

061005T4ICT
ICT TECHNICIAN LEVEL 5
IT/OS/ICT/CR/6/5
MANAGE OPERATING SYSTEM
NOV/ DEC 2023



**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION
COUNCIL (TVET CDACC)**

WRITTEN ASSESSMENT

Time: 3 Hours

INSTRUCTIONS TO CANDIDATE

1. This paper has THREE sections: A, B and C. Attempt questions in each section as per instructions given in the section.
2. You are provided with a separate answer booklet.
3. Marks for each question are indicated in the brackets.
4. Do not write on the question paper

This paper consists of 7 printed pages
Candidate should check the question paper to ascertain that all the pages are printed
as indicated and that no questions are missing.

SECTION A: 20 MARKS

Answer ALL questions in this section.

1. Which of the following represents a significant milestone in the evolution of operating systems?
 - A. Release of Microsoft Office
 - B. Introduction of the first personal computer
 - C. Development of the World Wide Web
 - D. Invention of the transistor
2. The client-server model in operating systems is commonly associated with
 - A. Monolithic structures
 - B. Real-time operating systems
 - C. Distributed computing
 - D. Mainframe computers
3. The operating system structure that is known for having all operating system services and functionalities in a single program is known as
 - A. Monolithic
 - B. Layered
 - C. Virtual
 - D. Client-server model
4. Enumerate one type of operating system that is designed for resource-constrained devices like smartphones and IoT devices.
 - A. Mainframe OS
 - B. Mobile OS
 - C. Desktop OS
 - D. Server OS
5. The component of the operating system that manages the essential functions and interacts directly with the hardware
 - A. Shell
 - B. System call
 - C. Kernel
 - D. Object file
6. _____ is the function of an operating system that is responsible for process management, memory management and file system management.

- A. Resource allocation
 - B. User interface
 - C. Device management
 - D. Security and access control
7. During the installation of an operating system, which step involves creating user accounts and setting passwords?
- A. Disk partitioning
 - B. Installation of device drivers
 - C. Network configuration
 - D. User configuration
8. The memory management technique that involves dividing physical memory into fixed-sized blocks, allowing multiple processes to reside in memory simultaneously is known as _____
- A. Paging
 - B. Segmentation
 - C. Swapping
 - D. Fragmentation
9. In computer systems, what is the role of the clock system or clock cycle
- A. It manages input devices.
 - B. It controls the power supply to the CPU.
 - C. It synchronizes the execution of instructions and operations.
 - D. It regulates the network connections.
10. File protection and security mechanisms in an operating system are designed to:
- A. Maximize data duplication.
 - B. Ensure all files are accessible to all users.
 - C. Prevent unauthorized access and maintain data integrity.
 - D. Improve network connectivity.
11. The file access method that allows reading and writing files from any position in the file, making it suitable for random access is referred to
- A. Sequential access
 - B. Direct access
 - C. Index access
 - D. Consecutive access

12. What is the purpose of device drivers in computer systems?
- A. They manage user interfaces.
 - B. They control the CPU clock speed.
 - C. They enable communication between the operating system and hardware devices.
 - D. They provide network security.
13. Define file system management in the context of computer systems.
- A. Managing user accounts and authentication.
 - B. Managing file storage and retrieval.
 - C. Managing network connections.
 - D. Managing hardware resources.
14. Highlight one primary objective of managing input/output devices in computer systems.
- A. Maximizing CPU performance.
 - B. Ensuring data encryption.
 - C. Efficiently managing data transfer between devices and memory.
 - D. Enhancing user interface design.
15. Mention one example of an emerging trend in operating systems
- A. Decreased reliance on virtualization technologies
 - B. Enhanced data security measures
 - C. Reduced demand for cloud computing
 - D. Diminished importance of user-friendly interfaces
16. How can organizations cope with the challenges posed by emerging trends in file system management?
- A. Ignore the trends and continue with traditional file management methods.
 - B. Invest in advanced data security and privacy technologies.
 - C. Reduce data storage capacities to minimize risks.
 - D. Decrease data backups to reduce costs.
17. In a virtual operating system structure, what is the primary advantage of running multiple operating systems on a single physical machine?
- A. Improved security
 - B. Enhanced performance
 - C. Efficient resource sharing
 - D. Reduced software complexity

- 18.State one effective strategy for organizations to cope with the challenges posed by emerging trends in operating systems.
- A. Resist adopting new technologies to maintain stability.
 - B. Focus on decreasing data backups to reduce costs.
 - C. Embrace continuous learning and adaptability in IT practices.
 - D. Discontinue updates and patches to prevent system disruptions.
- 19.State the function of a Process Control Block (PCB).
- A. To store the executable code of a process.
 - B. To control the input/output operations of a process.
 - C. To contain information about a process's state and resources.
 - D. To manage the allocation of CPU time.
- 20.Concurrency control in operating systems is primarily concerned with
- A. Increasing the processing speed of the CPU.
 - B. Managing multiple processes to ensure efficient resource utilization.
 - C. Preventing software bugs in the code.
 - D. Enhancing user interface design.

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SECTION B: 40 MARKS

Answer ALL questions in this section.

21. Highlight the procedures involved in the installation of operating systems. (5 Marks)
22. With the aid of a *diagram*, describe a THREE states process model as used in operating system. (5 Marks)
23. Describe TWO memory management and allocation mechanisms utilized by operating systems. (4 Marks)
24. Process scheduling mechanisms in operating systems have a variety of properties that affect how they work in a computer system. Describe FOUR characteristics of scheduling algorithms used in process scheduling. (4 Marks)
25. Differentiate between *pre-emptive* and *non-pre-emptive* scheduling. (4 Marks)
26. Deadlocks, in the context of operating systems, are complex situations where processes are unable to proceed because each is holding a resource and waiting for another resource that is held by another process. Outline FOUR of such conditions. (4 Marks)
27. Fixed partitioning is a memory management approach in which main memory is divided into fixed-size sections to accommodate processes. List at least FOUR drawbacks to this strategy. (4 Marks)
28. To ease the interaction between software applications and hardware devices, input and output (I/O) software systems often include numerous levels. Mention any FOUR that you are familiar with. (5 Marks)
29. Hardware clocks and timers serve critical roles in computer systems, providing a variety of operations that aid in system functioning and synchronization. Name **THREE** of these functions. (3 Marks)
30. A Process Control Block (PCB) is a data structure that operating systems use to handle information about active processes. Describe the **TWO** primary goals of (PCB) in process management. (2 Marks)

SECTION C: 40 MARKS

Answer any TWO questions are attempted.

31. Mary is working for smart tech company that deals with distribution of software in Kiambu region. She was invited for training in a certain company that had introduced the use of computers in their operation. In order to achieve her objective in the training, she had to do a documentation of operation starting their evolution to the present.

- a) Define the term operating system (2 Marks)
- b) Discuss at least FOUR evolution of operating systems (8 Marks)
- c) An operating system (OS) is a fundamental software component that performs a variety of functions in a computer system. Explain At least FIVE of those responsibilities. (10 Marks)

32.

- a) Explain TWO modes of direct access memory in a computer system. (4 Marks)
- b) Cloud-based file management solutions have various advantages, including scalability, accessibility and cost-effectiveness. They do, however, provide issues in terms of data storage, access and security. Discuss FOUR difficulties of this cloud-based file management. (8 Marks)
- c) Process scheduling algorithms are an essential component of an operating system, especially when several processes compete for the CPU's attention in multitasking contexts. Explain **FOUR** different process scheduling algorithms. (8 Marks)

33.

- a) You work as the director of information technology for a multinational firm. Describe **FIVE** factors you would use to choose the best operating system for the company. (10 Marks)
- b) Highlight the steps involved in installing operating systems. (10 Marks)

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