

Tribhuvan University
Institute of Science and Technology
 2080
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Bachelor Level / Second Year/ Forth Semester/ Science
Computer Science and Information Technology (CSC 259)
 (Operating Systems)
(NEW COURSE)

Full Marks: 60
 Pass Marks: 24
 Time: 3 hours.

Candidates are required to give their answers in their own words as far as practicable.
 All figures in the margin indicate full marks.

Section A

Long Answer Questions.

Attempt any **TWO** questions.

[2×10=20]

1. How DMA operation is performed? Consider a disk with 200 tracks and the queue has random requests from different processes in the order: 45, 48, 29, 17, 80, 150, 28, and 188. Find the seek time using FIFO, SSTF and SCAN. Assume that the initial position of head is at 100. [4 + 6]
2. How do you distinguish between deadlock and starvation? Describe the necessary conditions for deadlock. Explain the working mechanism of TLB. [2 + 3 + 5]
3. Why do we need to schedule process? Find the average waiting time and average turnaround time for the following set of processes using FCFS, SJF, RR(Quantum =3) and Shortest Remaining Time Next. [2 + 8]

Process	CPU Burst Time	Arrival Time
P1	20	0
P2	25	15
P3	10	30
P4	15	45

Section B

Short Answer Questions.

Attempt any **EIGHT** questions.

[8×5=40]

4. What is system call? Describe the transition between different states of a process. [1 + 4]
5. Discuss about contiguous and linked list allocation approach in implementing files. [5]
6. Why do we need virtual memory? Describe the structure of a page table. [1 + 4]
7. Illustrate the term safe and unsafe state in deadlock prevention with a scenario. [5]
8. How lock variable is used in achieving mutual exclusion? Describe. [5]
9. Why do we need hierarchical directory system? Explain the structure of a disk. [2 + 3]
10. Find the number of page faults using FIFO and LRU for the reference string, 4, 7, 6, 1, 7, 6, 1, 2, 7, 2 with frame size 3. [5]
11. Define working set. How does clock page replacement algorithm work? [2 + 3]
12. Write short notes on [2×2.5=15]
 - a. Inodes
 - b. RAID