R19

II B. TECH II SEMESTER REGULAR EXAMINATIONS, AUGUST 2021
OPERATING SYSTEMS
(Common to CSE and IT Branches)

Time: 3 hours   Max. Marks: 60

Note: Answer **ONE** question from each Unit (**5 × 12 = 60 Marks)**
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UNIT - I

1. a) Define Operating System? Outline the functions of Operating System. [6M]

   b) What is System call? Describe the types of system calls in detail. [6M]

(OR)

2. a) Explain in detail about structures of Operating System? [6M]

   b) Discuss about Distributed Systems and Special Purpose Systems. [6M]

UNIT – II

3. a) Define Process? With a neat sketch explain the concept of Process State [6M] Diagram.

   b) Consider the following set of processes, with the length of the CPU-burst [6M] time given in Milliseconds:

Process	Burst Time
P1	5
P2	1
P3	3
P4	1
P5	7

   The processes are assumed to have arrived in the order P1, P2, P3, P4, and P5 all at time 0. Draw a Gantt charts illustrating the execution of these processes using non preemptive SJF, and Round Robin (Quantum = 1) scheduling? Calculate the average waiting time and average turnaround time.

(OR)

4. a) Define Thread? Discuss Various Multi-Threading models. [6M]

   b) Write a short note on [6M]
   (i) Long Term Scheduler
   (ii) Process Control Block
   (iii) Turnaround Time

UNIT – III

5. a) What is meant by monitor? How it is different from semaphore? And also [6M] explain various operations used in monitor.

b) Apply Banker's algorithm to decide whether the system has deadlock or not for the below given information: [6M]

Considering a system with five processes P_0 through P_4 and three resources types A, B, C. Resource type A has 10 instances, B has 5 instances and type C has 7 instances. Suppose at time t_0 following snapshot of the system has been taken:

Process	Allocation A B C	Max A B C	Available 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) Define Deadlock? Describe the necessary conditions for occurrence of deadlocks [6M]

b) What is a semaphore? List the types of semaphores and show that if wait() and signal() operations are not executed automatically, then mutual exclusion may be violated [6M]

UNIT –IV

7. a) What do you mean by Page Replacement algorithms? What is its need? Consider the following page reference string: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page faults would occur for the following replacement algorithms, assuming that there are four frames? Remember that all frames are initially empty, so your first unique pages will cost one fault each. [6M]

(i) LRU page replacement   (ii) Optimal page replacement

b) Define Thrashing. Explain working set model to handle thrashing problem? [6M]

(OR)

8. a) Discuss various Contiguous Memory Allocation techniques with examples [6M]

b) With a neat sketch explain the concept of Demand Paging? [6M]

UNIT –V

9. a) Schedule the given requests 98, 183, 37, 122, 14, 124, 65, 67, 10, 150 with the disk head at the cylinder 51 and has just finished a request at track 25. (Assume cylinder range from 0 to 199) with the following disk scheduling algorithms, calculate the seek time? [6M]

(i) FCFS   (ii) SSTF   (iii) SCAN

b) Describe Single level and Two Level Directory Structure with a neat diagram [6M]

(OR)

10. a) Discuss various issues Disk Performance Parameters [6M]

(i) Seek Time   (ii) Rotational Delay   (iii) Transfer Time

b) Explain in detail about File Allocation methods? [6M]

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