KUMARAGURU
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B.E DEGREE EXAMINATIONS: APRIL /MAY 2024

(Regulation 2018)

Fourth Semester

INFORMATION SCIENCE AND ENGINEERING

U18ISI4202**:** Operating Systems

COURSE OUTCOMES

CO1:   Apply the concepts of CPU scheduling and Process synchronization
CO2:   Experiment creation of different virtual machines in a hypervisor
CO3:   Simulate the principles of memory management
CO4:   Identify appropriate file system and disk organizations for a variety of computing scenario.
CO5:   Examine the features of various open-source operating systems.

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions: -
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	List the primary functions of an operating system.	CO1	[K$_2$]
2.	Mention the purpose of protection and security in an operating system.	CO1	[K$_1$]
3.	Define a monitor in the context of synchronization.	CO2	[K$_1$]
4.	Summarize the role of Thread-Local Storage.	CO2	[K$_2$]
5.	List the four necessary conditions for deadlock	CO3	[K$_1$]
6.	Outline the contiguous memory allocation.	CO3	[K$_2$]
7.	What is the primary purpose of Copy-on-Write in operating systems?	CO4	[K$_1$]
8.	Name the different types of directory structure.	CO4	[K$_2$]
9.	Tell the primary function of a file allocation table.	CO5	[K$_1$]
10.	Explain an inode in a Unix-based file system	CO5	[K$_2$]

Answer any FIVE Questions: -
PART B (5 x 4 = 20 Marks)
(Answer not more than 80 words)

11.	Examine the operations performed by an operating system to manage processes, memory, storage, and security.	CO1	[K$_2$]
12.	Compare and contrast the First-Come-First Serve (FCFS) and Round Robin (RR) scheduling algorithms.	CO2	[K$_3$]
13.	Distinguish between paging and segmentation.	CO3	[K$_3$]

14.	Identify the actions taken by the operating system when a page fault occurs.		CO4	[K$_3$]
15.	Discuss free space management with neat example.		CO5	[K$_2$]
16.	Analyze the different multithreading models and their applicability in various scenarios.		CO2	[K$_4$]

Answer any FIVE Questions: -
PART C (5 x 12 = 60 Marks)
(Answer not more than 300 words)

17.	Illustrate the process of inter-process communication (IPC). Discuss the different IPC mechanisms and their applications.	12	CO1	[K$_2$]
18.	Compare and contrast the synchronization mechanisms provided by semaphores and monitors. Evaluate their suitability for different types of synchronization problems.	12	CO2	[K$_3$]
19. a)	Discuss the importance of deadlock detection and recovery in modern operating systems.	8	CO3	[K$_3$]
b)	Analyze the causes and effects of fragmentation in memory management.	4	CO3	[K$_3$]
20.	Consider the virtual page reference string 1, 2, 3, 2, 4, 1, 3, 2, 4, 1 on a demand paged virtual memory system running on computer system that has main memory size of 3-page frames which are initially empty. Find out the number of page faults respective to Page Replacement Algorithm: i) Optimal ii) FIFO iii) LRU	12	CO4	[K$_3$]
21.	Suppose the order of requests are 70, 140, 50, 125, 30, 25, 160 and the initial position of the Read-Write head is 60. Perform the computation for the following scheduling algorithms. i) FIFO ii) SSTF iii) SCAN	12	CO5	[K$_3$]
22. a)	Describe in detail about file sharing and protection.	8	CO2	[K$_2$]
b)	Define the file allocation method and mention the types.	4	CO5	[K$_2$]

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