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Reg No:_____   Name:_____

RAJAGIRI SCHOOL OF ENGINEERING & TECHNOLOGY (Autonomous)

B.Tech Degree Fourth Semester Examination (2021 Scheme)

August 2023

Course Code : 101003/CS400D
Course Name : OPERATING SYSTEMS

Programme: Computer Science and Engineering

Max.Mark:100   Duration: 3 hours

Part A

Answer All Questions

1	Explain any three Operating System Services.	(3)
2	Explain the steps involved in a System Boot.	(3)
3	Elaborate on the concept of threads.	(3)
4	Define Turnaround time, Waiting time and Throughput.	(3)
5	Explain the three requirements that must be satisfied by a solution to the critical-section problem.	(3)
6	What is a semaphore? Differentiate between counting and binary semaphore.	(3)
7	What are the advantages and disdvantages of first fit memory allocation?	(3)
8	Compare the features of paging and segmentation.	(3)
9	What is disk bandwidth?	(3)
10	What are file attributes?	(3)

Part B

Each question carries 14 Marks

11	Elaborate on Operating System Functions.	(14)

OR

12	Explain any three Operating-System Structures.	(14)

13	Consider the following three processes that arrive in a system at the time t=0 in the order P1, P2, P3. Process P1 has a CPU burst of 10 ms. P2 has a CPU burst of 6 ms. P3 has a CPU burst of 3 ms. Draw the Gantt chart and calculate the average turnaround time and average waiting time of the three processes under each of the following scheduling policies.	(14)

(i) FCFS (ii) SJF (non pre-emptive) (iii) Round Robin (time quantum = 2ms).

OR

14	a) Elaborate on Message-Passing Systems.	(7)
	b) Elaborate on the different types of Schedulers.	(7)

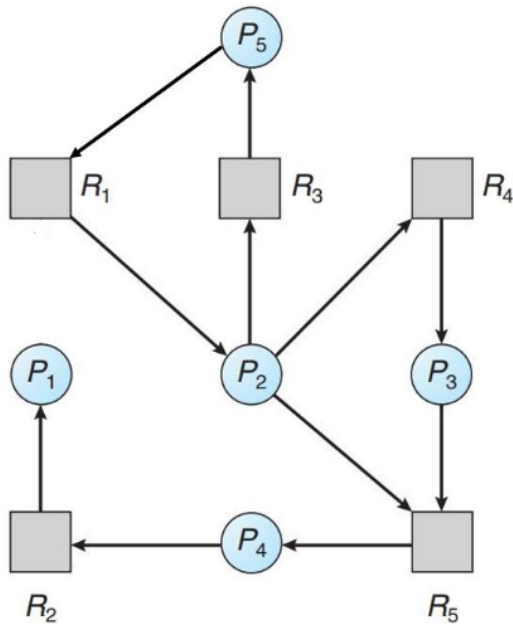15   a) Describe the Readers–Writers Problem. (2)
        b) Develop a solution for the Readers–Writers Problem using semaphores. Write the structure
        of the reader and writer processes. (6)

        c) Convert the given resource-allocation graph into a wait-for graph and detect whether a (6)
        deadlock exists in the system. Justify your answer.

OR

16   a) Explain race condition with an example. (4)
        b) Consider the following snapshot of a system with five processes P_0, P_1, P_2, P_3, P_4 and four
        resource types A, B, C, D. (10)

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_0	2	0	0	1	4	2	1	2	2	5	3	4
P_1	3	1	2	1	5	2	5	2				
P_2	2	1	0	3	2	3	1	6				
P_3	1	3	1	2	1	4	2	4				
P_4	0	3	2	2	3	6	6	5				

Total how many instances does each resource type have in the system? Apply the Banker's
Algorithm to check whether the system is in a safe state or not.

17   Consider four processes of size 90k, 50k, 30k and 40k and five variable sized partitions of memory 20k, 100k, 40k, 200k and 10k. Allocate memory using

a) First Fit allocation.   (7)

b) Best Fit allocation.   (7)

OR

18   Consider the page reference string 3,2,1,3,4,1,6,2,4,3,4,2,1,4,5,2,1,3,4. For a system with three frames which are initially empty, compute page faults using the following:-

a) LRU page replacement algorithm.   (7)

b) Optimal page replacement algorithm.   (7)

19   Consider a disk queue consisting of I/O requests from cylinders as follows:-   (14)

122, 98, 183, 37, 14, 15 , 67, 124. Let the r/w head position be at cylinder number 37.

Draw the diagram for SSTF disk scheduling method and calculate the number of head movements required.

OR

20   a) Explain directory implementation.   (7)

b) Explain any one file allocation method. What are the advantages and disadvantages of the method?   (7)