

Name \_\_\_\_\_

Index No. \_\_\_\_\_

2920/105  
**OPERATING SYSTEMS**  
**November 2015**  
**Time: 3 hours**

Candidate's Signature \_\_\_\_\_

Date \_\_\_\_\_



**THE KENYA NATIONAL EXAMINATIONS COUNCIL**

**DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY**

**MODULE I**

**OPERATING SYSTEMS**

**3 hours**

**INSTRUCTIONS TO CANDIDATES**

*Write your name and index number on the question paper in the spaces provided above.*

*Sign and write the date of examination in the spaces provided above.*

*Answer any **FIVE** of the following **EIGHT** questions in the spaces provided in this question paper.*

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

**For Examiner's Use Only**

Question	1	2	3	4	5	6	7	8	Total Score
Candidate's Score									

**This paper consists of 12 printed pages.**

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

1. (a) (i) Explain the term *page table* as applied in operating systems.

---

---

---

(ii) Outline **four** advantages of First Come First Served (FCFS) scheduling algorithms. (4 marks)

---

---

---

---

---

---

---

---

(b) Paul was investigating the challenges that his company might be experiencing as a result of using monolithic operating system. Explain **two** challenges he could have identified. (4 marks)

---

---

---

---

---

---

---

---

(c) Explain **two** circumstances that could necessitate implementation of a client server operating system in an organization. (4 marks)

---

---

---

---

---

---

---

---

- (d) Sam was required to investigate disadvantages of virtual machines in computers. Explain **three** disadvantages that he could have established. (6 marks)

---

---

---

---

---

---

---

---

2. (a) (i) Outline **two** file allocation methods that could be used in operating systems. (2 marks)

---

---

---

---

- (ii) Explain **two** reasons for adapting buffering technique in I/O communication. (4 marks)

---

---

---

---

---

---

---

---

- (b) Figure 1 shows inbound memory hierarchy diagram. Describe each of the layers labeled A, B and C. (6 marks)

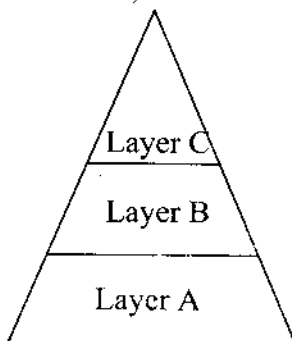


Figure 1

- (c) Several design issues are of concern in disk cache implementation. Explain **two** typical considerations that should be observed. (4 marks)

- (d) Beth intends to adopt a full backup scheme for her company's file system. Explain **two** disadvantages that she could likely realize while using this backup scheme. (4 marks)

3. (a) Distinguish between *human-readable* and *machine-readable* I/O devices. (4 marks)

- (b) Sarah intends to select a file system for her company. Outline **four** factors that she should consider other than cost. (4 marks)

---

---

---

---

---

- (c) Define each of the following terms as used in file system:

(i) field; (2 marks)

---

---

---

(ii) record. (2 marks)

---

---

---

- (d) (i) The short-term scheduler is invoked whenever an event occurs that may lead to the blocking of the current process in an operating system. Outline **four** examples of such events that could be invoked. (4 marks)

---

---

---

---

---

(ii) Explain **two** circumstances under which an operating system would prompt a user to rename a file. (4 marks)

---

---

---

---

---

4. (a) Explain each of the following terms as used in operating systems:

(i) port;

(2 marks)

---

---

---

(ii) message.

(2 marks)

---

---

---

(b) (i) Figure 2 shows a cross section of a disk platter. Outline each of the parts label (i) and (ii). (4 marks)

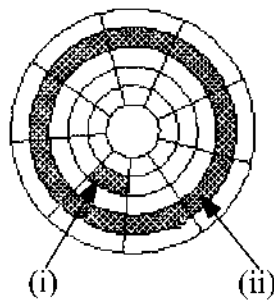


Figure 2

---

---

---

(ii) Kate was investigating conditions necessary for deadlocks in operating systems. Outline **four** conditions that she was likely to identify. (4 marks)

---

---

---

---

---

---

---

---

---

---

- (c) Julie intends to use fixed memory partitioning in an operating system that she was designing for a client. Explain **two** difficulties that she could experience while using this memory technique. (4 marks)

---

---

---

---

---

---

---

---

- (d) Load sharing is one of un-processor scheduling technique. Explain **two** versions of this technique that could be implemented in operating systems. (4 marks)

---

---

---

---

---

---

---

---

5. (a) Explain each of the following types of I/O operations:

(i) control; (2 marks)

---

---

---

---

---

---

---

---

(ii) status; (2 marks)

---

---

---

---

---

---

---

---

(iii) transfer. (2 marks)

---

---

---

---

---

---

---

---

- (b) Explain **two** circumstances that could render use of context switching in operating systems. (4 marks)

---

---

---

---

---

---

---

- (c) Hillary was required to identify disadvantages of sequential file access method during a job interview. Outline **five** disadvantages that he could have mentioned. (5 marks)

---

---

---

---

---

---

---

---

---

- (d) With the aid of a diagram, describe a process control block PCB as applied in operating system. (5 marks)

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

6. (a) Explain each of the following terms as used in memory management:

- (i) address space; (2 marks)

---

---

---



(ii) user space.

---



---



---

(b) Distinguish between a *ready-state* and *blocked-state* of a process. (4 marks)

---



---



---



---

(c) Amos was required to implement remote file sharing system for a client. Explain **three** methods that he could consider for the client. (6 marks)

---



---



---



---



---



---



---

(d) Figure 3 shows a memory allocation technique. Use it to answer questions that follow.

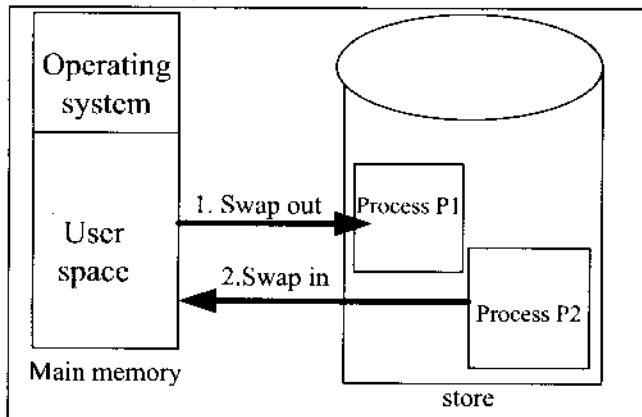



Figure 3

- (i) Identify the appropriate memory management techniques depicted in the  (2 marks)

---

---

---

- (ii) Explain **two** benefits that could be realized when using memory management technique identified in (i). (4 marks)

---

---

---

---

---

---

7. (a) (i) Outline **four** typical resources needed in a process execution. (4 marks)

---

---

---

---

---

---

---

---

- (ii) Differentiate between *data* and *system* buses as used in computers. (4 marks)

---

---

---

---

---

---

---

---

- (b) (i) Describe the term *disk cache* as applied in computers. (2 marks)

---

---

---

---

---

- (ii) Anna was required to investigate I/O protection measures that could be implemented in an operating system for her company. Explain **two** measures that could have identified. (4 marks)

---

---

---

---

---

---

---

---

- (c) A number of memory placement techniques exist in an operating system. Explain **three** of such techniques that could be adapted in a given operating system. (6 marks)

---

---

---

---

---

---

---

---

---

---

8. (a) (i) Define the term *monitor* as used in process management. (2 marks)

---

---

---

---

- (ii) Distinguish between *logical* and *physical* addresses as applied in memory management. (4 marks)

---

---

---

---

---

---

---

---

(b) Tom was required to develop a clock module for an operating system for a client. Outline **four** functions of this module to the proposed operating system. (4 marks)

---

---

---

---

---

---

(c) Nabat described several objectives for developing an I/O module to his friends. Outline **four** objectives that he could have mentioned. (4 marks)

---

---

---

---

---

---

(d) Nissi Company Ltd. was experiencing security issues with its file system. Explain **three** logical security measures that it could implement in order to mitigate the issue. (6 marks)

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

**THIS IS THE LAST PRINTED PAGE.**