Subject Code: UGCS5T0418 **R18**

SHRI VISHNU ENGINEERING COLLEGE FOR WOMEN:: BHIMAVARAM
(AUTONOMOUS)
III B.Tech I Semester Regular Examinations
Operating Systems
(Information Technology)
MID Question Bank
All Questions carry equal marks
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NIL

Course Outcomes:
Upon the completion of the course, the student will be able to:
CO1**:** Study the basic principles and functionality of operating systems
CO2: Understand the concepts of CPU scheduling, concurrent processes, deadlock
CO3: Identify the significance of file systems, virtual memory
CO4: Understand disk scheduling, memory management, and device management

	UNIT-I	Marks	CO	BL	PO
1(a)	List the functions provided by operating systems	[5M]	CO1	L2	1,2
(b)	Explain in detail about the Objectives of operating systems.	[5M]	CO1	L2	1,2
2	Write about the various generations of Operating Systems.	[10M]	CO1	L4	1
3(a)	Define the essential properties of the following types of operating system: Batch Systems	[5M]	CO1	L3	1, 3
(b)	Multi programmed System	[5M]	CO1	L3	1, 3
4	Identify the differences between a tightly coupled and loosely coupled systems.	[10M]	CO1	L4	1,2
5(a)	Distinguish in detail about the third and fourth generation operating systems.	[5M]	CO1	L4	2
(b)	Write the importance of system calls in operating systems.	[5M]	CO1	L3	1
6(a)	Define the essential properties of the following types of operating system: Time sharing system	[5M]	CO1	L3	2,3
(b)	Real Time System	[5M]	CO1	L2	1,3
7	Briefly about the services and functions provided by the operating system.	[10M]	CO1	L2	1,2
8(a)	Explain the following structure of Operating system: Simple Structure	[5M]	CO1	L2	1,3
(b)	Micro Kernel Structure.	[5M]	CO1	L2	1
9	Explain in detail about the structure of operating system.	[10M]	CO1	L2	1,2
10(a)	Explain in detail about the following service: Accounting	[5M]	CO1	L2	1,2
(b)	Communications	[5M]	CO1	L2	2

11	Explain about the importance of protection and security in operating systems.	[10M]	CO1	L2	1
12(a)	What is Layered Approach in System Structure?	[5M]	CO1	L3	1
(b)	Explain Modular Structure approach in System structure.	[5M]	CO1	L2	1,2

UNIT-II		**Marks**	**CO**	**BL**	**PO**
1(a)	Draw the Process state Life cycle diagram.	[5M]	CO2	L3	2,3
(b)	Explain in detail about various stages in the process life cycle.	[5M]	CO2	L2	1,2
2	Define process and explain with a neat diagram about process states and process control block	[10M]	CO2	L3	2
3(a)	Explain about long term scheduler and short term scheduler	[5M]	CO2	L2	1
(b)	Differentiate between Pre-emptive and Non Pre-emptive Scheduling.	[5M]	CO2	L4	2
4	Discuss in detail schedulers. Describe the difference between different types of scheduling	[10M]	CO2	L3	3
5(a)	Explain context switch with the help of a neat diagram	[5M]	CO2	L2	2,3
(b)	Justify, how does context switch improves the multitasking feature of operating system	[5M]	CO2	L4	1
6(a)	Explain about single threaded and multi-threaded process models with suitable diagrams	[5M]	CO2	L2	1,2
(b)	Differentiate between shared memory and message queues.	[5M]	CO2	L4	2
7	Explain about different inter process communication mechanisms	[10M]	CO2	L2	1,2
8(a)	Consider the following process, with the CPU burst time given in milliseconds Process arrived in P1, P2, P3, P4, P5 order at time 0 Draw Gantt charts to show execution using FCFS, SJF, Non-pre-emptive priority.	[5M]	CO2	L3	3,4
(b)	Calculate the waiting time and turnaround time for each scheduling algorithms.	[5M]	CO2	L3	3
9	Explain about various Multithreading Models.	[10M]	CO2	L2	1,2
10	Explain in detail round robin scheduling algorithm .With an example show how a smaller time quantum increases context switches	[5M]	CO2	L2	1,2

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

<table>
<tr><td>11</td><td>What are the scheduling algorithms? Discuss briefly about the priority scheduling algorithm and the round-robin scheduling algorithm</td><td>[10M]</td><td>CO2</td><td>L2</td><td>2</td></tr>
<tr><td>12(a)</td><td>Consider we have the process arrival time chart as given below
<table>
<tr><th>Process</th><th>Arrival Time</th><th>Burst Time</th><th>Priority</th></tr>
<tr><td>P1</td><td>0</td><td>16</td><td>1</td></tr>
<tr><td>P2</td><td>0</td><td>6</td><td>2</td></tr>
<tr><td>P3</td><td>6</td><td>10</td><td>3</td></tr>
<tr><td>P4</td><td>7</td><td>4</td><td>4</td></tr>
<tr><td>P5</td><td>8</td><td>10</td><td>5</td></tr>
</table>
Draw the Gantt Chart and calculate waiting time for each process using FCFS, SJF algorithms</td><td>[5M]</td><td>CO2</td><td>L3</td><td>3</td></tr>
<tr><td>(b)</td><td>Draw the Gantt Chart and calculate waiting time for each process using Priority and Round Robin algorithms</td><td>[5M]</td><td>CO2</td><td>L3</td><td>3</td></tr>
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	UNIT-III	Marks	CO	BL	PO
1	Explain about Peterson's solution to the critical section problem	[10M]	CO2	L2	1,2
2	Explain in detail how process synchronization is useful in operating system.	[10M]	CO2	L2	2
3	Justify, how the three necessary conditions of deadlock are satisfied using Peterson's solution.	[10M]	CO2	L4	1, 2
4	Describe in detail about the critical-section problem? What are the requirements to be satisfied for its solution?	[10M]	CO2	L2	2
5(a)	Explain briefly about the following instructions: TestAndSet()	[5M]	CO2	L2	2
(b)	Swap()	[5M]	CO2	L2	2
6(a)	What are Semaphores? Explain with examples.	[5M]	CO2	L3	1,2
(b)	What is the difference between binary semaphore and counting semaphore? Explain	[5M]	CO2	L3	1, 2
7	How can Semaphores be used to achieve mutual exclusion? Explain with an example.	[10M]	CO2	L3	3
8(a)	Explain the Dining Philosophers Problem and give solution using Semaphores	[5M]	CO2	L2	3
(b)	Explain about The Readers Writers Problem give solution using Semaphores	[5M]	CO2	L2	3
9	What are the classical problems of synchronization? Discuss briefly about the bounded-buffer problem?	[10M]	CO2	L3	3
10(a)	Explain the Dining Philosophers Problem and give solution using Monitors.	[5M]	CO2	L2	3
11	Briefly explain about the use of monitors and impact on critical section problem	[10M]	CO2	L2	1,2

12	Write the algorithm using test and set() instruction that satisfy all the critical section requirements.	[10M]	CO2	L3	2

	UNIT-IV	**Marks**	**CO**	**BL**	**PO**
1(a)	What are the conditions that must satisfy for Deadlock Occurrence and explain them.	[5M]	CO2	L2	1,2
(b)	Why is deadlock state more critical than starvation? Describe resource allocation graph with a deadlock, with a cycle but no deadlock	[5M]	CO2	L4	3
2	What is a Deadlock? Explain all the features that characterize the Deadlocks	[10M]	CO2	L2	1,2
3(a)	Describe necessary conditions for a deadlock situation to arise.	[5M]	CO2	L2	1
(b)	Explain different methods to handle deadlocks.	[5M]	CO2	L2	1,2
4	What is Deadlock Detection and Explain Detection Methods with Several Instance of Resources	[10M]	CO2	L3	3
5(a)	Solve the deadlock to find safe or unsafe state	[5M]	CO2	L2	1,2
(b)	What is Deadlock Detection and Explain Detection Methods with Single Instance of Resources	[5M]	CO2	L2	3
6(a)	Illustrate Deadlock Prevention with No Pre-emption and Circular Wait methods	[5M]	CO2	L4	3,4
(b)	Describe how deadlock could be detected in detail.	[5M]	CO2	L2	1
7	Describe Deadlock Prevention with Mutual Exclusion and Hold & Wait method.	[10M]	CO2	L2	1,2
8(a)	The operating system contains 3 resources, the number of instances of each type are 10, 5, 7. The current resource allocation state is as follows.	[5M]	CO2	L3	3

	Allocation			Max		
	A	B	C	A	B	C
P0	0	1	0	7	5	3
P1	2	0	0	3	2	2
P2	3	0	2	9	0	2
P3	2	1	1	2	2	2
P4	0	0	2	4	3	3

Is current allocation in a safe state? Justify.
Can request for (3,3,0) by P_4 be granted?

9	Explain the Methods that are used to Recover from a Deadlock.	[10M]	CO2	L2	2
10	Illustrate Deadlock Detection – Algorithm Usage. Explain different methods to handle deadlocks.	[10M]	CO2	L2	1
11	Explain in detail about Bankers' Algorithm for Deadlock Avoidance	[10M]	CO2	L2	1,2
12(a)	Outline the Safe State of Deadlock Avoidance.	[5M]	CO2	L2	2

(b)	Explain Deadlock Avoidance with Resource-Allocation-Graph Algorithm.	[5M]	CO2	L2	2

UNIT-V		Marks	CO	BL	PO
1(a)	Write a detail notes on Swapping	[5M]	CO3	L1	1
(b)	What is paging and swapping?	[5M]	CO3	L1	1,2
2	Memory partitions of 100kb,500 kb,200 kb,300kb,600 kb are available how would best, worst, first fit algorithm to place processes 212,417,112,426 in order. Which is the best algorithm?	[10M]	CO3	L3	3
3(a)	Explain in detail about Contiguous Memory Allocation	[5M]	CO3	L2	2
(b)	Explain in detail about the internal and external Fragmentation	[5M]	CO3	L2	2
4	What is demand paging? Discuss in detail the steps in handling a page fault. Explain about performance of demand paging in detail.	[10M]	CO3	L2	2
5(a)	What is the importance of Virtual Memory and its influence on memory management?	[5M]	CO3	L2	1,2
(b)	Write short notes on Virtual Memory	[5M]	CO3	L3	2
6	What is segmentation? Describe in detail about general method with hardware implementation of segmentation	[10M]	CO3	L2	1,2
7	What is paging? What is the need for page replacement? Discuss the basic method of paging in detail.	[10M]	CO3	L3	1,2
8	Illustrate FIFO and Optimal Page Replacement Algorithms for the following reference string for 4 frames 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1	[10M]	CO3	L3	3
9	Consider the following page reference string: 1,2,3,4,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. How many page faults would occur for the FIFO and LRU replacement algorithm for 3 frames?	[10M]	CO3	L3	3
10	Consider a reference string: 4, 7, 6, 1, 7, 6, 1, 2, 7, 2. the number of frames in the memory is 3. Find out the number of page faults respective to: 1. Optimal Page Replacement Algorithm 2. FIFO Page Replacement Algorithm 3. LRU Page Replacement Algorithm	[10M]	CO3	L3	3
11	What is Thrashing? Describe various causes of thrashing	[10M]	CO3	L2	1,2
12(a)	Write a Detailed note on Thrashing	[5M]	CO3	L2	2
(b)	Explain Frame allocation methods.	[5M]	CO3	L2	2

UNIT-VI		Marks	CO	BL	PO
1(a)	Explain about the directory structure in detail	[5M]	CO3	L2	2
(b)	Discuss in detail about tree level and acyclic level directory	[5M]	CO3	L2	1,2

2	Explain the directory implementation of a file system in detail.	[10M]	CO3	L2	2
3(a)	Describe about boot block and bad block.	[5M]	CO4	L3	1
(b)	Explain in detail about different types of Bad Blocks with an example	[5M]	CO4	L2	1,2
4	Discuss in detail about variety of techniques to improve the efficiency and performance of secondary storage.	[10M]	CO4	L2	2
5(a)	Explain about file system structure.	[5M]	CO3	L2	2
6	Explain about different Free space techniques with neat sketch.	[10M]	CO3	L2	2
7	What is disk scheduling? Explain in detail about FCFS and SSTF scheduling	[10M]	CO4	L1	1
8(a)	What are the allocation methods of a file system? Explain.	[5M]	CO3	L2	2
(b)	How linked allocation is advantageous over the contiguous allocation method	[5M]	CO3	L2	2
9	List all the disk scheduling algorithms and explain with an example	[10M]	CO3	L4	1,2
10(a)	Explain about allocation methods and particularly about indexed allocation	[5M]	CO3	L2	1,2
(b)	Explain in detail about different file types.	[5M]	CO3	L2	1,2
11	Explain in detail about the file attributes, file operations and about the structure of a file system?	[10M]	CO3	L2	2
12(a)	Describe Sequential Access and Direct Access Methods	[5M]	CO3	L2	1
(b)	Write about different File Allocation Methods in detail.	[5M]	CO3	L1	2