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061005T4ICT

ICT TECHNICIAN LEVEL 5**IT/OS/ICT/CR/06/5/A**

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IT/OS/ICT/CR/06/5/B**Manage Operating systems****July/August 2022**

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

WRITTEN ASSESSMENT

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Time: 3 HOURS**INSTRUCTIONS TO CANDIDATE**

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1. The paper consists of **TWO** sections: **A** and **B**.
2. Answer all questions in section A and ANY THREE (3) questions in section B.
3. Marks for each question are indicated in the brackets.
4. Candidates are provided with a separate answer booklet.
5. **DO NOT** write on the question paper.

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Printed By: **FOUR (5) printed pages**

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**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)***An Answer ALL the questions in this section***

1. During a manage 6 stems lesson, the learners encountered the following terminologies. Define the terminologies. (4 Marks)

i. Operating system.

ii. Process

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iii. System call

iv. Kernel

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2. Each brand of operating system has a distinctive icon that uniquely identifies it. Associate the following icons with their appropriate Operating systems. (4 marks)

a.



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b.



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d.

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3. One of the roles of a device driver is to abstract hardware complexity. Outline THREE other roles of a device driver in operating systems. (3 marks)

4. A deadlock is a state that occurs when several processes compete for a finite number of resources i.e. a process is waiting for a particular event that will not occur. List FOUR conditions necessary for a deadlock to occur. (4 Marks)

5. The field of operating systems is constantly evolving and new trends are emerging every other day. Name THREE emerging trends in modern operating systems. (3 Marks)

6. You have been given the responsibility of creating an engaging online course. List TWO security challenges in modern OS that you are likely to encounter and suggest their solutions. (4 Marks)

7. Trainees in an operating system class learnt about virtualization. Outline FOUR ways in which virtualization improves OS efficiency? (4 Marks)

8. An organization has installed a multitasking operating system in their computers. Outline THREE ways in which this operating system manages multitasking. (3 Marks)

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9. An operating system is an essential part of any computing system and without which a computer cannot even power up. Identify FOUR reasons why an OS is necessary for a computer system. (4Marks)

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10. Organizing and accessing data is a fundamental task of any computer system. The primary purpose of 'file system management' within an operating system is to ensure files are organized and ease in file access. Identify the THREE file access methods. (3 Marks)

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11. The main purpose of a disk scheduler is to improve the overall performance and efficiency of disk operations. Outline FOUR roles of a disk scheduler in an operating system. (4 Marks)

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SECTION B (60 MARKS)**Answer Any THREE Questions in This Section****13**

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- a) Scheduling is the process of switching the CPU among processes consequently making the computer more productive. Explain FOUR key criteria used to evaluate the effectiveness of CPU scheduling algorithms in an operating system. (8 marks)
- b) Processes transition through different states as they progress through their lifecycle, reflecting their current status. Using a FIVE-STATE process diagram explain how a process transitions through different states during its lifecycle. (8 marks)
- c) An attendee in an ICT firm realized that his computer hanged when he was playing a computer game while at the same time running network diagnostics. His supervisor told him that the game was preempted. Explain the difference between preemptive and non-preemptive scheduling algorithms giving an example in each case. (4 marks)

14.

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used to allocate processor time to processes to ensure optimum utilization of the processor and fair distribution of processor time among competing processes. Explain the following algorithms. (6 marks)

a. First Come First Served (FCFS).

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b. Shortest Process Next (SPN).

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c. Shortest Remaining Time (SRT)

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b) able, graphically illustrate the differences in the processor scheduling using the THREE algorithms below indicating waiting time and completion time. (6 marks)

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a. First Come First Served (FCFS).

b. Shortest Process (SPN)

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c. Shortest Remaining Time (SRT)

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Process	Arrival Time	Required Service Time
A	0	3
B	2	6
C	4	4
D	5	5
F	8	2

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- c) An ICT Technician you need to have a good understanding of operating systems. Explain FOUR types of operating system structure. (8 marks)

15.

a) The computer clock system is essential for coordinating and managing the timing of operating system. Explain FOUR main functions of a computer clock system. (8 marks)

b) A file system is a method used by an operating system to organize, store, retrieve, and manage data on storage devices. Explain THREE Key concepts related to file systems in operating systems. (6 marks)

c) To ease the interaction between software applications and hardware devices, input and output (I/O) software systems often include numerous levels. Explain FOUR drawbacks to this strategy. (6 marks)

16.

a) Data in any organization must be kept safe and secure to ensure its privacy, confidentiality and integrity. Explain FOUR key File protection and security methods in operating systems. (8 marks)

b) A hard disk with 200 tracks has disk schedulers that receives the read and write requests. The requested tracks, in the order received by the disk scheduler, are 55, 58, 39, 18, 90, 160, 150, 38, 184. Assuming that currently the read/write head is on track 100, use diagrams to show how the requests will be serviced using the following disk schedulers.

i. First In First Out (FIFO). (4 marks)

ii. Shortest Service Time First (SSTF). (4 marks)

iii. CSCAN. (4 marks)