Subject Code: 24CT11RC13 R-24 Reg No: | | | | | | | | | | | |

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN

(Autonomous)

(Affiliated to Andhra University, Visakhapatnam)

II B.Tech. - I Semester Regular Examinations, Nov – 2025

OPERATING SYSTEMS

(Common to CSE, IT)

1. All questions carry equal marks
2. Must answer all parts of the question at one place

Time: 3Hrs. **Max Marks: 70**

UNIT-I

1. a. Outline the operating-system structure and discuss the operating system operations. **7Marks**
   b. Analyze the services provided by operating system to users, processes and other systems. **7Marks**

OR

2. a. Show the activities of process management, memory management and storage management. **7Marks**
   b. How system calls are used? List out and describe various types of system calls. **7Marks**

UNIT-II

3. a. Label the diagram of process states and explain the transition from one state to another state. **7Marks**
   b. Consider the below table of arrival time and burst time for threeprocesses P0, P1 and P2. **7Marks**

Process	Arrival Time(ms)	Burst Time(ms)
P0	0	9
P1	1	4
P2	2	9

The pre-emptive shortest job first scheduling algorithm is used. Scheduling is carried out only at arrival or completion of processes. What is the average waiting time for the three Processes?

OR

4. a. Elaborate the tasks of shared-memory and message-passing in interprocess communication. **7Marks**
   b. Inspect the common ways of establishing a relationship between user and kernel threads. **7Marks**

UNIT-III

5. a. Demonstrate the role of the Semaphores for handling the critical section problem. **7Marks**
   b. Consider a system with five processes P_0 through P_4 and three resources of type A, B, C. Resource type A has 10 instances, B has 5 instances and type C has 7 instances. Check whether the system is in safe state and mention the sequence. **7Marks**

Process	Allocation	Max	Available
	A B C	A B C	A B C
P_0	0 1 0	7 5 3	3 3 2
P_1	2 0 0	3 2 2	
P_2	3 0 2	9 0 2	
P_3	2 1 1	2 2 2	
P_4	0 0 2	4 3 3	

OR

6. a. Infer the necessary conditions to hold simultaneously for a deadlock situation to arise. **7Marks**
   b. Assess any one classic problems of synchronization and suggest a solution to the problem. **7Marks**

UNIT-IV

7. a. Consider the following page references: 7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1 with 3-page frames. Find number of page faults using FIFO and LRU page replacement techniques. **7Marks**
   b. Interpret the approach for swapping of two processes using a disk as a backing store. **7Marks**

OR

8. a. Illustrate the mechanism used for implementation of the paging and segmentation. **7Marks**
   b. Examine the step-by-step procedure for handling a page fault with a neat diagram. **7Marks**

UNIT-V

9. a. Elucidate the several ways of accessing the information available in the files. **7Marks**
   b. Provide the advantages and disadvantages of various RAID levels. **7Marks**

OR

10. a. Diagnose the methodology used for accomplishment of the file allocation methods. **7Marks**
    b. Suppose that a disk drive has 5,000 cylinders, numbered from 0 to 4,999. The drive is currently serving a request at cylinder 2,150, and the previous request was at cylinder 1,805. The queue of pending requests, in FIFO order, is: 2,069, 1,212, 2,296, 2,800, 544, 1,618, 356, 1,523, 4,965, 3,681. Starting from current head position, Calculate the total distance (in cylinders) that the disk arm moves to satisfy all pending requests using FIFO and SSTF algorithms. **7Marks**