Seat No. : _____

DI-111

December-2025

5 Year Integrated M.Sc. IT Software Development (Web & Mobile), Sem.-V

DSC-C-SMD-353T : Operating System

Time : 2:00 Hours] **[Max. Marks : 50**

Instructions :

(1) Attempt all questions.
(2) Make suitable assumptions wherever necessary.
(3) Figures to the right indicate full marks.

1. MCQs : **20**

(1) The Medium-Term Scheduler is mainly responsible for :
   (a) Process creation
   (b) Swapping processes in and out of memory
   (c) Device scheduling
   (d) Process termination

(2) The Round Robin algorithm is best suited for :
   (a) Batch systems (b) Real-time systems
   (c) Time-sharing systems (d) Multiprocessing systems

(3) In a Multithreaded process, threads share :
   (a) Stack and registers (b) Code, data, and OS resources
   (c) CPU registers only (d) Stack only

(4) Which of the following is a disadvantage of User-Level Threads ?
   (a) Simple to implement (b) Faster context switch
   (c) Cannot utilize multiple processors (d) Independent scheduling

(5) In real-time systems, the main goal of scheduling is to :
   (a) Maximize throughput
   (b) Minimize memory usage
   (c) Reduce response time and meet deadlines
   (d) Increase CPU utilization

(6) The Short-Term Scheduler is also known as :

(a) Job Scheduler (b) Dispatcher

(c) Queue Manager (d) Memory Manager

(7) The Logical Address is generated by :

(a) CPU (b) Main Memory

(c) Cache (d) Secondary Memory

(8) In a Fixed Partition Scheme, internal fragmentation occurs :

(a) Process is smaller than partition (b) Process is larger than partition

(c) Memory is non-contiguous (d) Partition size keeps changing

(9) In a Variable Partition Scheme, the main problem is :

(a) Internal fragmentation (b) External fragmentation

(c) No fragmentation (d) Swapping delay

(10) Compaction is used to :

(a) Remove internal fragmentation

(b) Reduce external fragmentation

(c) Increase degree of multiprogramming

(d) Load OS faster

(11) Static loading means :

(a) Loading program parts as needed

(b) Loading the entire program at once

(c) Loading only data segments

(d) Using virtual memory

(12) Segmentation divides memory based on :

(a) Fixed-size blocks (b) Logical units like code and data

(c) Power of two (d) Contiguous frames

(13) In Demand Paging, a page fault occurs when :

(a) Page is in memory (b) Page is not in memory

(c) CPU switches processes (d) Disk becomes full

(14) The Buddy System helps reduce :

(a) Internal fragmentation (b) External fragmentation

(c) Memory swapping (d) CPU load

(15) In Paging, the physical memory is divided into :

(a) Pages (b) Frames

(c) Segments (d) Blocks

(16) The Hybrid Kernel combines the features of :

(a) Microkernel and Exokernel (b) Monolithic and Microkernel

(c) Layered and Modular (d) Virtual and Layered

(17) The Exokernel architecture was developed at :

(a) Stanford University (b) Harvard University

(c) MIT (d) Oxford University

(18) In a Layered structure, the topmost layer represents :

(a) Hardware (b) User Interface

(c) Kernel (d) Drivers

(19) The main advantage of a Modular OS structure is :

(a) Less complex

(b) High flexibility and maintainability

(c) High memory usage

(d) Reduced portability

(20) The Virtual Machine concept is mainly used to :

(a) Execute only one process

(b) Simulate multiple operating systems

(c) Increase hardware speed

(d) Eliminate multitasking

2. Explain the four necessary conditions for a deadlock with suitable diagrams. **10**

OR

2. Consider a three-process system in which processes may request any of 12 drives. Suppose the allocation state given below, show that the allocation state is unsafe. Will this system deadlock ? **10**

	Allocation	***Max***	**Need**	**Available**
P_0	5	10		12
P_1	2	4		
P_2	3	9		

3. What is a Process Control Block (PCB) ? Mention its main components. **10**

OR

3. Describe the differences between Batch processing, Multiprogramming, and Multitasking operating systems. **10**

4. Explain the critical section problem. Describe software solutions using semaphores or monitors. **10**

OR

4. (82, 170, 43, 140, 24, 16, 190) and current position of Read/ Write head is: 50. Solve this question using FCFS SCHEDULING ALGORITHAM. **10**