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# MCS-203

## POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS (PGDCA) (NEW)

## Term-End Examination

## December, 2022

### MCS-203 : OPERATING SYSTEMS

*Time : 3 Hours* *Maximum Marks : 100*

*Weightage : 75%*

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***Note :*** *(i) Question No. **1** is compulsory.*

*(ii) Attempt any **three** questions from the rest.*

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1. (a) What are concurrent processes ? Write Dekker's solution for mutual exclusion and explain it. 10

   (b) Consider the following set of processes, with the length of CPU burst time given in milliseconds : 10

| Process | CPU burst time |
|---|---|
| P1 | 10 |
| P2 | 8 |
| P3 | 4 |
| P4 | 6 |

All the four processes (P1, P2, P3, P4) arrived at the same time in the order P1, P2, P3 and P4. Draw Gantt charts illustrating the execution of the processes using SJF, FCFS and RR (Quantum = 2) scheduling. What is the turnaround time of each process for each of the scheduling algorithms ? Also find the average waiting time for each of the processes.

(c) Define virtual memory. Explain the principles of operation and the address mapping scheme of it. Also, write briefly about the protection and sharing in virtual memory. 10

(d) With reference to Android operating system explain the layered architecture

and its components. Also draw the layered architecture diagram indicating its components. 10

2. (a) Describe the difference between security policy vs. security model in the context of operating system. Briefly explain the following security models : 10

   (i) Access Matrix Model

   (ii) Discretionary Access Control

   (b) With the help of an example, explain the linked/chained allocation scheme of non-contiguous memory allocation. 10

3. (a) Define an overlay with the help of an example. Explain the allocation scheme using overlays. How is this scheme different from swapping ? 10

   (b) Define deadlock. List and explain *four* necessary conditions that must hold simultaneously for a deadlock to occur. 10

4. (a) When does a page fault occur in demand paging ? Describe the action taken by the operating system when it occurs. 10

   (b) What is Disk Scheduling ? With the help of an example for each, explain the following disk scheduling algorithms : 10

   (i) FCFS

   (ii) SSTF

5. Write short notes on any ***four*** of the following : 4×5=20

   (a) Process and thread management in iOS

   (b) IPC mechanisms in Android

   (c) File permissions, data verification, encrypted storage and remote access in Linux operating system.

   (d) Inter-process communication in Windows 10

   (e) File management in LINUX operating system