

NATIONAL INSTITUTE OF TECHNOLOGY, KURUKSHAETRA
THEORY EXAMINATION

Question Paper

Month and Year of Examination: **May-June 2019**

Programme: **B.Tech**

Subject: **Operating Systems**

Course No: **ITPC-20**

Number of Questions to be attempted: **5**

Total no of Questions: **8**

Semester: **IVth**

Maximum Marks: **50**

Time Allowed: **3 hrs**

Total No of Pages Used: **2**

Note: Attempt any five questions taking atleast one question from each unit

UNIT-I

- 1 a) What are System Calls? Explain user mode and kernel mode with diagram. How many Child Process will be generated if fork () function is called 'n' time? (5)
b) Differentiate between User level thread and kernel Level thread. What are their advantages and disadvantages? (5)
- 2 a) Consider a variant of the RR scheduling algorithm where the entries in the ready queue are pointers to the PCBs (5)
i. What would be the effect of putting two pointers to the same process in the ready queue?
ii. What would be the major advantage and disadvantages of this scheme?
b) Suppose that a scheduling algorithm (at the level of short term CPU scheduling) favors those processes that have used the least processor time in the recent past. Why will this algorithm favor I/O bound programs and yet not permanently starve CPU bound programs? (5)

UNIT-II

- 3 a) Suppose that a system is in unsafe state. Show that it is possible for the process to complete their execution without entering a deadlock state (5)
b) Can a system detect that some of its process are starving? If you answer yes, explain how it can? If you answer no, explain how the system can deal with the starvation problem? (5)
- 4 a) Explain semaphores and write a short note on it? A counting semaphore S is Initialized to 10. Then, 6 P operations and 4 V operations are performed on S. What is the final value of S? (5)
b) Explain the Dining Philosopher Problem and what is the possible solution to solve this problem? (5)

UNIT-III

- 5 a) Why is that on a system with paging, a process cannot access memory it does not own? How could the operating system allow access to other memory? Why should it or should it not? (5)
- b) Suppose your replacement policy (in a paged system) consists of regularly examining each page and discarding that page if it has not been used since the last examination. What would you gain and what would you lose by using this policy rather than LRU or second chance replacement? (5)
- 6 a) Consider a typical disk that rotates at 15000 rotations per minute (RPM) and has a transfer rate of 50×10^6 bytes/sec. If the average seek time of the disk is twice the average rotational delay and the controller's transfer time is 10 times the disk transfer time. What is the average time (in milliseconds) to read or write a 512-byte sector of the disk? (5)
- b) Consider a disk with 200 tracks and the queue has random requests from different processes in the order 55, 58, 39, 18, 90, 160, 150, 38, 184. Initially, arm is at 100. Find the Average Seek length using FIFO, SSTF, SCAN and C-SCAN algorithm. (5)

UNIT-IV

- 7 a) What are the goals of protection and how it is different from security? (5)
- b) What is access matrix and how it implemented? (5)
- 8 a) Consider a system that supports the strategies of contiguous, linked and indexed allocation. What criteria should be used in deciding which strategy is best for a particular file? (5)
- b) How is Acyclic graph directory different from Tree structured directory? (5)