

TIT 501

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Odd Semester Examination, 2019-20

B.Tech (IT, Semester V)

Operating System

Time: 3 Hours

Total Marks: 100

Total no. of printed pages: 2

- Note: (i) Attempt **ALL** questions all Questions carry equal marks.
 (ii) In case of numerical problems assume data wherever not provided.
 (iii) Be precise in your answer.

- Q.1. Attempt **any four** parts of the following: (5 × 4 = 20)
- Give examples of at least two applications which in your opinion are real-time applications. Support your example with appropriate rationale?
 - Differentiate between time sharing and real time systems.
 - Differentiate between multiprogramming and multi-tasking systems.
 - Write the type services provided by the Operating System to the user?
 - Define batch processing systems. What are disadvantages of using batch processing systems?
 - Discuss the structure of operating system in brief.

- Q.2. Attempt **any four** parts of the following: (5 × 4 = 20)
- Explain producer consumer problem and provide a solution for it using code snippet.
 - Explain starvation. When and how starvation may occur and also explain the difference between busy waiting and blocking.
 - Explain the different schedulers and process life cycle.
 - Suppose that the following processes arrive for execution at the times indicated. Each process will run the listed amount of time. In answering the questions, use non-preemptive scheduling and base all decisions on the information you have at the time the decision must be made.

<u>Process</u>	<u>Arrival Time</u>	<u>Burst Time</u>
P ₁	0.0	12
P ₂	0.4	24
P ₃	1.0	19
P ₄	.4	10

- What is the average turnaround time for these processes with the FCFS and SJF scheduling algorithm?
- What are different process performance criteria explain.
 - Discuss the process generation and process scheduling.

- Q.3. Attempt **any two** parts of the following: (10 × 2 = 20)
- Explain critical region and mutual exclusion. What is race condition explain.
 - What are different deadlock prevention and avoidance algorithm explain?
 - Describe paging and segmentation with suitable examples.

P.T.O

Q.4. Attempt *any two* parts of the following:

(10 × 2 = 20)

(a) Explain Thrashing and virtual memory.

(b) When do page fault occurs? Describe the actions taken by the operating system when a page fault occurs.

(c) Consider the following page reference string:

7, 2, 3, 1, 2, 5, 3, 4, 6, 7, 7, 1, 0, 5, 4, 6, 2, 3, 0, 1, 4, 7, 13, 9

Assuming demand paging with three frames, how many page faults would occur for the following replacement algorithms?

i) LRU replacement

ii) FIFO replacement

iii) Optimal replacement

Q.5. Attempt *any two* parts of the following:

(10 × 2 = 20)

(a) On a disk with 1000 cylinders numbers 0 to 999 compute the number of the tracks the disk arm move to satisfy all requests in disk queue. Assume the last request received was at track 355 and the head is moving towards track 0. The queue in FIFO order contains request for the following tracks

123, 874, 692, 475, 105, 367, 927, 364

Perform the computation for the SSTF and SCAN scheduling algorithms.

(b) Describe two kernel data structures in which race conditions are possible. Be sure to include a description of how a race condition can occur.

(c) What are the different frame allocation strategies? Define swap space and swap space management.
