



PAC INSTITUTE OF TECHNOLOGY AND SOCIAL STUDIES

MAY-AUGUST 2025 ASSESSMENT

FORMATIVE ASSESSMENT

Course : Computer Science

Level : 6

Unit of Competency : Operating System

WRITTEN ASSESSMENT

TIME: 3 HOURS

INSTRUCTIONS TO THE CANDIDATE:

- 1. Read all the instructions carefully before attempting the questions.*
- 2. This paper consists of two sections, A & B.*
- 3. You are allowed 3 Hours to Answer the questions.*
- 4. Marks for each question are indicated in brackets.*
- 5. Write your responses in the Separate Answer booklet provided.*
- 6. Do not write anything on this question paper.*

SECTION A: (40 MARKS)

Answer ALL questions in this section.

1. As a systems operator, describe how a process transitions through its lifecycle from creation to termination. (4 marks)
2. When managing system resources, explain how context switching enables multitasking in modern operating systems. (4 marks)
3. In a software development team, distinguish kernel-level threads from user-level threads based on control, performance, and use cases. (4 marks)
4. Given a system with limited RAM, illustrate how virtual memory enhances performance in a multiprogramming environment. (4 marks)
5. During kernel diagnostics, identify three primary tasks the kernel is responsible for. (2 marks)
6. In a network lab, name two server operating systems designed for file and printer sharing. (2 marks)
7. Given a multitasking system, state and explain two advantages of multiprogramming in maximizing CPU time. (4 marks)
8. As part of a printing process, define the concept of spooling in operating systems. (2 marks)
9. During program execution, describe how a system call allows communication between a user program and the OS. (2 marks)
10. As a virtualization engineer, describe how virtual machines replicate real hardware and manage resources independently. (4 marks)
11. In the deployment of applications, distinguish static and dynamic linking/loading with reference to executable files. (4 marks)

SECTION B: (60 MARKS)

*Answer any **THREE** questions in this section.*

12. A shared lab computer is reported to hang often, despite having sufficient RAM. The task manager shows many processes in “waiting” state.

You are designing an OS for an ICU system that must read and display patient vitals every second without failure.

- a) Differentiate between soft and hard real-time OS based on timing and failure consequences. (6 marks)
- b) Identify and explain five critical functions the OS must support in this system. (10 marks)
- c) Suggest two memory handling methods to ensure stability. (4 marks)

13. A student’s laptop running Windows OS crashed after a virus infection.

- a) Describe how a virus compromises OS files and system stability. (5 marks)
- b) List three recovery tools and explain how each restores OS functionality. (6 marks)
- c) Recommend three preventive measures for long-term OS safety. (5 marks)
- d) Explain how the OS uses logs to trace the cause of failure. (4 marks)

14. A financial institution requires an OS that can handle multiple concurrent transaction processes securely.

- a) Illustrate how multiprogramming works in such a system. (6 marks)
- b) List and explain five resources that must be monitored and scheduled. (6 marks)
- c) Analyze one scenario where mutual exclusion must be enforced. (4 marks)
- d) Suggest one thread model that improves speed without compromising safety. (4 marks)

15. A school intends to shift from standalone PCs to a centralized network with a server OS.

- a) Outline three key features of a Network Operating System that justify this

migration.

(6 marks)

- b) Assess the benefits of central data and user management for the school.

(6 marks)

- c) Identify two security challenges and how they can be addressed.

(4 marks)

- d) Propose basic maintenance tasks for the network OS.

(4 marks)