

University of Mumbai

Examinations Summer 2022

Program: **Computer Engineering**

Curriculum Scheme: CBGS / R-19 (C-scheme)

Program No. : 1T00734

Name of the Examination: SE Sem - IV

Subject paper Code: 40524

Course Name: Operating System

Time: 3 hours

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	When a computational speed and resource sharing is required and implemented through various full computer systems in a network, what OS should be chosen?
Option A:	Real-time OS
Option B:	Distributed OS
Option C:	Embedded OS
Option D:	Batch OS
2.	Core of operating system is _____
Option A:	Shell
Option B:	Kernel
Option C:	Commands
Option D:	Script
3.	Which of the following state transitions is not possible?
Option A:	Blocked to running
Option B:	Ready to running
Option C:	Running to blocked
Option D:	Blocked to ready
4.	Degree of multiprogramming is characteristic of
Option A:	Long Term Scheduler
Option B:	Short Term Scheduler
Option C:	Medium Term Scheduler
Option D:	Dispatcher
5.	The situation where more than one processes access and update the same data concurrently and the result depends on the sequence of execution in which it takes place is known as
Option A:	Critical section

Option B:	Deadlock
Option C:	Non-critical section
Option D:	Race condition
6.	Which algorithm requires that the system must have some additional <i>a priori</i> information available about resources?
Option A:	Deadlock prevention
Option B:	Deadlock recovery
Option C:	Deadlock avoidance
Option D:	Deadlock allocation
7.	Which Page replacement algorithm suffers from Belady's Anomaly?
Option A:	LRU
Option B:	FIFO
Option C:	Optimal
Option D:	None of the Above
8.	Which technique is used to overcome external fragmentation when Dynamic Partitioning is used during the process to memory allocation?
Option A:	Polling
Option B:	Page fault
Option C:	Context switch
Option D:	Compaction
9.	Which one is not a file attributes?
Option A:	Time, date, and user identification
Option B:	Name
Option C:	Truncate
Option D:	Protection or Permission
10.	In _____ algorithm, the disk head moves from one end to the other , servicing requests along the way, when the head reaches the other end, it immediately returns to the beginning of the disk without servicing any requests on the return trip.
Option A:	LOOK
Option B:	C-LOOK
Option C:	C-SCAN
Option D:	SCAN

Q2.	Solve any Four out of Six	5 marks each
A	Describe microkernel operating system structure.	
B	What is the need of thread? Describe any four advantages of multithreading model.	
C	How to solve busy waiting problem?	

D	What is the producer consumer problem? Provide solution to producer consumer problem using semaphores.
E	Give details of file organization types
F	Give details of IO Buffering techniques.

Q3.	Solve any Two Questions out of Three 10 marks each																															
A	Consider the following set of processes.																															
	<table border="1"> <thead> <tr> <th>Process</th> <th>Burst Time</th> <th>Arrival Time</th> <th>Priority</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>0</td> <td>4</td> <td>2(L)</td> </tr> <tr> <td>P2</td> <td>1</td> <td>2</td> <td>4</td> </tr> <tr> <td>P3</td> <td>2</td> <td>3</td> <td>6</td> </tr> <tr> <td>P4</td> <td>3</td> <td>5</td> <td>10</td> </tr> <tr> <td>P5</td> <td>4</td> <td>1</td> <td>8</td> </tr> <tr> <td>P6</td> <td>5</td> <td>4</td> <td>12 (H)</td> </tr> <tr> <td>P7</td> <td>6</td> <td>6</td> <td>9</td> </tr> </tbody> </table> <p><i>Note Higher number is having higher priority.</i></p> <ol style="list-style-type: none"> 1. Draw Gantt chart for SJF-Preemptive Scheduling and Preemptive Priority scheduling. 2. Calculate average waiting time, average turnaround time and average response time for this scheduling algorithms. 	Process	Burst Time	Arrival Time	Priority	P1	0	4	2(L)	P2	1	2	4	P3	2	3	6	P4	3	5	10	P5	4	1	8	P6	5	4	12 (H)	P7	6	6
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P7	6	6	9																													
B	Define Deadlock. Explain the necessary & sufficient conditions of deadlock. Suggest techniques to avoid deadlock.																															
C	Given five memory partition of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would the first-fit, best-fit and worst-fit algorithms place processes of P1-212 KB, P2-417 KB, P3-112 KB and P4-426 KB (in order)? Which algorithm makes the most efficient use of memory? Use fixed size Dynamic partitioning method.																															

Q4.	
A	Solve any Two 5 marks each
i.	Draw and Explain five state process model.
ii.	Explain with the help of a diagram how the system call will be generated?
iii.	Explain the effect of page size on performance.
B	Solve any One 10 marks each
i.	Describe Disk Scheduling algorithms with example
ii.	Explain File Allocation methods in detail.