

Code No: 154BR**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech II Year II Semester Examinations, April/May - 2023****OPERATING SYSTEMS****(Common to CSE, IT, CSBS, CSIT, ITE, CE(SE), CSE(CS), CSE(AI&ML), CSE(DS),
CSE(IOT), CSE(N))****Time: 3 Hours****Max. Marks: 75****Note:** i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A**(25 Marks)**

- 1.a) Define the essential properties of parallel operating systems. [2]
- b) How does multiprogramming increase CPU utilization? [3]
- c) Write about wait command. [2]
- d) How does priority scheduling differ from round robin method? [3]
- e) What is a message queues? [2]
- f) Give an example of the situation describing deadlock. [3]
- g) Define segmentation. [2]
- h) What is the purpose of paging the page tables? [3]
- i) What is a file? [2]
- j) List down various file attributes. [3]

PART – B**(50 Marks)**

- 2.a) In a multiprogramming and time-sharing environment, several users share the system simultaneously. This situation can result in various security problems. What are two such problems?
- b) Can we ensure the same degree of security in a time-shared machine as in a dedicated machine? Explain your answer. [5+5]

OR

- 3.a) Under what circumstances would a user be better off using a timesharing system rather than a PC or single-user workstation.
- b) Distinguish between the client-server and peer-to-peer models of distributed systems. [5+5]

- 4.a) Describe the differences among short-term, medium-term, and long-term scheduling.
- b) Can a multithreaded solution using multiple user-level threads achieve better performance on a multiprocessor system than on a single-processor system? [5+5]

OR

- 5.a) Describe the actions taken by a thread library to context switch between user-level threads.
- b) Why is it important for the scheduler to distinguish I/O-bound programs from CPU-bound programs? [5+5]

- 6.a) Demonstrate that monitors and semaphores are equivalent as they can be used to implement the same types of synchronization problems.
- b) What is critical-section problem? Give a classic Peterson's solution to the critical-section problem. [5+5]

OR

7. Discuss the tradeoff between fairness and throughput of operations in the readers-writers problem. Propose a method for solving the readers-writers problem without causing starvation. [10]
8. Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)? Which algorithm makes the most efficient use of memory? [10]

OR

9. Explain the concept of Least Recently Used memory page replacement method and how it is different from First In First Out (FIFO) page replacement method. [10]
- 10.a) What are the advantages of Contiguous allocation? What are the drawbacks of contiguous allocation of disk space?
- b) Explain the following commands: lseek, stat, ioctl. [4+6]

OR

11. Explain in detail about the common schemes for defining the logical structure of a directory. [10]

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