Register Number:……..

KUMARAGURU
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B.E. DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Fourth Semester

COMPUTER SCIENCE AND ENGINEERING

U18CSI4202: 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.	What do you mean by dual mode of operation? List out any two operations carried out in each mode of operations.	CO1	[K_1]
2.	Define short term and long-term Scheduler.	CO1	[K_2]
3.	Distinguish between Thread and Process.	CO1	[K_2]
4.	List out the requirements to be satisfied by the critical section problem solution	CO1	[K_1]
5.	How will you recover the system from deadlock?	CO1	[K_2]
6.	Calculate the number of bits required in the address for memory size of 32 GB. The memory is 2-byte addressable.	CO3	[K_3]
7.	Find Effective Access Time (EAT) if hit ratio is 75%, time for TLB is 20ns and access to main memory is 80ns?	CO3	[K_3]
8.	Summarize the steps to handle page fault.	CO3	[K_2]
9.	Compare seek time and latency time	CO4	[K3]
10.	List out the object types available in Linux File system.	CO5	[K_2]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	What is the use of multi-threading? Explain about OS functionalities	8	CO1	[K_1]
	b)	Write any four system calls and explain its functionalities.	8	CO1	[K_2]

12.

Process	Burst Time (ns)	Arrival Time(ns)	Priority
P0	3	3	1
P1	2	1	2
P2	3	0	2
P3	2	2	1
P4	4	1	3

16 CO1 [K_3]

Calculate Average Turn Around Time and Average waiting time using

a) SJF scheduling (Shortest Job First)
b) Preemptive priority scheduling (Priority 1 has the highest priority)
c) SRTF scheduling (Shortest Remaining Time First)

13.	a)	Describe about Test-and-Set hardware instruction for implementing process synchronization	8	CO1	[K_2]
	b)	Explain how semaphore is used to implement synchronization in Readers-Writers problem.	8	CO1	[K_2]

14. a) State whether the system is in safe state using Banker's algorithm for the following snapshot: 8 CO1 [K_3]

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

If process P_4 request for (2, 2, 1), can the request be granted immediately? Explain.

b) Explain any two structure of a page table 8 CO3 [K_2]

15.	a)	Calculate the number of page faults using LRU and OPT page replacement methods for the reference string 5 3 4 3 4 1 6 4 6 1 9 2 1 4 6 2 1 and the number of frames is 3.	8	CO3	[K_3]
	b)	Describe about the components of a Linux system.	8	CO5	[K_1]
16.	a)	Consider the following disk requests 120,130,518,122,1112,908,1810,450, and 300. Assume there are 3000 tracks numbered 0 to 2999. The r/w head is at 30th track and it has processed previously the request for the track number 15 earlier. Calculate the number of head movements using FCFS, SSTF, SCAN, C-LOOK disk scheduling methods	12	CO4	[K_3]
	b)	Explain about disk free space management.	4	CO4	[K_2]

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