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MCS–203

POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS (PGDCA–NEW)

Term-End Examination

June, 2026

MCS-203 : OPERATING SYSTEMS

Time : 3 Hours *Maximum Marks : 100*

Weightage : 70%

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

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

1. (a) Define the essential properties of the following types of operating systems : 10

   (i) Batch

   (ii) Interactive

(iii) Time-sharing

(iv) Real-Time

(v) Distributed

(b) Consider the following set of processes (P_1, P_2, P_3, P_4, P_5) with the length of the CPU burst time given in milliseconds along with the arrival time :

Process	Arrival Time	CPU Burst Time
P_1	1	4
P_2	2	6
P_3	3	2
P_4	4	5
P_5	5	3

Draw Gantt charts illustrating the execution of the processes using FCFS,

SRTN (Shortest Remaining Time Next) and RR (with quantum = 2) scheduling algorithms. Also, find the average turn around time, average waiting time, processor utilization and throughput for all the algorithms. 10

(c) What is segmentation ? With the help of a diagram, explain the Address Translation Scheme in Segmentation. Also, explain protection and sharing in this context. 10

(d) Explain Lamport's Distributed Mutual Exclusion Algorithm. 10

2. (a) What is the cause of thrashing ? How does the system detect thrashing ? Once it detects thrashing, what can the system do to eliminate this problem ? 10

(b) Consider six memory partitions of size 200 kB, 400 kB, 600 kB, 500 kB, 300 kB and 250 kB. These partitions need to be allocated to four processes of sizes 357 kB, 210 kB, 468 kB and 491 kB in that order. 10

Perform the allocation of processes using :

(i) First-fit Algorithm

(ii) Best-fit Algorithm

(iii) Worst-fit Algorithm

3. (a) There are four processes and two resources in the system. Each resource has two instances. Furthermore : 10

(i) P1 acquires an instance of R2, and requests an instance of R1.

(ii) P2 acquires an instance of R1, and doesn't need any other resource.

(iii) P3 acquires an instance of R1, and requires an instance of R2.

(iv) P4 acquires an instance of R2, and doesn't need any other resource.

(I) Draw the resource allocation graph.

(II) Is there any cycle in the graph ? If yes, name it.

(III) Whether the system is in deadlock ? If yes, explain why; if not, provide sequence of execution of processes.

(b) How to allocate space to files for effective disk space utilization and

quick access using the following methods. 10

(i) Continuous allocation

(ii) Non-continuous allocation

4. (a) Briefly explain the Access Matrix Security Model that can possibly be implemented in operating systems with the help of an example. 10

(b) If you have to choose any one between WINDOWS 10 and LINUX operating systems, for your work, then which OS will you go for ? Give *five* reasons for choosing the same. 10

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

(a) Remote Procedure Call (RPC).

(b) Android Libraries.

(c) Design issues in mobile operating system.

(d) Kernel Architecture of Linux.

(e) Distributed Shared Memory.

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