

**OPERATING SYSTEMS**

(Common to CSE and IT)

Time: 3 hours

Max. Marks: 70

**PART – A**

(Compulsory Question)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- Define system calls. Explain the main purpose of an operating system.
  - Give an example of a Process State Transition diagram.
  - What is a thread? What are the differences between process and thread?
  - What is scheduling? What criteria affect the scheduler's performance?
  - What are the differences between paging and segmentation?
  - What necessary conditions can lead to a deadlock situation in a system?
  - Enumerate the different RAID levels.
  - What attributes are considered for designing the file structure for an Operating System?
  - What is the difference between synchronous I/O and asynchronous I/O?
  - Define system threats. What is known as DOS attack?

**PART – B**

(Answer all five units, 5 X 10 = 50 Marks)

**UNIT – I**

- 2 Explain the different functions of an operating system and discuss the various services provided by an operating system.

**OR**

- 3 What is Inter-process communication? What are the models of IPC? Explain "unicast" and "multicast" IPC?

**UNIT – II**

- 4 What is synchronization? What are the different synchronization mechanisms? Explain in detail.

**OR**

- 5 Why is round robin algorithm considered better than first come first serve algorithm?  
Take three processes that arrive at the same time in the following order and the time quantum is 2 ms.

Process	Burst Time
P1	10
P2	5
P3	2

Draw Gantt chart and calculate average turnaround and waiting time using Round Robin Scheduling Algorithm without Switching.

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**UNIT – III**

6 Given page reference string: 1,2,3,2,1,5,2,1,6,2,5,6,3,1,3,6,1,2,4,3. Compare the number of page faults for LRU, FIFO and Optimal page replacement algorithm.

**OR**

7 (a) What are the different methods of handling deadlock?  
 (b) Consider the table given below for a system, find the need matrix and the safety sequence, using Banker's algorithm.

Resource – 3 types

A – (10 instances)

B – (5 instances)

C – (7 instances)

Process	Allocation			Maximum			Available		
	A	B	C	A	B	C	A	B	C
p <sub>0</sub>	0	1	0	7	5	3	3	3	2
p <sub>1</sub>	2	0	0	3	2	2			
p <sub>2</sub>	3	0	2	9	0	2			
p <sub>3</sub>	2	1	1	2	2	2			
p <sub>4</sub>	0	0	2	4	3	3			

**UNIT – IV**

8 Explain the different Disk scheduling algorithms with their comparisons.

**OR**

9 Explain the concept of a file. Discuss the different file access mechanisms in detail.

**UNIT – V**

10 Explain the different components of I/O Hardware and different layers of I/O Software.

**OR**

11 Discuss and compare various access matrix implementation techniques.

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