KUMARAGURU
college of technology
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B.TECH. DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Third Semester

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

U18AII3203 **:** Operating System

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: 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 two common operations performed on processes in an operating system.	CO1	[K1]
2.	Discuss the purpose of a page table in virtual memory management.	CO1	[K2]
3.	What is inter-process communication and why it is necessary in a multi-process environment?	CO1	[K2]
4.	Compare user threads and kernel threads.	CO2	[K2]
5.	Outline the purpose of synchronization in a multithreaded environment.	CO2	[K2]
6.	Provide an example scenario where Peterson's solution can be applied to ensure mutual exclusion.	CO2	[K3]
7.	Identify one necessary condition for the occurrence of a deadlock in a system.	CO3	[K3]
8.	Provide an example of a situation where deadlock detection would be beneficial.	CO3	[K2]
9.	Compare "join" command and the "awk" command in terms of their primary functionalities.	CO4	[K2]
10.	Explain the purpose of the GNU Debugger (GDB) in the context of debugging C and C++ programs.	CO4	[K2]

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

11.	a)	Categorize system calls into two main types based on their functionalities.	8	CO1	[K2]
	b)	Compare the advantages and disadvantages of message passing compared to shared memory in inter-process communication.	8	CO1	[K2]
12.		Examine the key services provided by an operating system. Illustrate how these services facilitate user and application interaction with the underlying hardware, emphasizing their importance in enhancing system functionality.	16	CO1	[K4]
13.	a)	Identify and explain two potential threading issues that could arise in the concurrent processing of large datasets. Propose strategies to mitigate each issue.	8	CO2	[K3]
	b)	Recommend a scheduling algorithm that would be suitable for maximizing CPU utilization in a multithreaded environment processing large datasets. Justify your choice.	8	CO2	[K3]
14.	a)	Examine the challenges associated with memory fragmentation in operating systems. Discuss how paging and segmentation address these challenges, and compare their effectiveness in managing memory.	8	CO3	[K4]
	b)	Inspect how the Banker's algorithm is used for deadlock avoidance in an operating system.	8	CO3	[K4]
15.		Evaluate different methods for handling deadlocks, such as deadlock prevention, deadlock avoidance, deadlock detection, and recovery. Discuss the advantages and limitations of each approach.	16	CO3	[K5]
16.	a)	Explain the concept of file filters and provide examples of commands used for filtering and processing text files. Demonstrate the use of piping to combine multiple commands.	8	CO4	[K2]
	b)	Outline the process of creating a new user account in Linux, testing its functionality, and subsequently removing the account. Discuss the allocation of specific resources or privileges to a user.	8	CO4	[K2]

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