

Tribhuvan University
Institute of Science and Technology
2069



Bachelor Level/ Second Year/ Third Semester/Science
Computer Science and Information Technology (CSc 203)
(Operating System)

Full Marks: 60
Pass Marks: 24
Time: 3 Hours

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

Section A

Attempt any two questions:

(2x10=20)

1. Define the essential properties of following types of operating systems:
 - (a) Batch
 - (b) Interactive
 - (c) Time sharing
 - (d) Real time
 - (e) Handheld

OR

Why some process requires high priority? What would happen if all processes have some the priority? Mention merits and demerits of assigning priority on process.

2. Given references to the following pages by a program,
0, 9, 0, 1, 8, 1, 8, 7, 8, 7, 1, 2, 8, 2, 7, 8, 2, 3, 8, 3
How many page faults will occur if the program has three page frames for each of the following algorithms?
 - (a) FIFO
 - (b) Optimal
 - (c) Second Chance
 - (d) LRU
3. For the processes listed in the following table, draw a Gantt chart illustrating their execution and calculate the average waiting time using :
 - (a) First-Come-First-Serve
 - (b) Short-Job-First
 - (c) Shortest-Remaining-Time-Next
 - (d) Round-Robin (quantum = 2)
 - (e) Round-Robin (quantum = 1)

<u>Processes</u>	<u>Arrival Time</u>	<u>Burst Time</u>
A	0.00	4
B	2.01	7
C	3.01	2
D	3.02	2

Section B

Attempt any eight questions:

(8x5=40)

4. Explain the Peterson's concept for the solution of critical section problem.
5. Show how sleep and wake up solution is better than busy waiting solution for the critical section problem.
6. Describe how multithreading improves performance over a single threaded solution.
7. Explain how priority scheduling works. In how many ways can priority be assigned?
8. What do you mean by deadlock prevention? Mention the mechanism for deadlock prevention.
9. Two separate systems one implemented in bitmap and another in linked list to manage the fragmentation of 256 MB memory. For bitmap, allocation units are of 512 bytes. For linked list, each holes or segments are of 32 KB, and each node in the list needs a 32 bits. How many bytes of storage is required for each method? Which one is better in terms of memory spare required?
10. Distinguish between the paging and segmentation. Why many systems use the combination of both?
11. Compare the bitmap and linked list implementation of disk free-space management. How much space required in memory to store bitmap for 20 GB hard disk with 2KB block size.
12. How does DMA increase system concurrency? How does it complicate the hardware design?