061005T4ICT

ICT TECHNICIAN LEVEL 5

IT/OS/ICT/CR/6/5

MANAGE OPERATING SYSTEM

July/Aug 2023

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

WRITTEN ASSESSMENT

Time: 3 Hours

INSTRUCTIONS TO CANDIDATE

1. The paper consists of **THREE** sections: **A**, **B** and **C.**
2. Marks for each question are indicated in the brackets.
3. Do not write on the question paper.
4. A separate answer booklet will be provided.

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 is not a part of the operating system? (1 Mark)
   A. Input/output control program
   B. Job control program
   C. Supervisor
   D. Performance monitor
2. An operating system that reads and reacts in terms of actual time is known as__(1 Mark)
   A. Real time system
   B. Time sharing system
   C. Quick response system
   D. Batch system
3. Which of the following is not an operating system? (1 Mark)
   A. UNIX
   B. MS-DOS
   C. CP/M
   D. PASCAL
4. What is the name of the operating system that reads and reacts in terms of actual time
   A. Real time system
   B. Time sharing system
   C. Quick response system
   D. Batch system
5. Context switching is part of (1 Mark)
   A. Interrupt servicing
   B. Interrupt handling
   C. Polling
   D. Spooling
6. Under the normal mode of operation, identify the right sequence through which a process may utilize a resource (1 Mark)
   A. Request – Use – Release
   B. Request – Hold – Use – Release
   C. Hold – Use – Release
   D. Request – Hold – Release

7. Which of the following is an example of a spooled device (1 Mark)
   A. A graphic display device
   B. A line printer used to print the output of a number of jobs
   C. A secondary storage device in a virtual memory system
   D. A terminal used to enter input data to a running program
8. What are the TWO basic types of operating systems (1 Mark)
   A. Batch and interactive
   B. Sequential and real time
   C. Batch and time share
   D. Sequential and direct
9. In disk operations, rotational latency refers to_____ (1 Mark)
   A. The time required to move the disk arm to the required track.
   B. The amount of time required for the desired sector to rotate around and come under the read-write head.
   C. The time required to move the data electronically from the disk to the computer
   D. The time required to move the heads from one cylinder to another, and for the heads to settle down after the move.
10. _____ are the functions used to modify the value of semaphore (1 Mark)
   A. Wait () and Run ()
   B. Signal () and Exit ()
   C. Wait () and Exit ()
   D. Wait () and signal ()
11. The allocation of processors by process management is known as_____ (1 Mark)
   A. Managing
   B. Processing
   C. Planning
   D. Scheduling
12. A set of extended instructions providing an interface between the Operating System and the user programs is called a (1 Mark)
   A. Machine call
   B. System call
   C. Instruction calls
   D. Service call

13. An operating system fence registers is used for (1 Mark)
    A. Disk protection
    B. CPU protection
    C. Memory protection
    D. File protection
14. Which of the following is a single-user operating system (1 Mark)
    A. Windows
    B. MAC
    C. Ms-DOS
    D. Linux
15. The size of virtual memory is based on which of the following (1 Mark)
    A. CPU
    B. RAM
    C. Address bus
    D. Data bus
16. _____ is a file that contains a list of file names and other information related to these files (1 Mark)
    A. Ordinary file
    B. Special file
    C. Directory file
    D. System file
17. _____is the page number that is not found in the translation lookaside buffer (1 Mark)
    A. Translation Lookaside Buffer miss
    B. Buffer miss
    C. Translation Lookaside Buffer hit
    D. Cache hit
18. Highlight one set of the types of addresses used in a program before and after memory is allocated (1 Mark)
    A. Symbolic addresses, Relative addresses, Page Address
    B. Page Address, Physical addresses, Symbolic addresses
    C. Symbolic addresses, Physical addresses, Relative addresses.
    D. Physical addresses, Relative addresses, Page Address
19. Which of the following statements best describes physical disk formatting (1 Mark)
    A. Low level formatting is done by the end users

B. Disk must not be formatted before storing data

C. Low level formatting files the disk with a special data structure for each sector.

D. Deleting everything in the disk.

20. From the statements below, choose a key limitation of Batch Operating System.

(1 Mark)

A. CPU is often idle, because the speed of the mechanical I/O devices is slower than the CPU.

B. Frequent interaction between the user and the job.

C. It is easy to provide the desired priority.

D. Jobs with similar needs are batched together and run as a group

SECTION B: (40 MARKS)

*Answer **all** questions in this section.*

21. Define the following terms as used in operating systems.
    a) Kernel. (2 Marks)
    b) Time sharing (2 Marks)
    c) Multiprocessor (2 Marks)
22. Highlight TWO advantages of multiprogramming. (2 Marks)
23. Distinguish between *hard* and *soft copy* real time system. (4 Marks)
24. Differentiate between *contiguous* and *non-contiguous* memory allocation techniques. (4 Marks)
25. State TWO disadvantages of paging in memory management. (2 Marks)
26. Outline TWO advantages of virtual approach to system design. (2 Marks)
27. Highlight FOUR conditions to hold to have good solution to race condition. (4 Marks)
28. Describe FOUR conditions that must hold true for a deadlock to occur. (4 Marks)
29. State FOUR Circumstances under which a running process can be terminated by an operating system (4 Marks)
30. Differentiate between *multi-tasking* and *multiprogramming*. (4 Marks)
31. State TWO functions of the computer clock. (2 Marks)
32. Memory fragmentation is not popular with the modern operating systems. Outline TWO limitations that could be aiding this trend. (2 Marks)

SECTION C (40 MARKS)

Answer any TWO questions are attempted.

33.

a) Operating system efficiently manages and control the execution of multiple processes on a system by storing all the necessary information about a process in a Process Control Block. Describe the Process Control Block outlining its elements. (8 Marks)

b) Process scheduling helps in efficient allocation of computer resources and is done by different process scheduler. Explain THREE types of process schedulers. (6 Marks)

c) In multitasking operating systems, executing different threads, context switching is needed, Define context switch. (2 Marks)

d) Differentiate between *demand paging* and *thrashing* as used in memory management. (2 Marks)

e) State TWO objectives of file management systems. (2 Marks)

34.

a) Explain TWO types of scheduling queues. (4 Marks)

b) In Operating system practical class, students were taken through attributes of files, Describe FOUR files attributes they would have covered in the practical. (4 Marks)

c) Division of complex task into smaller executable subtasks known as threads is done at user level and kernel level. Differentiate between *user level threads* and *kernel level threads.* (6 Marks)

d) With the aid of a diagram describe linked file allocation technique. (6 marks)

35.

a) Differentiate between *block* and *character* devices as used in device management. (4 Marks)

b) Mary was planning to install an I/O software into her newly acquired system. Explain FOUR goals the I/O software would help in serving her. (8 Marks)

c) Operating systems interacts with files and perform read and write operations using different methods. Describe THREE types of file access methods. (6 Marks)

d) Outline TWO emerging trends in Operating systems. (2 Marks)