MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : MIC401A Basics of Operating System
UPID : 4500001

Time Allotted : 3 Hours .... *Full Marks :70*

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

Group-A (Very Short Answer Type Question)

1. Answer *any ten* of the following : [1 x 10 = 10]

   (I) What is the difference between a program and a process?

   (II) Define physical address and Logical address.

   (III) What is FIFO disk scheduling?

   (IV) Which principle of data protection ensures that only authorized users can access data?

   (V) Define an Operating System

   (VI) What is a process?

   (VII) What do you mean by fixed partition and variable partition allocation?

   (VIII) What is the purpose of RAID (Redundant Array of Independent Disks)?

   (IX) What are different types of CPU Schedulers?

   (X) Mention one key difference between Windows and Linux.

   (XI) What is the main disadvantage of FCFS scheduling?

   (XII) Define page fault.

Group-B (Short Answer Type Question)

Answer *any three* of the following : [5 x 3 = 15]

2. Consider a disk with 200 tracks and the queue has random requests from different processes in the order: [5]
   54, 40, 10, 90, 150, 30, 180
   Find out total number of head movements following FIFO and SSTF disk scheduling algorithms.

3. Explain the CIA triad and its importance in data protection. [5]

4. Explain the concept of Time-Sharing Operating System with an example. [5]

5. Consider the following 5 processes: P1, P2, P3, P4, P5, with their burst times as given below: [5]
   What are the average waiting and turnaround time for the round-robin scheduling algorithm (RR) with a time quantum of 4 units?

Process	Burst Time
P1	3
P2	6
P3	9
P4	8
P5	2

6. What is the difference between preemptive and non-preemptive scheduling? [5]

Group-C (Long Answer Type Question)

Answer *any three* of the following : [15 x 3 = 45]

7. (a) Explain the functions of an Operating System with suitable examples. [5]

   (b) What do you mean by Virtual machine. Show the architecture with a simple diagram indicating Host and Guest OS. [5]

   (c) What are Monolithic, Layered and Microkernel architectures of OS? [5]

8. Consider the following processes. [15]

Process	Arrival Time	Burst Time	Priority
P1	0	2	3

P2	3	1	2
P3	3	3	1
P4	6	5	4

Find out Average Waiting Time and Average Turn Around Time.

9. (a) Explain segmentation and how it differs from paging.   [10]

    (b) Explain diagrammatically paging sceme using Translation Look Aside Buffer.   [5]

10. (a) Explain the structure of a hard disk and its components. How does the organization of data on a   [7]
         hard disk impact performance?

    (b) What do you mean by seek time and rotational latency?   [4]

    (c) What are Boot block and Bad block?   [4]

11. Suppose we have a reference page (7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 3) and number of frames is 3. Find   [15]
    out number of page faults following FIFO, Optimal and LRU Page replacement algorithms.

*** END OF PAPER ***