

1920/106  
OPERATING SYSTEMS  
July 2019  
Time: 3 hours



**THE KENYA NATIONAL EXAMINATIONS COUNCIL**  
**CRAFT CERTIFICATE IN INFORMATION TECHNOLOGY**  
**MODULE I**  
**OPERATING SYSTEMS**

**3 hours**

**INSTRUCTIONS TO CANDIDATES**

*This paper consists of **TWO** sections, **A** and **B**.*

*Answer **ALL** the questions in section **A** and any **FOUR** from section **B** in the answer booklet provided.*

*Candidates should answer the questions in **English**.*

**This paper consists of 4 printed pages.**

**The candidate should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**

## SECTION A (40 marks)

Answer **ALL** the questions in this section.

1. Richard intends to install an operating system in his new computer. Explain **two** requirements that should be considered before installation. (4 marks)
2. Describe each of the following *disk arm scheduling algorithms* as used in operating systems:
  - (i) elevator;
  - (ii) shortest seek time first. (4 marks)
3. Explain **two** advantages of flash memory over compact disks storage media. (4 marks)
4. Netcom Company Ltd, a mobile communication device manufacturer intends to install the android mobile operating system in their new devices. Explain **two** advantages the company would gain from using this operating system. (4 marks)
5. Define each of the following terms as used in operating systems:
  - (i) multiprogramming;
  - (ii) multitasking. (4 marks)
6. With the aid of a diagram, describe *spooling technique* as applied in operating systems. (4 marks)
7. Define each of the following terms as used in operating systems:
  - (i) polling;
  - (ii) pipe. (4 marks)
8. Explain the **two** functions of *directories* in a computer system. (4 marks)
9. Computer users are advised to set strong passwords to protect data. Outline **four** characteristics that these passwords should possess. (4 marks)
10. Differentiate between *dynamic loading* and *dynamic linking* as used in memory management. (4 marks)

## SECTION B (60 marks)

Answer any **FOUR** questions in this section

11. (a) Outline **three** reasons for implementing threads at the user level. (3 marks)
- (b) Outline **three** differences between a *process* and a *thread* as applied in operating systems. (6 marks)
- (c) The process control block of an operating system comprises of different types of information. Explain **three** types of this information. (6 marks)
12. (a) State **three** categories of system calls, giving an example in each case. (3 marks)
- (b) Explain the **three** components of disk access time in an operating system. (6 marks)
- (c) Table 1 shows different processes with their arrival and execution times. Use it to answer the questions that follow.

Process	Arrival Time	Execute Time
P <sub>0</sub>	0	6
P <sub>1</sub>	1	4
P <sub>2</sub>	2	9
P <sub>3</sub>	3	7

Table 1

- (i) Draw a Gantt chart to represent the scenario for using the round robin (RR) scheduling algorithm. (3 marks)
- (ii) Using the first come first served (FCFS) scheduling algorithm, calculate the average waiting time for this scenario. (3 marks)
13. (a) Outline **three** advantages of an operating system that supports *batch processing*. (3 marks)
- (b) The computer system is made up of different *buses* that facilitate input/output processes. Explain **three** of these buses. (6 marks)
- (c) Operating system deadlocks are due to various causes. Outline **three** of these causes, stating a mechanism to prevent each. (6 marks)
14. (a) (i) Define the term *virtual machine* as applied in device management. (2 marks)
- (ii) Describe *paged memory management* technique as used in operating systems. (3 marks)
- (b) Spedy Communication Company has embraced the use of Speech recognition technology. Explain **three** ways in which the company could apply the technology. (6 marks)

- (c) During an operating systems lesson, a teacher discussed various types of operating system structures. Describe **two** of these structures. (4 marks)
15. (a) Outline the characteristics of an electronic file set with each of the following attributes:
- (i) hidden;
  - (ii) read only. (2 marks)
- (b) Describe each of the following file allocation techniques:
- (i) linked;
  - (ii) indexed. (4 marks)
- (c) Disk operating system commands are divided in two major categories. Explain each of these categories, giving an example in each case. (5 marks)
- (d) Distinguish between *best fit* and *first fit* storage placement policies as used in operating systems. (4 marks)

Process	Arrival Time	Execution Time
P <sub>1</sub>	0	1
P <sub>2</sub>	1	1
P <sub>3</sub>	2	2
P <sub>4</sub>	3	2

**THIS IS THE LAST PRINTED PAGE**