

TEVETA

Technical Education, Vocational and
Entrepreneurship Training Authority

CERTIFICATE IN ADVANCED COMPUTER STUDIES

LEVEL 5 EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATIONS

SITTING: NOVEMBER/DECEMBER 2025

SUBJECT: OPERATING SYSTEMS

TIME: THREE (3) HOURS

TOTAL MARKS: 100

PASS MARK: 50

INSTRUCTIONS TO THE CANDIDATE

1. Write your Examination number and National Registration Card number on the answer booklet provided. Ensure to append your signature in the space provided on the answer booklet.
2. Write your answer SCRIPTS SERIAL NUMBER on the examination register provided and on the entry slip.
3. There are Seven (7) questions in this paper.
4. Question one (1) Compulsory.
5. Answer any other Four (4) questions of your choice from the remaining
6. All questions carry equal marks.
7. Cell phones and Programmable calculators are not allowed in the examination room.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

QUESTION 1 - COMPULSORY

You are hired as a junior systems analyst at a startup called MedTech Solutions, which specializes in building smart healthcare devices such as automated pill dispensers, mobile diagnostic kits, and real-time patient monitors. The company wants to develop a custom embedded operating system for its new wearable health monitor, which will be used by patients in rural areas to transmit their health data to central hospitals. You've been asked to provide insights on what features, design considerations, and types of operating systems are best suited for this project.

- a) Define an operating system (2 marks)
- b) State **one (1)** specific OS the company might customize. (4 marks)
- c) Describe **three (3)** fundamental functions that would be critical in this context. (6 marks)
- d) State **four (4)** essential characteristics that the OS should have to be effective in medical context. (4 marks)
- e) Explain the way knowledge of the evolution of operating systems can influence the development of this custom Operating System. (4 marks)

Total (20 Marks)**QUESTION 2**

- a) State **two (2)** challenges associated with concurrent processes. (2 marks)
- b) Describe the actions taken by a kernel to context-switch between processes. (4 marks)
- c) Explain the way a process differs from a program. (4 marks)
- d) Describe **three (3)** methods of inter-process communication. (6 marks)
- e) Explain process synchronization referring to real-world examples. (4 marks)

Total (20 marks)**QUESTION 3**

- a) Describe **three (3)** scheduling algorithms. (6 marks)
- b) Explain **five (5)** conditions can lead to a deadlock. (10 marks)
- c) Describe **two (2)** strategies for deadlock prevention. (4 marks)

Total (20 marks)**QUESTION 4:**

- a) Define fragmentation. (2 marks)
- b) Explain the concept of virtual memory management. (6 marks)
- c) Compare paging and segmentation using **three (3)** points. (6 marks)
- d) Distinguish between internal and external types of memory giving an example of each. (6 marks)

Total (20 marks)

QUESTION 5

- a) Define open-source operating systems. (2 marks)
 - b) State the purpose of interrupt. (3 marks)
 - c) Compare DOS, Windows, and Linux in terms of user interface, multitasking, and file systems. (9 marks)
 - d) Explain the strengths and weaknesses of Unix/Linux in enterprise environments. (6 marks)
- Total (20 marks)**

QUESTION 6:

- a) Define access control lists. (2 marks)
 - b) Explain the importance of protection in an Operating System. (6 marks)
 - c) Describe dynamic protection structures with examples. (6 marks)
 - d) Explain the difference between authentication and authorization. (6 marks)
- Total (20 marks)**

QUESTION 7

- a) Explain **four (4)** steps involved in installing and configuring an operating system. (8 marks)
 - b) Describe **three (3)** tools for Operating System configuration. (6 marks)
 - c) Explain **three (3)** tasks involved in Operating System maintenance, the importance of each is important. (6 marks)
- Total (20 marks)**