Code No: R2021052 **R20** SET - 1

II B. Tech I Semester Regular Examinations, Feb/March - 2022
OPERATING SYSTEMS
(Com to CSE, 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
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1 a) i) Explain operating system goals from user's view and system's view.
ii)List various services of Operating System [7M]

b) i)What is operating system? Explain multiprogramming and time sharing systems.
ii) Explain briefly about system calls with suitable examples. [7M]

Or

2 a) i)Explain the concept of multiprocessor and Multicore organization
ii) What are the major activities of an operating system with regard to file management? [7M]

b) i)State and explain various types of computer systems.
ii) Explain about the dual mode operation in OS with a neat block diagram. [7M]

3 a) What is a process? Explain Process states and process scheduler. [7M]

b) What is Semaphore? How can we achieve the synchronization using semaphore for producer consumer problem? [7M]

Or

4 a) Consider the following four processes, with the length of the CPU burst time given in the following:

Process	Arrival Time(ms)	Burst Time (ms)
P1	1	6
P2	1	5
P3	2	5
P4	2	3

Find Average Waiting Time and Turnaround time for given Process using FCFS and SJF Algorithms? [9M]

b) Explain about Inter Process communication, in client – server systems. [5M]

5 a) What are the disadvantages of single contiguous memory allocation? Explain. MVT and MFT techniques with examples. [7M]

b) Consider the page reference string 1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2 With Five Frames. How many page faults would occur for the FIFO, Optimal page replacement algorithms? [7M]

Or

6 a) i) Compare and Contrast Free space management and Swap space management.
ii)What is virtual memory? Discuss the benefits of virtual memory techniques. [7M]

b) Discuss clearly about the following:
i)Structure of page table ii)LFU Page replacement algorithm [7M]

7 a) A system has 3 devices D1, D2 and D3 and 3 processes P1, P2 and P3. P1 is holding D1 and waiting for D3. P2 is holding D2 and waiting for D1. P3 is holding D3 and waiting for D2. Draw resource allocation graph and wait-for graph. Is the system in deadlock state or not? Explain. [7M]

b) Write about various disk scheduling algorithms and compare the number of head moves to schedule the requests with an example. [7M]

Or

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8 a) Explain about the banker's algorithm for deadlock avoidance. [7M]

b) Discuss various types of Disk storage attachments and RAID structures. [7M]

9 a) In the capability-based system, describe the techniques, which can be used to protect the capabilities from unauthorized modification. [7M]

b) Write the principles of protection? And explain the access matrix in detail. [7M]

Or

10 a) What is meant by authentication? Why simple password protection is the most common authentication scheme in use today? Discuss the weakness inherent in the password protection scheme. [7M]

b) How to implement security detense with fire walls? Explain its design and working principle in systems protection. [7M]

Code No: R2021052 **R20** SET - 1

II B. Tech I Semester Supplementary Examinations, July - 2022
OPERATING SYSTEMS
(Com to CSE, 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
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1	a)	i.	Explain how operating systems are used in a variety of computing environments?	[7M]
		ii.	What are the main differences between operating systems for mainframe computers and personal computers?	
	b)		What are the functionalities of Operating Systems? Explain in detail	[7M]
			Or	
2	a)	i.	What is operating system? Explain multiprogramming and time sharing systems.	[7M]
		ii.	Explain different operations performed by the operating system.	
	b)	i.	Explain different categories of system calls with suitable example.	[7M]
		ii.	State and explain the process of executing system calls.	
3	a)	i.	Explain scheduling criteria used to compare scheduling algorithms.	[7M]
		ii.	Explain fine Process state model and types of process schedulers used in each state.	
	b)		Describe dining-philosopher problem? Write an algorithm to solve the problem using semaphores?	[7M]
			Or	
4	a)		What is Semaphore? Explain the usage &implementation of monitors. Give the solution to Reader's – writers problem.	[7M]
	b)		Explain the basic concepts of process synchronization. How message passing mechanism is working inwards communication of processes?	[7M]
5	a)		Compare Paging with Segmentation with respect to the amount of memory required by the address translation structures in order to convert virtual addresses to physical addresses.	[7M]
	b)	i.	Explain about Swapping and memory management module.	[7M]
		ii.	What is Thrashing? Explain the Causes of Thrashing.	
			Or	
6	a)		Consider the page reference string 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6 Determine how many page faults would occur for Optimal page replacement algorithm? Assume three, four frames are initially empty.	[7M]
	b)		Explain the terms in Memory Partitioning with examples: i) Fixed Partitioning ii) Dynamic partitioning.	[7M]
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7 a) i)Consider t following snapshot of a system: [10M]

Processes	Allocation	Max	Available
	A B C D	A B C D	A B C D
P_0	0 0 1 2	0 0 1 2	2 1 0 0
P_1	2 0 0 0	2 7 5 0	
P_2	0 0 3 4	6 6 5 6	
P_3	2 3 4 5	4 3 5 6	
P_4	0 3 3 2	0 6 5 2	

Answer the following questions using the banker's algorithm:
a) What is the content of the matrix Need?
b) Is the system in a safe state? Why?
c) Is the system currently deadlocked? Why or why not?
d) Which process, if any, or may become deadlocked if this whole request is granted immediately?

b) Illustrate the functions of file and file implementation. [4M]

Or

8 a) Compare the performance of write operations achieved by a RAID level 5 organization with that achieved by a RAID level 0 organizations? [7M]

b) Explain the following with relevant diagrams: [7M]
   i. Single level directory structure.
   ii. Tree-structured directory structure

9 a) Describe the system security model. How the cryptography ensures system security? Discuss. [7M]

b) Explain Capability-Based Protection system. How it achieves the goals of the protection system? [7M]

Or

10 a) What is access matrix? What are various methods to implement it? [7M]

b) Discuss about revocation of access rights and their role in system protection. [7M]

Code No: R2021052 **R20** SET - 1

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
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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

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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]

Code No: R2021052 **R20** SET - 2

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
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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]

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Code No: R2021052 **R20** SET - 2

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]

Code No: R2021052 **R20** SET - 3

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
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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]

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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]

Code No: R2021052 **R20** SET - 4

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
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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]
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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. 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6	[7M]
	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]

Code No: R2021052 **R20** SET - 1

II B. Tech I Semester Supplementary Examinations, July - 2023
OPERATING SYSTEMS
(Com to CSE, CST,IT,CSE(CS),CSE(IOTCSBCT), CSE(IOT),CS)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions each Question from each unit
All Questions carry **Equal** Marks
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UNIT-I

1	a)		What are the various components of Operating System structure? And explain simple layered approach of Operating System in detail.	[7M]
	b)	i.	Discuss the essential properties of Time sharing and distributed systems.	[7M]
		i.	What is a system call? Explain how a user application invoking the open () system call is handled.	

Or

2	a)	i.	With a neat diagram describe how a modern computer works?	[7M]
		ii.	Discuss briefly about the typical functions of an OS Kernel.	
	b)		What system calls have to be executed by a command interpreter or shell in order to start a new process? Discuss briefly various types of system calls.	[7M]

UNIT-II

3	a)	State critical section problem? Discuss three solutions to solve the critical section problem.	[7M]
	b)	Assume 5 processes arrived at 1, 2, 3, 4, with burst times 4, 2, 8, 6, 3. Implement preemptive scheduling algorithms and compare the performance.	[7M]

Or

4	a)	What is the role of Scheduler? What requirement is to be satisfied for a solution of a critical section problem? Explain briefly.	[7M]
	b)	Describe various types and operations of semaphores. Give the solution for producer – consumer synchronization problem with semaphores.	[7M]

UNIT-III

5		What is the need of Page Replacement? Consider the given reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1. Find the number of Page Faults with FIFO, Optimal Page replacement and LRU with four, five frames which are empty initially. Which algorithm gives the minimum number of page faults? Discuss.	[14M]

Or

6	a)	i.	What is the need of demand paging? Explain briefly.	[10M]
		ii.	Explain in detail about paging technique and its implementation.	
	b)		Explain how protection can be ensured using paging.	[4M]
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UNIT-IV

7 a) Explain banker's algorithm for deadlock avoidance with an example. [7M]

b) Compare the performance of write operations achieved by a RAID level 5 organization with that achieved by a RAID level 0 organizations? [7M]

Or

8 a) What are the objectives of file management system? Explain file system architecture. [7M]

b) What is deadlock? Explain the conditions that lead to deadlock. Characterize it with graph. [7M]

UNIT-V

9 a) Compare and contrast the terms external and operational security in the context of operating systems. [7M]

b) Explain the protection mechanism illustrating the use of protection domain and access control list. [7M]

Or

10 a) Explain the importance of Memory protection in multiprogramming systems. [7M]

b) i. Define Protection Domain with Example. [7M]
ii. Explain about C-List with Example.