Register Number:……..

KUMARAGURU
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B.E DEGREE EXAMINATIONS: APRIL / MAY 2023

(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 commands that are used in Unix OS process control.	CO1	[K_2]
2.	Is OS a resource Manager? If so, Justify your answer.	CO1	[K_2]
3.	Is there any CPU scheduling policy available to ensure no starvation? Justify.	CO2	[K_2]
4.	Identify the role of Thread-Local Storage.	CO2	[K_2]
5.	Why do we need swapping?	CO3	[K_1]
6.	Discuss about the types of Fragmentation.	CO3	[K_2]
7.	How does the system detect thrashing?	CO4	[K_1]
8.	Name the different types of directory structure.	CO4	[K_2]
9.	Mention the major attributes and operations of a file system.	CO5	[K_1]
10.	Outline Linux file system.	CO5	[K_2]

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

11.	Demonstrate with a neat diagram about the processing states and needs of each process state.	CO1	[K_2]
12.	List the various types of Semaphores.	CO2	[K_2]
13.	Consider a system consisting of four resources of the same type that are shared by three processes, each of which needs at most two resources. Show that the system is deadlock free.	CO3	[K_3]
14.	Under what circumstances do page faults occur? Identify the actions taken by the operating system when a page fault occurs.	CO4	[K_3]

15. Explain free space management with neat example. CO5 [K2]

16. Discuss the evolution of virtual machines. Also explain how virtualization could be implemented in Operating Systems. CO2 [K2]

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

17. Classify the various Inter Process Communication in operating systems and explain. 12 CO1 [K2]

18. Find the Average Waiting Time, Average Turnaround Time, Throughput using the FCFS, SJF for the given process. 12 CO2 [K3]

Process	Burst Time (ms)
P1	5
P2	24
P3	16
P4	10
P5	3

19. a) Explain in detail about the Resource Allocation Graph and the basic facts of Resource Allocation Graph. 8 CO3 [K2]
    b) Distinguish between paging and segmentation. 4 CO3 [K2]

20. Consider a reference string: 4, 7, 6, 1, 7, 6, 1, 2, 7, 2. The number of frames in the memory is 3. Find out the number of page faults respective to Page Replacement Algorithm: 12 CO4 [K3]
    i) Optimal ii) FIFO iii) LRU

21. On a disk with 1000 cylinders, number 0-999. compute the number of tracks the disk arm must move to satisfy all requests in the disk queue. Assume the latest request received was at track 345 and the head is moving towards track 0. The queue in FIFO order contains requests for the following tracks. 123,874,692,475,105,376. Perform the computation for the following scheduling algorithms. 12 CO5 [K3]
    i) FIFO ii) SSTF iii) SCAN

22. a) Explain Single and Multithreaded Processes in detail. 8 CO2 [K2]
    b) List the advantages and disadvantages of Linked Allocation. 4 CO5 [K2]

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