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MCS–041

MASTER OF COMPUTER APPLICATIONS (MCA) (REVISED)

Term-End Examination

December, 2024

MCS-041 : OPERATING SYSTEMS

Time : 3 Hours *Maximum Marks : 100*

Weightage : 75%

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

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

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1. (a) What is a process ? Define independent processes and cooperating processes. Also discuss various process states and their transition with the help of a diagram. 10

   (b) What is an Inter Process Communication (IPC), supported by an operating system ? Why is it required ? Also, discuss the *two* types of IPC namely shared memory system and message passing systems. 10

(c) What is segmentation memory management scheme ? Explain its principles of operation and address translation with the help of a diagram. 10

(d) Write and explain Lamport's Bakery Algorithm in a distributed operating system environment. 10

2. (a) Discuss the file system of UNIX operating system highlighting the structure followed for file-system, file permissions, file compression and back-up. 10

(b) Explain processes, threads, API cells and interprocess communication implemented in Windows 2000. 10

3. (a) Explain the Bell and La Padula multilevel security model for an operating system. 10

(b) Explain the following strategies to deal with the deadlocks : 10

(i) Deadlock prevention

(ii) Deadlock Detection and Recovery

4. (a) Explain the following with reference to process scheduling performance criteria : 10

   (i) CPU utilization

   (ii) Throughput

   (iii) Turnaround time

   (iv) Waiting time

   (b) Write and explain the sleeping Barber's problem. Also, provide a sample solution using 'mutex' for that problem. 10

5. Write short notes on the following : 4×5=20

   (a) Generations of operating system

   (b) Structure of UNIX O/S

   (c) Distributed shared memory

   (d) Multistage switch-based multiprocessor system

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