C** P0 1 1 2 4 3 3 2 1 0 P1 2 1 2 3 2 2 P2 4 0 1 9 0 2 P3 0 2 0 7 5 3 P4 1 1 2 1 1 2	8	CO4	Ap
Q.4	**Solve any two questions out of three.**	**16**		
i)	Analyze the Dining philosopher's problem and suggest an appropriate solution for the same.	8	CO4	An
ii)	Consider following reference string 3,8,2,3,9,1,6,3,8,9,3,6,2,1,3 Determine the number of page hits and page faults using FIFO and LRU replacement algorithms. Frame size=5	8	CO5	Ap
iii)	On a disk with 200 cylinders numbered 0 to 199, assume read write head at track 67, the queue in FIFO order contains request for the following tracks: 84,147,113,74,48,185,22,50 Calculate the total overhead movement (total distance covered by the disk arm) using FCFS, SSTF and SCAN disk scheduling algorithms.	8	CO6	Ap

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