



*Sambal*

# Avinashilingam Institute for Home Science and Higher Education for Women

Deemed to be University Estd.u/s 3of UGC Act 1956, Category A by MHRD (now MoE)

Re-accredited with A++ Grade by NAAC. CGPA 3.65/4, Category I by UGC

Coimbatore-641043, Tamil Nadu, India

## Bachelor's Degree Examination - November 2025

### III Semester

Class : II UG

Major : Computer Science

Time : 3 Hours

Max. Marks : 100

### 23BCSC05 Operating Systems

#### Course Outcomes:

- CO1: Obtain knowledge to know about the types of algorithms
- CO2: Understand the concepts of Kernels and threading concepts
- CO3: Learning about Deadlocks and their types
- CO4: Develop skills on Memory Management
- CO5: Trained skills in Android Applications

#### Part A

10 x 1 = 10

#### Choose the Correct Answer

1. An \_\_\_\_\_ is software that enables applications to interact with a computer's hardware CO1K1
  - a. software
  - b. operating system
  - c. assembler
  - d. compiler
2. In a multiprogramming operating system, the main objective is to \_\_\_\_\_. CO1K1
  - a. Reduce the size of programs
  - b. Increase CPU utilization by executing multiple jobs simultaneously
  - c. Execute one program at a time more efficiently
  - d. Minimize the number of I/O operations
3. Which of the following best defines a process in an operating system? CO2K1
  - a. A lightweight unit of CPU utilization
  - b. A program in execution
  - c. A collection of threads
  - d. A part of the kernel
4. Which of the following is shared by all threads in the same process? CO2K1
  - a. Stack
  - b. Program Counter
  - c. Code and data
  - d. Register set
5. Which of the following is not a method for handling deadlocks? CO3K1
  - a. Deadlock prevention
  - b. Deadlock detection and recovery
  - c. Deadlock avoidance
  - d. Deadlock fragmentation
6. Which algorithm is commonly used for deadlock avoidance? CO3K1
  - a. FIFO-scheduling
  - b. Banker's algorithm
  - c. Round Robin scheduling
  - d. Shortest Job Next
7. Which of the following is not a memory management technique? CO4K1
  - a. Paging
  - b. Segmentation
  - c. Swapping
  - d. Scheduling
8. In paging, the memory is divided into \_\_\_\_\_. CO4K1
  - a. Segments
  - b. Frames
  - c. Files
  - d. Pages
9. Which of the following is the core component of the Android architecture? CO5K1
  - a. Kernel drivers
  - b. Android Runtime
  - c. Application framework
  - d. All of the above
10. In Android small application development, which file is primarily used to define the app's user interface layout? CO5K1
  - a. androidManifest.xml
  - b. build.gradle
  - c. activity\_main.xml
  - d. MainActivity.java

**Part B**

**5 x 6 = 30**

**Answer ALL questions**

**Each answer should not exceed 400 words or two pages**

- 11.a. Differentiate between the various types of operating systems based on their characteristics and functionalities. CO1K2  
(or)  
11.b. Explain the history and evolution of operating systems CO1K2
- 12.a. Explain the processor mode and user mode in an operating system with suitable examples. CO2K  
(or)  
12.b. Describe the concept of process abstraction in an operating system with examples. CO2K2
- 13.a. Write the necessary conditions for a deadlock to occur in an operating system with examples. CO3K2  
(or)  
13.b. Elaborate on Producer-Consumer Problem in operating systems using bounded buffer approach. CO3K3
- 14.a. Describe internal fragmentation and external fragmentation in memory management. CO4K2  
(or)  
14.b. Analyze the differences between paging and segmentation and evaluate which method is more efficient for handling large processes. CO4K2
- 15.a. Explain briefly the android file system. CO5K2  
(or)  
15.b. List the applications of Android Operating Systems CO5K3

**Part C**

**5 x 12 = 60**

**Answer ALL questions**

**Each answer should not exceed 800 words or four pages**

- 16.a. Explain the basic functions of an operating system and illustrate how these functions support multiprogramming and time-sharing environments. CO1K2  
(or)  
16.b. Compare and analyze the following types of operating systems: Multiprogramming OS, Batch OS, Time-Sharing OS and OS for Personal Computers with examples. CO1K4
- 17.a. Explain preemptive and non-preemptive CPU scheduling in detail. CO2K2  
(or)  
17.b. Explain process scheduling in an operating system. Discuss its types, objectives and give suitable examples. CO2K2
- 18.a. Elaborate on different deadlock handling techniques in an operating system with examples and a neat diagram. CO3K2  
(or)  
18.b. Solve Banker's Algorithm for deadlock avoidance with a numerical example. CO3K5
- 19.a. A system uses demand paging with four-page frames. CO4K5  
The page reference string is: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3  
(a) Using the LRU (Least Recently Used) page replacement algorithm, calculate the number of page faults.  
(b) Evaluate how the number of page faults would change if the system used FIFO instead. CO4 K5  
(or)
- 19.b. Discuss the different types of file allocation methods and analyze the impact of file size on these methods. CO4K3
- 20.a. List the components of the Android Development Framework and explain their roles with examples. CO5K3  
(or)  
20.b. Design and develop a small Android application that accepts two numbers from the user and performs basic arithmetic operations. Explain the steps involved along with the important files used. CO5K5