**Tribhuvan University**
**Institute of Science and Technology**
**2070**
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Bachelor Level/ Second Year/ Third Semester/Science                    Full Marks: 60
**Computer Science and Information Technology (CSc 203)**       Pass Marks: 24
(Operating System)                                                                    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.

<u>Section A</u>

**Attempt any two questions:**                                                   **(2x10=20)**

1.  For the processes listed in following table, draw a Gantt chart illustrating their execution 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

| Processes | Arrival Time | CPU Time |
|-----------|--------------|----------|
| A | 0.000 | 3 |
| B | 1.001 | 6 |
| C | 4.001 | 4 |
| D | 6.002 | 2 |

What is the turnaround time for each algorithm?
                                    **OR**
What do you mean by disk management? What are the major differences between error handling and formatting?

2.  How many page faults occur for each of the following page replacement algorithm for the reference string 0172327103 with four page frames and eight pages? Suppose all frames are initially empty.

    a)  Optimal replacement
    b)  FIFO replacement
    c)  LRU replacement
    d)  Clock replacement

3.  Suppose that the disk drive has 50 cylinders, numbered from 0 to 49. The drive currently serving the request at cylinder 20 and the previous request was at cylinder 25. The queue of

pending request is 10, 22, 20, 2, 40, 6 and 38 in the order. A seek takes 6 msec per cylinder moved. How much seek time is needed for the following disk-scheduling algorithms?

    a) First-Come, First-Served
    b) Shortest Seek Time First
    c) SCAN
    d) LOOK

## Section B

**Attempt any eight questions:**                                     **(8x5=40)**

4. Define the essential properties of following types of operating systems.

    a) Batch
    b) Interactive
    c) Time Sharing
    d) Real Time
    e) Handheld

5. Describe how multithreading improves performance over a singled-threaded solution.

6. "Using Semaphores is very critical for programmer". Do you support this statement? If yes, prove the statement with some fact. If not, put your view with some logical facts against the statement.

7. Students working at individual PCs in a computer laboratory send their files to be printed by a server which spools the files on its hard disk. Under what conditions may a deadlock occur if the disk space for print spool is limited? How may the deadlock be avoided?

8. What are Segmentation and Paging? Why they are sometimes combine into one scheme?

9. What are the differences between the trap and interrupt? What is the use of each function?

10. What is "device independence"? Define.

11. Explain how file allocation table (FAT) manages files. Mention the merits and demerits of using FAT.

12. Write short notes on (any two):

    a.) System programs
    b.) Race condition
    c.) Windows file system