

**MASTER OF COMPUTER
APPLICATIONS (MCA)
Term-End Examination
June, 2026**

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) Define a context switch and explain the step-by-step procedure for process switching between two processes with the help of a diagram. 10
 - (b) What is a semaphore ? List and define the two standard atomic operations of the semaphore. With the help of the semaphores, solve the producers/consumers problem with a bounded buffer (write pseudocode). 10

- (c) With reference to o/s security multi level models, explain the following : 10
 - (i) Biba Model
 - (ii) Lattice Model
 - (d) What are the constituents of UNIX file system ? Also explain the purpose of the following directories : 10
 - (i) / bin
 - (ii) / lib
 - (iii) / tmp
 - (iv) / etc
2. (a) What is a process scheduler ? Explain different types of schedulers in an operating system. 7
- (b) Discuss the Round-Robin and priority scheduling algorithms with a suitable example for each. 8
- (c) What is a Deadlock in an operating system ? Also, mention the four necessary conditions that must hold simultaneously for a deadlock to occur. 5

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3. (a) Explain virtual memory and its advantages in an operating system. 7
- (b) Discuss the Linked/Chained non-continuous allocation scheme with reference to disk space management. 8
- (c) What is a memory-manager ? Describe the four important tasks of it. 5
4. (a) Write and explain briefly the functions of operating systems. 6
- (b) Explain FCFS, SSTF and SCAN disk scheduling algorithms. 10
- (c) Write and explain how monitors make synchronization easier and correctly. 4
5. Write short notes on the following : 4×5=20
- (a) Process Control Block (PCB)
- (b) RAID
- (c) Resource Allocation Graph
- (d) Threads

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