LAIKIPIA UNIVERSITY

UNIVERSITY EXAMINATIONS

FIRST SEMESTER 2025/2026 ACADEMIC YEAR

THIRD YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE

COMP 315: PRINCIPLES OF OPERATING SYSTEMS

STREAM: R ***TIME: 2 HRS***

DAY: MONDAY [14.30 – 16.30 P.M] ***DATE: 02/02/2026***

THIS QUESTION PAPER CONSISTS OF THREE (3) PAGES

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INSTRUCTIONS TO CANDIDATES

SECTION A: (Compulsory) TOTAL MARKS FOR THIS SECTION IS 30.

QUESTION ONE (30 MARKS)

a) Explain the following terms as used in platform technologies:

i. Operating system **(2 Marks)**

ii. Scheduler **(2 Marks)**

iii. Interrupt **(2 Marks)**

iv. Dispatcher **(2 Marks)**

v. Algorithm **(2 Marks)**

b) Distinguish between user-level thread and kernel-level thread **(4 Marks)**

c) Highlight any **FOUR** services of an operating system **(4 Marks)**

d) Explain **TWO** circumstances under which a pre-emptive scheduling decision would be made by the operating system during the inter-process communication **(4 Marks)**

e) Differentiate between a process and a thread **(4 Marks)**

f) Outline any **TWO** advantages of file management **(2 Marks)**

g) State **TWO** objectives of memory management **(2 Marks)**

SECTION B. TOTAL MARKS FOR THIS SECTION IS 40.

ANSWER ANY TWO QUESTIONS FROM THIS SECTION. EACH QUESTION IN THIS SECTION CARRIES 20 MARKS.

QUESTION TWO (20 MARKS)

a) Explain the term process management **(2 Marks)**

b) Citing an example in each case, discuss the following process management scheduling algorithms

i. Fist Come, First Serve **(3 Marks)**

ii. Short Job First **(3 Marks)**

iii. Round Robin **(3 Marks)**

iv. Multilevel Queue **(3 Marks)**

c) Assuming you have been tasked to design a job scheduling algorithm for a proposed operating system. Explain **THREE** features that you would consider in your design **(6 Marks)**

QUESTION THREE (20 MARKS)

a) A typical operating system is bound to be upgraded over a number of reasons. Discuss any **FOUR** reasons that could influence the upgrade **(8 Marks)**

b) Explain **THREE** file allocation strategies **(6 Marks)**

c) Describe **THREE** memory allocation algorithms **(6 Marks)**

QUESTION FOUR (20 MARKS)

a) Explain the meaning of the terms below and point out their effect on performance of the computer from the users view:

i. Pre-emptive multitasking **(2 Marks)**

ii. Non-pre-emptive multitasking **(2 Marks)**

b) With the aid of a diagram describe Batch operating system. Also give one advantage and one disadvantage. **(4 Marks)**

c) Assume the following processes arrived in the order PI, P2, P3. With their respective burst/run time

Process time(m/sec)	**Burst**
P1	12
P2	7
P3	15

i. Draw Gantt charts to represent the three processes using FIFo and SJF **(2 Marks)**

ii. Calculate the waiting time for each process using using FIFO and SJF respectively **(2 Marks)**

iii. Calculate the avarange waiting time of the processes with FIFO and SJF respectively **(4 Marks)**

d) Discuss the difference between FIFO algorithm and SJF with respect to the calculation above **(4 Marks)**

QUESTION FIVE (20 MARKS)

a) Deadlock in resource allocation exists only if several conditions hold. Explain **THREE** conditions that are likely to trigger a deadlock **(6 Marks)**

b) Explain **THREE** file access methods **(6 Marks)**

c) Explain **FOUR** benefits of a good operating system **(8 Marks)**