R20

II B. Tech I Semester Regular/Supplementary Examinations, January - 2023
OPERATING SYSTEMS
(Com to CSE, CSE-IOT, CST, IT, CSE(CS), IOTCSBT, IOT, CS)

Time: 3 hours   Max. Marks: 70

Answer any **FIVE** Questions, each Question from each unit
All Questions carry **Equal** Marks
~~~~~~~~~~~~~~~~~~~~~~~~~

UNIT-I

1	a)	Discuss the important functions of an operating System.	[7M]
	b)	Explain the types of System calls related to file management.	[7M]

OR

2	a)	What system calls have to be executed by a command interpreter or shell in order to start a new process?	[7M]
	b)	What is Open source software? Discuss its advantages and disadvantages. List out some Open-Source operating systems.	[7M]

UNIT-II

3	a)	Draw the Process state diagram and explain its states.	[7M]
	b)	Write the important characteristics of Round Robin Scheduling algorithm. And demonstrate its performance for the following workload in a system with time quantum = 2 units.	[7M]

Consider the set of 5 processes whose arrival time and burst time are given below

Process Id	Arrival time	Burst time
P1	5	5
P2	4	6
P3	3	7
P4	1	9
P5	2	2
P6	6	3

Draw a Gantt chart illustrating the execution of these jobs and also Calculate the average waiting and average turnaround times.

OR

|'"'|'|'|'|'|'||'|||

4	a)	What is the necessity of Context switching? What information is saved during Context switching? Explain the actions taken by a kernel to context switch between processes.	[7M]
	b)	What is meant by Starvation in Dining philosopher problem? Suggest a solution to solve this problem using Semaphores.	[7M]

UNIT-III

5	a)	How does fragmentation occur in contiguous memory allocation? Explain with an example.	[7M]
	b)	Explain the LRU and Optimal page replacement algorithms.	[7M]

OR

6	a)	Elaborate on most common techniques for structuring the page table.	[7M]
	b)	What is Thrashing? What is the cause of Thrashing? How does the system detect Thrashing? What can the system do to eliminate this problem?	[7M]

UNIT-IV

7	a)	Why Ostrich algorithm is considered the best solution for deadlock handling? Explain the Ostrich algorithm.	[7M]
	b)	Explain about Network-attached and Host-attached storage.	[7M]

OR

8	a)	Discuss the different ways of aborting a process in order to recover from deadlock.	[7M]
	b)	Consider a disk queue with requests for I/O to blocks on cylinders 98, 183, 41, 122, 14, 124, 65, 67. The head is initially at cylinder number 53. The cylinders are numbered from 0 to 199. Find out the total head movement (in number of cylinders) incurred while servicing these requests with respect to SCAN and SSTF algorithms.	[7M]

UNIT-V

9	a)	Discuss the goals and principles of protection in a Modern Computer System.	[7M]
	b)	Differentiate between Symmetric and Asymmetric encryption.	[7M]

OR

10	a)	How can the Access matrix be implemented effectively? Give the application in protection.	[7M]
	b)	Explain the different types of Program Threats.	[7M]

|'''|'|'|'|'|'||'|||

R20

II B. Tech I Semester Regular/Supplementary Examinations, January - 2023
OPERATING SYSTEMS
(Com to CSE, CSE-IOT, CST, IT, CSE(CS), IOTCSBT, IOT, CS)

Time: 3 hours   Max. Marks: 70
___

Answer any **FIVE** Questions, each Question from each unit
All Questions carry **Equal** Marks
~~~~~~~~~~~~~~~~~~~~~~~~~

UNIT-I

1	a)	What is an Operating System? What are its objectives?	[7M]
	b)	What is meant by Dual Booting? Explain the Booting process in Operating System.	[7M]

OR

2	a)	Explain the types of Operating System structures.	[7M]
	b)	Describe the system calls related to Communications and protection.	[7M]

UNIT-II

3	a)	What are the benefits of Multithreaded programming? Discuss the different types of Multithreading models in Operating System.	[7M]
	b)	Consider the set of 5 processes whose arrival time and burst time are given below.	[7M]

Process Id	Arrival time	Burst time	Priority
P1	0	4	2
P2	1	3	3
P3	2	1	4
P4	3	5	5
P5	4	2	5

If the CPU scheduling policy is priority non-preemptive, calculate the Average Waiting time and Average Turnaround time. (Higher number represents higher priority)

OR

4	a)	Explain the Shared-memory systems model of IPC. Discuss its advantages and limitations.	[7M]
	b)	Specify the requirements that any solution to the critical section problem must satisfy and brief any four solutions to the critical section problem.	[7M]

UNIT-III

5. a) Explain about Segmentation and illustrate the translation of Logical address into Physical address by segment table. [7M]

    b) What is the need for page replacement in paging? Describe any two page replacement algorithms with examples. [7M]

OR

6. a) Explain the working of Demand Paging technique. And name the hardware required to support demand paging. [7M]

    b) Explain the Copy-on-write technique and its benefits. [7M]

UNIT-IV

7. a) What is Deadlock and what are its four necessary conditions? Specify the difference between Deadlock and Starvation. [7M]

    b) Briefly discuss various Disk-scheduling algorithms. [7M]

OR

8. a) Discuss various on-disk and in-memory structures used to implement a file system. [7M]

    b) Write about the different levels of RAID configuration. [7M]

UNIT-V

9. a) Discuss the strengths and weaknesses of implementing an access matrix using capabilities that are associated with domains. [7M]

    b) Briefly discuss the types of System and Network Threats. [7M]

OR

10. a) Summarize the four security classifications in Computer System. [7M]

    b) How can we determine whether a security policy has been correctly implemented? [7M]

II B. Tech I Semester Regular/Supplementary Examinations, January - 2023
OPERATING SYSTEMS
(Com to CSE, CSE-IOT, CST, IT, CSE(CS), IOTCSBT, IOT, CS)

Time: 3 hours   Max. Marks: 70

Answer any **FIVE** Questions, each Question from each unit
All Questions carry **Equal** Marks
~~~~~~~~~~~~~~~~~~~~~~~~~

UNIT-I

1 a) Discuss the major types of Operating System.   [7M]

   b) Explain the types of Booting in Operating System. Compare them.   [7M]

OR

2 a) Explain the layered structure of Operating System and its advantages.   [7M]

   b) Discuss the taxonomy of Operating systems.   [7M]

UNIT-II

3 a) Explain the Message passing model of IPC mechanism. Discuss its advantages and limitations.   [7M]

   b) Describe the characteristics of SJF scheduling algorithm. Consider there are five jobs named as P1, P2, P3, P4 and P5. Their arrival time and burst times are given below.   [7M]

Process Id	Arrival time	Burst time
P1	1	7
P2	3	3
P3	6	2
P4	7	10
P5	9	8

Draw a Gantt chart illustrating the execution of these jobs using SJF algorithm and also Calculate the average waiting time and average turnaround time.

OR

4 a) Explain about Long-term, Short-term and Medium-term schedulers.   [5M]

   b) What resources are used when a Thread is created? How do they differ from those used when a Process is created?   [5M]

   c) What is the Critical section problem in Operating systems? Explain it.   [4M]

|'"|'|'|'|'|''|ll'|ll

UNIT-III

5   a) What are the causes for External and Internal fragmentation? Suggest solutions to the fragmentation problem.   [7M]

   b) Explain in detail about how Virtual memory is implemented with a neat diagram.   [7M]

OR

6   Consider the following page reference string: [14M]
      1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6
   How many page faults would occur for FIFO, LRU and optimal page replacement algorithms assuming four page frame and all frames are initially empty.

UNIT-IV

7   a) Write about Linked and Index file allocation methods.   [7M]

   b) Explain about SCAN and C-SCAN disk scheduling algorithms.   [7M]

OR

8   Explain the Banker's algorithm with an example.   [14M]

UNIT-V

9   a) How are the access-matrix facility and the role-based access-control facility similar? How do they differ?   [7M]

   b) What are two advantages of encrypting data stored in the computer system?   [7M]

OR

10 a) Explain the following   [7M]
      i)Man-in-the-middle attack   ii)Denial –of- service   iii)Replay attack

   b) What are the features of firewall? How does a firewall protect the System and Network?   [7M]

|"|'|'|'|'|'|II'|III

II B. Tech I Semester Regular/Supplementary Examinations, January - 2023
OPERATING SYSTEMS
(Com to CSE, CSE-IOT, CST, IT, CSE(CS), IOTCSBT, IOT, CS)

Time: 3 hours   Max. Marks: 70

Answer any **FIVE** Questions each Question from each unit
All Questions carry **Equal** Marks
~~~~~~~~~~~~~~~~~~~~~~~~~

UNIT-I

1 a) Define Operating System. Briefly discuss its types, objectives and functions.   [7M]
   b) Explain in detail the different types of Operating System structures.   [7M]

OR

2 a) Describe the history and evolution of Operating systems.   [7M]
   b) Explain in detail about various types of System Calls handled by Operating System.   [7M]

UNIT-II

3 a) What are Independent and Cooperating processes? Explain the two fundamental models of IPC.   [7M]
   b) Consider the set of 5 processes whose arrival time and burst time are given below-   [7M]

Process Id	Arrival time	Burst time	Priority
P1	0	4	2
P2	1	3	3
P3	2	1	4
P4	3	5	5
P5	4	2	5

   If the CPU scheduling policy is priority preemptive, calculate the average waiting time and average turnaround time. (Higher number represents higher priority)

OR

4 a) Explain the role of Process Control Block in Operating System and describe its attributes.   [7M]
   b) State the Readers-Writers problem. Give a solution to Readers-Writers problem using Monitors.   [7M]

|'"|'|'|'|'|'||'|||

UNIT-III

5 a) Does virtual memory increase computer speed? Give justification to your answer.   [5M]

   b) What is a Page fault? Describe the sequence of steps in handling a Page fault.   [5M]

   c) Differentiate between Logical and Physical address space.   [4M]

OR

6 a) A system uses 4 page frames for storing process pages in main memory. Assume that all the page frames are initially empty. Find the number of Page faults, Hit ratio and Miss ratios for Optimal Page replacement algorithm while processing the page reference string given below.   [7M]
1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6

   b) Explain about Memory-mapped files and its types.   [7M]

UNIT-IV

7 a) Briefly explain about Single-level, Two-level and Tree-Structured directory implementations.   [7M]

   b) Suppose the following disk request sequence (track numbers) for a disk with 200 tracks is given: 82,170,43,140,24,16,190. Assume that the initial position of the R/W head is on track 50. Calculate the Seek Time for SSTF, SCAN, LOOK   [7M]

OR

8 a) Describe various data structures used in Bankers algorithm.   [7M]

   b) Explain the different File access methods.   [7M]

UNIT-V

9 a) What does the Access control matrix represent? Explain the implementation of Access control matrix.   [7M]

   b) What are Symmetric and Asymmetric Cryptosystems? Explain with example.   [7M]

OR

10 a) What commonly used computer programs are prone to man-in-the middle attacks? Discuss solutions for preventing this form of attack.   [7M]

   b) What is a Firewall and how does it protect Systems and Networks?   [7M]

|'"|'|'|'|'|'||'|||