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

April – May 2023
Program:B.Tech Information Technology Scheme: II
Examination: SY Semester: IV
Course Code: ITC403 and Course Name: Operating System

Date of Exam: 18/05/2023 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)	Describe the characteristics of a Modern Operating System.	2	CO1	U
ii)	Explain User level threads and Kernel-level threads.	2	CO2	U
iii)	Explain process scheduling and list the types of schedulers.	2	CO2	U
iv)	Explain the Critical Section and Semaphore.	2	CO3	U
v)	Discuss the advantages and disadvantages of demand paging.	2	CO4	U
vi)	Explain the need for page replacement.	2	CO4	U
vii)	Explain different directory operations.	2	CO5	U
viii)	Explain distributed operating systems.	2	CO6	U
Q.2	Solve any four questions out of six.	16		
i)	Explain System Calls in brief and list the types of System Calls.	4	CO1	U
ii)	Explain various states of the process with the help of the State Transition diagram.	4	CO2	U
iii)	Apply the concept of semaphore in an example to show its significance.	4	CO3	A
iv)	Explain virtual memory concept with respect to paging and segmentation.	4	CO4	U
v)	List and explain different operation performed on file.	4	CO5	U
vi)	Discuss the advantages and disadvantages of an Open Source Operating System.	4	CO6	U
Q.3	Solve any two questions out of three.	16		
i)	Explain the two main categories of functions and services of the operating	8	CO1	U

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	system.			
ii)	Consider the reference string 5,0,2,3,0,1,3,4,5,4,2,0,3,4,3 and consider 3 frames. Find the number of page faults using the FIFO page replacement algorithm and Optimum page replacement algorithm.	8	CO4	A
iii)	Suppose that the head of a moving disk with 200 tracks, numbered from 0 to 199 is currently serving a request at track 143 and had just finished request at track 125.The queue of requests is kept in FIFO order : 86,147,91,177,94,150,102,175,130. What is the total number of head movements needed to satisfy these requests for the following disk scheduling algorithms: 1)FCFS 2) SSTF 3) SCAN	8	CO5	A
Q.4	Solve any two questions out of three.	16		
i)	Consider 4 processes P1, P2, P3, and P4 with the length of CPU burst time. Find out the average waiting time and average turnaround time for the following algorithm. 1) FCFS 2) Round Robin (slice = 4ms) 3) Preemptive SJF Process / Arrival time / Burst time P1 / 0 / 8 P2 / 1 / 4 P3 / 2 / 9 P4 / 3 / 5	8	CO2	A
ii)	It is proposed to use bankers algorithm for handling deadlock. Total number of resource available for allocation is 7,7,10 respectively. The current resource allocation state is shown below: Process / Allocation R1 R2 R3 / Max R1 R2 R3 / Available R1 R2 R3 P1 / 2 2 3 / 3 6 8 / 7 7 10 P2 / 2 0 3 / 4 3 3 / P3 / 1 2 4 / 3 4 4 / 1) Is the current allocation in safe state? 2) Would the request be granted in current state? * P1 request (1, 1, 0)	8	CO3	A
iii)	Compare the functions of RTOS, Embedded OS, IoT OS, Multimedia OS.	8	CO6	An

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