B127473(022)

B. Tech. (Hon's) (Fourth Semester) Examination, April-May 2023

(New Scheme)

(Computer Science Engg. Branch)

(Data Science / Artificial Intelligence)

OPERATING SYSTEM

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : *Part (a) of each question is compulsory & carries 4 marks. Attempt any two parts from (b), (c) and (d) of each question and each part carries 8 marks.*

Unit-I

1. (a) Describe Batch Processing and Time Sharing Systems.

   (b) Explain System Calls and their types in detail.

   (c) Describe the various Operating System Services.

[2]

(d) Explain the differences between distributed and parallel processing concepts

Unit-II

2. (a) Describe the Process Control Block.

(b)

Process No	Arrival Time	Priority	Burst Time
P0	0	2	25
P1	12	3	30
P2	30	1	10
P3	36	2	20

Calculate Avg. TAT and Avg. WT of each process in FCFS and Premptive Priority

(c) Explain the Process Life Cycle with a neat and clean diagram

(d) Describe the Dining Philosophers Problem related to IPC. How can it be solved?

Unit-III

3. (a) What are the necessary conditions that must hold for a deadlock?

[3]

(b) What is a Resource Allocation Graph? Explain in detail

(c) What is the Banker's Algorithm.

Check if the following snapshot of the system is in safe state?

	Allocation			Max			Availability		
	A, B, C			A, B, C			A, B, C		
P0	0, 1, 0			7, 5, 3			3, 2, 2		
P1	2, 0, 0			3, 2, 2					
P2	3, 0, 2			9, 0, 2					
P3	2, 1, 1			2, 2, 2					
P4	0, 0, 2			4, 3, 3					

Now if the Process$_1$ asks for more resources as Request$_1$ = (1,0,2). Can this request be granted?

(d) How we can prevent the occurrence of a deadlock? Explain

Unit-IV

4. (a) What are the drawbacks of multiprogramming with fixed partition scheme in memory management?

(b) Differentiate between Swapping and Paging. How do they complement each other?

(c) Explain Contiguous Memory Allocation with its advantages and disadvantages.

(d) Consider the following reference string....

1,9,9,4,0,5,2,0,2,6,6,6,6,2,2,5,5,1,2,2,3,3,8,4,5,4,3,3,
2,0,0,2,3,3,4

For three (4) frames, find the number of page faults each of the following algorithm produces.

(i) FIFO

(ii) Optimal

(iii) LRU

Unit-V

5. (a) Describe I/O Buffering.

(b) What is a file? Describe various file attributes and operations.

(c) Explain the I/O Hardware with a neat and clean PC bus structure diagram.

(d) What is Directory? Describe the various Directory Structure.