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061005T4ICT

ICT TECHNICIAN LEVEL 5

ICT/OS/IT/CR/6/5

MANAGE OPERATING SYSTEM

July/August 2024

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

WRITTEN ASSESSMENT

TIME: 3 HOURS

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INSTRUCTIONS TO CANDIDATE:

1. This paper consists of TWO sections A and B
2. Answer ALL questions in sections A and THREE question in section B
3. Marks for each question are indicated in the brackets.
4. Do not write on the question paper
5. Answer ALL questions in English.

This paper consists FOUR (4) printed pages.

Candidate should check the question paper to ascertain that all pages are Printed as indicated and that no questions are missing.

SECTION A (40 MARKS)

Attempt ALL the question in this section

1. The following are common terminologies used in operating system. Explain the terminologies.
   i. Kernel (2 Marks)
   ii. Race condition (2 Marks)
   iii. Turn-around time (2 Marks)
2. During process execution, operating system assigns priority to the task through a scheduling process. Outline THREE conditions that necessitate the scheduling process. (3 Marks)
3. Memory allocation is an action of assigning the physical or the virtual memory address to a process. Outline THREE advantages of this action. (3 Marks)
4. A deadlock can occur in a situation where processes share resources. Identify THREE strategies for dealing with a deadlock problem. (3 Marks)
5. A multiprogramming operating system ensures that the CPU is engaged maximally. Highlight other THREE benefits of this type of operating system other than CPU utilization. (3 Marks)
6. The computer clock is important to the synchronization of events and processes in a computer system. Identify THREE functions of the computer clock. (3 Marks)
7. Process termination refers to the end of the execution of a program within an operating system. Highlight FOUR reasons which can lead to a process termination. (4 Marks)
8. Nest technologies intents to install a new computers for their cyber-cafe. Outline FIVE steps they will follow while installing an operating system to the new computer. (5 Marks)
9. When a file is used, information is read and accessed into computer memory. Outline FOUR ways used by operating system to access a file. (4 Marks)
10. Operating system helps to avoid race condition during process execution. Outline THREE objectives of I/O scheduling in computer system. (3 Marks)
11. A process is a program under execution. Highlight the THREE components of a process as applied in operating system. (3 Marks)

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SECTION B (60 MARKS)

Attempt THREE questions in this section

12. a) Different algorithms are used by operating systems to manage the execution order of processes. The list below shows some of the algorithms. Define each one of them.
    i. Shortest job next (2 Marks)
    ii. Priority scheduling (2 Marks)
    iii. First come first served (2 Marks)

    b) Tom has realized that processes are holding resources while waiting for other available resources in his computer. Describe FOUR conditions that must hold true for a deadlock situation to occur. (8 Marks)

    c) Input/ Output (i/o) management in operating system is crucial for facilitating communication between computer components. Explain THREE objectives of input/output management. (6 Marks)

13. a) The state of a process is defined in part by the current activity of that process. With the aid of a diagram describe the process state model. (10 Marks)

    b) Memory management is the process of controlling and coordinating computer's main memory. Discuss THREE techniques that can be applied in memory management. (6 Marks)

    c) Operating Systems can be understood through their ownership, development and accessibility. Differentiate between Proprietary operating systems and Generic operating systems (4 Marks)

14. a) Operating systems provide an environment which ensures that the computer system operates smoothly and efficiently. Explain FIVE ways on how operating system is used to achieve this efficiency. (10 Marks)

    b) The structure of an operating system depends mainly on how the various components are interconnected and melded into the kernel. Discuss THREE structures of an Operating System. (6 Marks)

    c) A computer system processes generate, send and receive messages by using system calls. Explain TWO problems associated with message passing. (4 Marks)

15. a) Emerging trends in operating systems bring significant advancements and opportunities as well as introducing several challenges. Explain FIVE challenges of these emerging trends. (10 Marks)

    b) Differentiate between first fit and best fit partition allocation technique. (4 Marks)

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c) A system call is a way in which a computer program requests a service from the kernel of the operating system. Explain THREE types of system calls that help to interface between a process and the operating system of a computer. (6 Marks)

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