



**SOMAIYA**  
VIDYAVIHAR UNIVERSITY

13-6-2023 (E)

Semester: January 2023 –May 2023		
Maximum Marks: 100	Examination: ESE Examination(KT)	Duration:3 Hrs.
Programme code: 01	Class: TY	Semester: V(SVU 2020)
Programme: B. Tech in Computer Engineering		
Name of the Constituent College: K. J. Somaiya College of Engineering		Name of the department: COMP
Course Code: 116U01C503	Name of the Course: Operating System	
Instructions: 1)Draw neat diagrams 2) All questions are compulsory 3) Assume suitable data wherever necessary		

Que. No.	Question	Max. Marks
Q1	Solve any <b>Four</b>	<b>20</b>
i)	With respect to System Software, Describe assembler and loaders.	5
ii)	Differentiate between Compiler and Interpreter	5
iii)	Illustrate the Process State Transition Diagram with suitable diagram.	5
iv)	Explain the concept of Resource pre-emption for Recovery from Deadlock	5
v)	With respect to Linux Operating System, Define Inodes with suitable diagram.	5
vi)	With respect to Memory Management, Describe Internal and External Fragmentation.	5

Que. No.	Question	Max. Marks
Q2	Solve the following	<b>10</b>
A		
i)	Describe the System Boot Process.	5
ii)	Define shell. Further Comment on the different types of shells.	5
	<b>OR</b>	
Q2	Illustrate the following types of Operating System Structures with the help of suitable examples:-	<b>10</b>
A	i. Traditional UNIX System Structure ii. Layered Approach iii. Microkernel System Structure	
Q 2	Solve any <b>One</b>	<b>10</b>
B		
i)	Compare and Contrast between Multilevel Queue and Multilevel Feedback Queue Scheduling Algorithms with the help of suitable diagrams.	10
ii)	Differentiate between User level Threads and Kernel Level Threads. Further Describe the various Multithreading Models.	10

Que. No.	Question	Max. Marks
Q3	Solve any <b>Two</b>	<b>20</b>
i)	Consider the methods used by processes P1 and P2 for accessing their critical sections whenever needed, as given below. The initial values of shared Boolean variables S1 and S2 are randomly assigned.	<b>10</b>
	Method Used by P1 while (S1 == S2) ;	

	<p>Critical Section S1 = S2;</p> <p>Method Used by P2 while (S1 != S2) ; Critical Section S2 = not (S1);</p> <p>Analyse the methods and State whether Mutual Exclusion and Progress Requirement are being satisfied or not. Justify your answer.</p>	
ii)	Discuss the Semaphore solution for Dining Philosophers Problem.	10
iii)	With respect to Process Synchronization, Examine the Bounded Buffer Problem and Readers Writer Problem.	10

Que. No.	Question	Max. Marks
Q4	Solve any <b>Two</b>	<b>20</b>
i)	<p>Consider a disk queue with requests for I/O to blocks on cylinders in order 43, 33, 127, 87, 17, 99, 20. The head is initially at cylinder number 60, moving towards larger cylinder numbers on its servicing pass. The cylinders are numbered from 0 to 199.</p> <p>If the following Disk Scheduling algorithms are applied:-</p> <p>a) C-LOOK</p> <p>b) C-SCAN</p> <p>For all the algorithms, Find the order in which the requests will be serviced. Further Calculate the total head movement (in number of cylinders) incurred while servicing these requests.</p>	10
ii)	With respect to File Management, Illustrate the various File Allocation Methods with suitable diagrams.	10
iii)	Discuss the Address Translation Scheme to map Pages into frames with the help of suitable diagrams. Further Explain the concept of Segmentation with an example.	10

Que. No.	Question	Max. Marks
Q5	Solve any <b>four</b>	<b>20</b>
i)	Describe System Calls ,Further list the types of system calls.	5
ii)	Describe Linux Scheduling.	5
iii)	Distinguish between Message Passing and Shared Memory	5
iv)	Explain the concept of Monitors with the help of suitable diagrams.	5
v)	Discuss the various Input/Out Buffering schemes with suitable diagrams for each.	5
vi)	Discuss the structure of Hashed Page Table with the help of suitable diagrams.	5