(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
YEAR TWO SEMESTER TWO EXAMINATIONS

FOR THE DEGREE OF
BACHELOR OF SCIENCE COMPUTER SCIENCE

COURSE CODE : **CSC 224**

COURSE TITLE : **PRINCIPLES OF OPERATING SYSTEMS**

DATE: 27 /04/2023   TIME: 2:00 P.M – 4:00 P.M

INSTRUCTIONS TO CANDIDATES
ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE [COMPULSORY] [30 MARKS]

a. i. Illustrate four functions of the computer kernel [4 Marks]

ii. Explain four reasons for process suspension by the operating system [4 Marks]

b. i. Show your understanding of the two state process model. [3 Marks]

ii. Describe how a short term scheduler works [4 Marks]

c. i. Define what a context switch is [2 Marks]

ii. Interpret the importance of context switch in multitasking operations of a desktop computer used by a student. [3 Marks]

d. i. Differentiate between a thread and a process. [4 Marks]

ii. Show why threads are an important component of the operating system [3 Marks]

e. i. What is inter-process communication? [1 Mark]

ii. Describe two aspects that affect inter-process communication [2 Marks]

QUESTION TWO [20 MARKS]

a. Elaborate on six computing resources that the operating system is responsible for managing in a computer. [12 Marks]

b. With reference to a time sharing operating system, illustrate its capabilities and show how it works. [4 Marks]

c. As a computer user, outline four ways how you can identify a process that has been suspended by the operating system [4 Marks]

QUESTION THREE [20 MARKS]

a. i. Describe a computer kernel   [2 Marks]

ii. Identify five types of kernels and show how each works.   [5 Marks]

iii. Explain the intermediary role that an operating system plays in the working and use of a computer.   [3 Marks]

b. Nyambura sees a computer advert on an online store with the following description

   16GB DDR4

   1TB NVMe SSD

   Intel Core i7-10700k, base clock sped 3.8GHz

   Windows 10pro 64-bit

   64-bit OS, x64-based processor

   10th Generation Intel Core i7

   60.5 cm (21.5") diagonal, FHD (1920 x 1080), IPS, three-sided micro-edge, BrightView, 250 nits

   AMD Radeon™ Graphics

   Audio by B&O, dual 5 W speakers

   Miracast compatible

Describe each of the above listed specifications in details.   Also give the complete meaning of abbreviations used in the specifications   [10 Marks]

QUESTION FOUR [20 MARKS]

a. i. Describe the round robin scheduling algorithm and show how it works   [3 Marks]

ii. In the following example, there are six processes named as P1, P2, P3, P4, P5 and P6. Their arrival time and burst time are given below in the table.

Process ID	Arrival Time	Burst/service Time
1	0	5
2	1	6
3	2	3
4	3	1
5	4	5
6	6	4

Given the time quantum of the system is 4 units, draw the gantt chart for the above execution

[4 Marks]

iii. Calculate the average wait time in the above example.   [3 Marks]

b. Interpret six different information that a PCB consists of   [6 Marks]

c. Detail four ways an operating system recovers from a deadlock   [4 Marks]

QUESTION FIVE [20 MARKS]

a. Describe the challenges that are handled by the operating system memory manager

[5 Marks]

b. i. Compare and contrast fixed partition memory and monopragramming.   [8 Marks]

ii. Demonstrate the importance of compaction to proper management of memory by the operating system

[4 Marks]

c. Describe three ways in which one time passwords are implemented in an operating system for security purposes.

[3 Marks]