Code: 20A05402T **R20**

B.Tech II Year II Semester (R20) Regular Examinations August/September 2022

OPERATING SYSTEMS

(Common to IT, CSE, CSE (AI), CSE (AI&ML), AI&DS, CSE (IoT) and CSE (DS))

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1		Answer the following: (10 X 02 = 20 Marks)	
	(a)	What are the different services of operating system?	2M
	(b)	Name different types of system calls.	2M
	(c)	What is convoy effect? Explain.	2M
	(d)	Distinguish between long-term scheduler and short-term scheduler.	2M
	(e)	Distinguish between demand-paging and pre-paging.	2M
	(f)	What is page replacement algorithm? Name at- least two.	2M
	(g)	What are necessary conditions which can lead to a deadlock situation in a system?	2M
	(h)	What is Banker's algorithm? What is its use?	2M
	(i)	What are the three additional operations to change the contents of the access-matrix?	2M
	(j)	What is ***ls-l*** command in Linux?	2M

PART – B

(Answer all the questions: 05 X 10 = 50 Marks)

2	(a)	Explain briefly about the functions of operating system.	5M
	(b)	Explain the structure of Micro-Kernel operating system.	5M
		OR	
3	(a)	Write a simple program that involve different system calls to read data from one file and copy them to another file.	5M
	(b)	Differentiate between multi-tasking, multiprogramming and multi-threading.	5M
4	(a)	Sketch the neat diagram of process life cycle and explain each state.	5M
	(b)	Describe the term CPU utilization, throughput, turnaround time, waiting time, response time.	5M
		OR	
5	(a)	Consider a system which has 'n' process sharing the CPU in round robin fashion. The context switching time is 's' units. Then what must be the time quantum 'q' such that each process is guaranteed to get its turn at the CPU for every 't' second of time.	5M
	(b)	Explain Dining philosopher's problems using semaphore.	5M
6	(a)	Consider the following page reference string: 1, 2, 3, 4, 1, 5, 4, 3, 2, 1, 4, 3 Find out the number of page faults that would occur for FIFO and LRU page replacement algorithms. Assume that there are three frames and initially all are empty.	5M
	(b)	Explain memory partitioning, paging and segmentation.	5M
		OR	
7	(a)	A paging scheme using TLB. TLB access time 10ns and main memory access time takes 45ns. What is the effective memory access time (in ns) if TLB hit ratio is 85% and there is no page fault.	5M
	(b)	Sketch the neat diagram of virtual memory management and explain.	5M

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8 (a) Consider the following disk request sequence for a disk with 200 tracks 98, 137, 122, 183, 14, 133, 65, 78 Head pointer starting at 54 and moving in left direction. Find the number of head movements in cylinders using C-SCAN and SCAN scheduling algorithm. 5M

(b) Write down the Banker's algorithm and explain with examples. 5M

OR

9 (a) A snapshot of the resource information of a system is given below for processes: 5M

	Allocation				Max				Available			
Process ID	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

(i) Calculate matrix need. (ii) Is the system being in a safe state?

(b) Explain briefly about the different RAID levels. 5M

10 (a) Describe briefly about the domain of protection. 5M

(b) Describe briefly about the classification of computer security. 5M

OR

11 (a) Discuss briefly about different user authentication mechanisms. 5M

(b) What is an access matrix? Describe briefly about the implementation of an access matrix. 5M

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B.Tech II Year II Semester (R20) Regular & Supplementary Examinations August/September 2023

OPERATING SYSTEMS

(Common to IT, CSE, AI&DS, CSE(AI&ML), CSE(AI), CSE(IoT), CSE(DS), CS&D and CSE (CS))

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a)	Define operating systems.	2M
(b)	What are multiprocessor systems?	2M
(c)	Explain the layout of a process in memory.	2M
(d)	Explain the swapping process.	2M
(e)	Does paging suffer from fragmentation? Explain.	2M
(f)	How is segmentation different from paging?	2M
(g)	What is the significance of access rights associated with each file in a system?	2M
(h)	What are the necessary conditions that cause deadlock in a system?	2M
(i)	Differentiate viruses and worms.	2M
(j)	What is message-authentication code?	2M

PART – B

(Answer all the questions: 05 X 10 = 50 Marks)

2 List and explain the different categories of system calls. 10M

OR

3 What are open-source operating systems? What are its benefits? 10M

4 Find the average waiting time and average turnaround time for the processes given in the table below using: (i) SRT scheduling algorithm, (ii) Priority scheduling algorithm. 10M

Process	Arrival Time (ms)	CPU Burst Time (ms)	Priority
P1	0	5	3
P2	2	4	1
P3	3	1	2
P4	5	2	4

OR

5 A writer process like to send some bulk information to a reader process. Explain the IPC mechanism that can be used for the purpose. 10M

6 (a) Explain Optimal page replacement and LRU algorithms for page replacement. 3M

(b) Find the number of page faults for the following page reference string with 3 page frames for Optimal page replacement and LRU algorithms 2 3 4 2 1 3 7 5 4 3. 7M

OR

7 (a) Describe contiguous memory allocation. 5M

(b) Given six memory partitions of 300 KB, 600 KB, 350 KB, 200 KB, 750 KB, and 125 KB (in order), how would the first-fit, best-fit, and worst-fit algorithms place processes of size 115 KB, 500 KB, 358 KB, 200 KB, and 375 KB (in order). Rank the algorithms in terms of how efficiently they use memory. 5M

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8	(a)	Which are the different access methods of a file?	5M
	(b)	What are the different allocation methods of a file?	5M
		OR	
9		Suppose that a disk drive has 200 cylinders numbered from 0 to 199.The disk is currently servicing at cylinder 100 and the previous request was at cylinder 120. The queue of pending requests in FIFO order is 23, 89, 132, 42, 187. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the scheduling algorithms. (i) FCFS, (ii) SSTF, (iii) SCAN.	10M
10		To protect a system, what are the four levels of security measures to be taken.	10M
		OR	
11		Discuss the use of cryptography as a security tool.	10M

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Code: 20A05402T **R20**

B.Tech II Year II Semester (R20) Supplementary Examinations February 2023

OPERATING SYSTEMS

(Common to IT, CSE, CSE (AI), CSE (AI&ML), AI&DS, CSE (IoT) and CSE (DS))

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1		Answer the following: (10 X 02 = 20 Marks)	
	(a)	What is System Call? Specify two System Calls?	2M
	(b)	What is Spooling? Explain with examples?	2M
	(c)	What is Process Control Block (PCB)?	2M
	(d)	What are the different criteria for CPU scheduling?	2M
	(e)	Distinguish between Paging and segmentation?	2M
	(f)	What is Thrashing. Explain with Examples?	2M
	(g)	What do mean by deadlock. Explain with Examples.	2M
	(h)	What is Resource allocation Graph? What is its use?	2M
	(i)	Explain the Belady's Anomaly?	2M
	(j)	What is use of ***ls-a*** command in Linux?	2M

PART – B

(Answer all the questions: 05 X 10 = 50 Marks)

2	(a)	Explain different types of System Calls with examples.	5M
	(b)	Differentiate between Multi-processing, Time-sharing and Multi-Threading.	5M
		OR	
3	(a)	Explain the layered Structure of Operating System? Mention the advantages & disadvantages of this system.	5M
	(b)	Explain briefly the functions of Operating System.	5M
4	(a)	Explain Readers-Writer's problem using Semaphore.	5M
	(b)	Name the three types of Schedulers and distinguish between them.	5M
		OR	
5	(a)	When does race condition take place? What are the three requirements that must be satisfied by any possible solution to critical section problem?	5M
	(b)	Assume we have workload as shown below. All 5 processes arrive at time 0, in order given below. The length of the CPU burst time is given in milliseconds Process: P1 P2 P3 P4 P5 Burst Time: 10 29 3 7 12 Considering the FCFS and Non-Pre-emptive-SJF, find out average turnaround time?	5M
6	(a)	Consider a reference string: 4, 7, 6, 1, 7, 6, 1, 2, 7, 1. Assume that there are three frames and initially all are empty. Find out the number of page faults respective to: (i) Optimal Page Replacement Algorithm. (ii) FIFO Page Replacement Algorithm.	5M
	(b)	Explain briefly about assembler, compiler, loader, linker and the functions executed by them.	5M
		OR	

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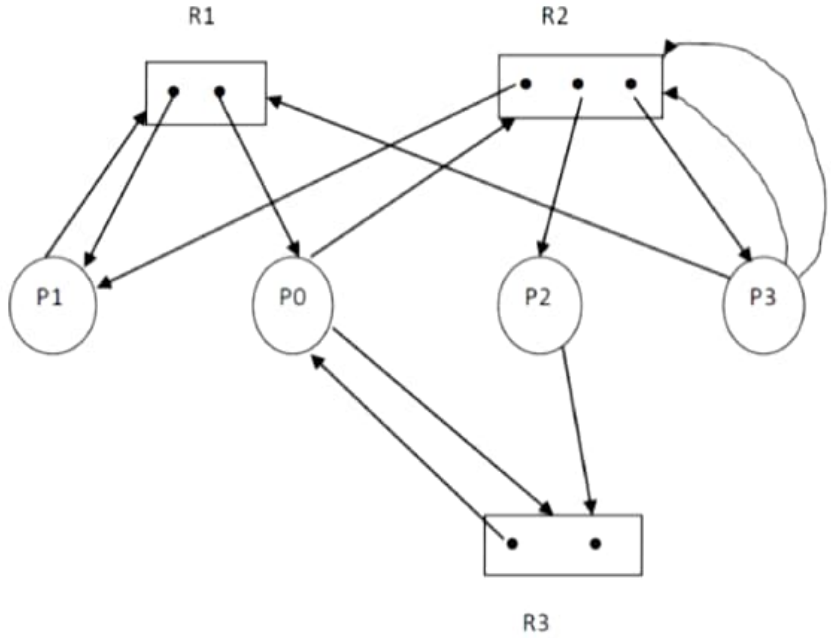
7	(a)	Consider a system which Logical address space=4GB, Physical Address space =64GB, and the page size=4KB, then estimate the following: (i) Number of pages=? (ii) Number of frames=? (iii) Number of entries in page Table=? (iv) Size of page table =?	5M
	(b)	Explain briefly the concept of segmentation with paging scheme.	5M
8	(a)	Explain briefly about the different RAID levels.	5M
	(b)	Consider the following disk request sequence for a disk with 100 tracks 45, 21, 67, 90, 4, 89, 52, 61, 87, 25. Head pointer starting at 50and moving in left direction. Find the number of head movements in cylinders using FCFS and SSTF scheduling Algorithm?	5M

OR

9		Write down the Banker's Algorithm and explain with examples.	10M



Consider the resource allocation graph in the above figure. Find if the system is in a deadlock state otherwise find a safe sequence?

10	(a)	Explain about malware analysis and protection.	5M
	(b)	Discuss briefly about different user authentication mechanisms.	5M

OR

11	(a)	What is an access matrix? Describe briefly about the implementation of an access matrix?	5M
	(b)	Discuss briefly about goals and principles of protection in a modern computer system?	5M

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