



# **MURANG'A UNIVERSITY OF TECHNOLOGY**

## **SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGY**

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**UNIVERSITY ORDINARY EXAMINATION**

**2020/2021 ACADEMIC YEAR**

**FIRST YEAR SECOND SEMESTER AND FIRST YEAR FIRST SEMESTER  
EXAMINATION FOR DIPLOMA IN INFORMATION TECHNOLOGY**

**SIT 052– OPERATING SYSTEM**

**DURATION: 2 HOURS**

**Instructions to candidates:**

1. Answer question one and Any Other Two questions.
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

## SECTION A: ANSWER ALL QUESTIONS IN THIS SECTION

### QUESTION ONE (30 MARKS)

- a) Define the following terms in relation to operating system (4marks)
  - (i) Multiprogramming
  - (ii) Process management
  - (iii) Process and program
- b) Highlight any four main resources that an operating system manages in a computer (4marks)
- c) What is the difference between independent process and cooperative process?
- d) What is the context switching, and when does it happen? (2marks)
- e) Explain how operating system can perform supervisory services as one of its functions. (4marks)
- f) Deadlock occurs if Coffman condition hold true. Explain the Coffman condition (2marks)
- g) What is virtual memory and how is it important in a computer?  
(3marks)Type equation here.
- h) Kernel  $1/O$  sub system is responsible to provide many services related to  $I/O$ . Highlight any five of these services. (4marks)
- i) List the various types of files operations that can be done by operating system (4marks)

## SECTION B – ANSWER ANY TWO QUESTIONS IN THIS SECTION

### QUESTION TWO (20 MARKS)

- a) Discuss the evolution of operating system based on the main technological advancements (10marks)
- b) Explain the scheduler metrics used by operating system to schedule jobs in a computer. (4marks)
- c) Discuss any three main scheduling algorithms used by the operating system to schedule jobs. (6marks)

### QUESTION THREE (20 MARKS)

- a) List the main desirable features of operating systems. (5marks)
- b) Process coordination and synchronization are very important for sharing resources by process. Explain the problems that might require process synchronization (4marks)

c) Discuss the two main ways in which an operating systems can achieve inter process communication (IPC)

d) Four processes entered into a computer and executed sequentially in order in which they entered following a non- preemptive scheduling algorithm as shown in the table below;

Process	Arrival	Execution time	Service time
Po	0	5	0
P1	1	3	5
P2	2	8	8
P3	3	6	16

Calculate the average wait time for each process. (4marks)

e) What are the multiprogramming activities that an operating system can perform? (3marks)

#### QUESTION FOUR (20 MARKS)

a) Resource allocation is one of the main functions of an operating system. Explain the two techniques to achieve this. (4marks)

b) Using a diagram, illustrate the condition of a deadlock (6marks)

c) Explain the salient attributes of a process in relation to operating system (4marks)

d) A process undergoes through a number of stages during its execution. With an aid of diagram, discuss these states. (6marks)