

**II B. Tech I Semester Supplementary Examinations, July - 2022**  
**OPERATING SYSTEMS**

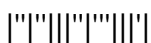
(Com to CSE, CST, IT, CSE(CS), IOTCSBT, IOT, CS)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions each Question from each unit  
 All Questions carry **Equal** Marks

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- 1 a) i. Explain how operating systems are used in a variety of computing environments? [7M]  
 ii. What are the main differences between operating systems for mainframe computers and personal computers?
- b) What are the functionalities of Operating Systems? Explain in detail [7M]
- Or
- 2 a) i. What is operating system? Explain multiprogramming and time sharing systems. [7M]  
 ii. Explain different operations performed by the operating system.
- b) i. Explain different categories of system calls with suitable example. [7M]  
 ii. State and explain the process of executing system calls.
- 3 a) i. Explain scheduling criteria used to compare scheduling algorithms. [7M]  
 ii. Explain fine Process state model and types of process schedulers used in each state.
- b) Describe dining-philosopher problem? Write an algorithm to solve the problem using semaphores? [7M]
- Or
- 4 a) What is Semaphore? Explain the usage & implementation of monitors. Give the solution to Reader's – writers problem. [7M]  
 b) Explain the basic concepts of process synchronization. How message passing mechanism is working inwards communication of processes? [7M]
- 5 a) Compare Paging with Segmentation with respect to the amount of memory required by the address translation structures in order to convert virtual addresses to physical addresses. [7M]  
 b) i. Explain about Swapping and memory management module. [7M]  
 ii. What is Thrashing? Explain the Causes of Thrashing.
- Or
- 6 a) Consider the page reference string 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6 Determine how many page faults would occur for Optimal page replacement algorithm? Assume three, four frames are initially empty. [7M]  
 b) Explain the terms in Memory Partitioning with examples: [7M]  
 i) Fixed Partitioning ii) Dynamic partitioning.



- 7 a) i) Consider the following snapshot of a system: [10M]

Processes	Allocation	Max	Available
	A B C D	A B C D	A B C D
P <sub>0</sub>	0 0 1 2	0 0 1 2	2 1 0 0
P <sub>1</sub>	2 0 0 0	2 7 5 0	
P <sub>2</sub>	0 0 3 4	6 6 5 6	
P <sub>3</sub>	2 3 4 5	4 3 5 6	
P <sub>4</sub>	0 3 3 2	0 6 5 2	

Answer the following questions using the banker's algorithm:

- a) What is the content of the matrix Need?  
 b) Is the system in a safe state? Why?  
 c) Is the system currently deadlocked? Why or why not?  
 d) Which process, if any, or may become deadlocked if this whole request is granted immediately?
- b) Illustrate the functions of file and file implementation. [4M]
- Or
- 8 a) Compare the performance of write operations achieved by a RAID level 5 organization with that achieved by a RAID level 0 organizations? [7M]  
 b) Explain the following with relevant diagrams: [7M]  
 i. Single level directory structure.  
 ii. Tree-structured directory structure
- 9 a) Describe the system security model. How the cryptography ensures system security? Discuss. [7M]  
 b) Explain Capability-Based Protection system. How it achieves the goals of the protection system? [7M]
- Or
- 10 a) What is access matrix? What are various methods to implement it? [7M]  
 b) Discuss about revocation of access rights and their role in system protection. [7M]

