Q. Code:974330

Reg. No. | | | | | | | | | | | | |

B.E./ B. TECH.DEGREE EXAMINATIONS, MAY 2024

Fourth -Semester

IT18403 – OPERATING SYSTEM CONCEPTS

(Information Technology)

(Regulation2018/2018A)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Interpret the basic concepts and functions of operating systems.	**4**
CO 2	Apply various CPU scheduling algorithms and practice deadlock prevention and avoidance algorithms.	**3**
CO 3	Compare and Contrast various memory management schemes.	**2**
CO 4	Demonstrate the functionality of file systems	**3**
CO 5	Examine the working principles of various operating systems	**5**

PART- A(10x2=20Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Justify the advantages of microkernel approach to system design.	**1**	**4**
2.	What is the difference between kernel and user mode? Explain how having two distinct modes aids in designing an operating system.	**1**	**4**
3.	Give examples for preemptable and non preemptable resources.	**2**	**2**
4.	How do deadlock and starvation differ in concurrent systems?	**2**	**3**
5.	Under what circumstances do page faults occurs? State the actions taken by the OS when a page fault occurs.	**3**	**2**
6.	Name two differences between logical and physical address.	**3**	**2**
7.	Evaluate the significance of free space management in file system implementation	**4**	**3**
8.	How is data access facilitated through the interaction between the I/O system and the file system?	**4**	**3**
9.	Compare and contrast the input-output management techniques utilized in Unix, Linux, and Windows 8.	**5**	**4**
10.	How do system calls and library functions relate to Unix commands?	**5**	**4**

PART- B (5x 14=70Marks)

		Marks	CO	RBT LEVEL
11. (a)	State the purpose and importance of system calls and discuss the calls related to process and file system with suitable code snippets.	**(14)**	**1**	**3**

(OR)

(b) Illustrate the concepts that are central in understanding what an operating system is made up of. **(14) 1 3**

12. (a) Consider the following snapshot of a system: **(14) 2 3**

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

Using the banker's algorithm, determine whether or not each of the following states is unsafe. If the state is safe, illustrate the order in which the processes may complete. Otherwise, illustrate why the state is unsafe.

a. Available = (0, 3, 0, 1)

b. Available = (1, 0, 0, 2)

(OR)

(b) Use the following process information **(14) 2 3**

Process number	Arrival time	Execution time	Priority
0	0 ms.	5 ms.	2
1	3 ms.	7 ms.	3
2	4 ms.	3 ms.	1
3	4 ms.	8 ms.	5
4	5 ms.	6 ms.	4

Consider these scheduling disciplines:

(a) First-come first-served (d) Round-robin (RR), quantum = 2

(c) Preemptive Shortest job first (b) preemptive priority.

Draw a Gantt chart (time line) showing which process is executing over time and calculate the turnaround time and waiting time for each process

13. (a)	Explain how paging facilitates the utilization of virtual memory for handling extensive address spaces. Discuss the role and composition of page tables in the translation of virtual addresses into physical addresses.	**(14)**	**3**	**2**
	(OR)			
(b)	Examine different page replacement algorithms such as FIFO, LRU, and Optimal, highlighting their respective advantages and drawbacks. Describe scenarios in which each algorithm is most appropriate	**(14)**	**3**	**2**
14. (a)	Consider a disk with 200 cylinders. Initially, the disk head is at cylinder 100, and the disk queue contains I/O requests for blocks on cylinders 120, 80, 30, 180, 10, 150, 70, and 190. Calculate the total head movement for FCFS, SSTF, SCAN, C-SCAN, and LOOK scheduling algorithms in this scenario.	**(14)**	**4**	**3**
	(OR)			
(b)	Demonstrate with suitable example the techniques available for free space management.	**(14)**	**4**	**3**
15. (a)	Examine the Linux process model and illustrate how Linux schedules processes and provides interprocess communication.	**(14)**	**5**	**4**
	(OR)			
(b)	Illustrate how the data is transferred to or from a computer in Windows operating systems	**(14)**	**5**	**4**

PART- C(1x 10=10Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Offer real-world instances or case studies showcasing how the choice of an operating system structure, coupled with the utilization of specific system calls, has impacted system performance, security, or manageability.	**(10)**	**5**	**5**

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