(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2020/2021 ACADEMIC YEAR

SPECIAL / SUP

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: 10/01/2022 **TIME:** 11:00 A.M – 01:00 P.M

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE [COMPULSORY] [30 MARKS]

a. Describe the importance of the operating system in a computer:

i. To the user [2 Marks]

ii. To the Computer system [2 Marks]

b. Interpret the following concepts and give examples how they practically work in a computing environment. [2 Marks each]

Caching Spooling Buffering

c. Identify four ways that are a likely indication of a suspended process. [4 Marks]

d. Assess the importance of scheduling to a multiprogramming system. [4 Marks]

e. Threads and processes are different entities. They however share some similarities. Enumerate four ways in which they resemble. [4 Marks]

f. Processes can at times be allowed not to proceed concurrently. Detail such an occurrence and give reasons why the operating system has to do that. [4 Marks]

g. i. Explain the concept of 'loading' in a computer. [2 Marks]

ii. Why does it take some computers little time and others more time to 'load'? [2 Marks]

QUESTION TWO [20 MARKS]

a. Justify why an Operating System needs to transfer a process from main memory to secondary storage. [4 Marks]

b. i. Examine the concept of 'holes' in memory management and explain how the 'holes' are dealt with. [4 Marks]

ii. Explain how a computer working with the best fit algorithm will differ from another computer using first fit [4 Marks]

c. Make a small model of the things or assets that as a systems administrator you will seek to protect in a computer system. [4 Marks]

d. Evaluate four different ways the OS uses to detect a security violation. [4 Marks]

QUESTION THREE [20 MARKS]

a. Real time processing is always on line whereas on line system need not be real time. Interview the above statement. Indicate areas where real-time solutions are used. [5 Marks]

b. Elaborate on why the execution of a process must progress in a sequential format.[4 Marks]

c. Assess the importance of a PCB in computing systems [3 Marks]

d. Summarize three types of scheduling queues in an operating system [3 Marks]

e. i. Demonstrate your understanding of a context switch. [1 Mark]

ii. Give two application areas of context switch that make it and indispensable facility in the operating system. [4 Marks]

QUESTION FOUR [20 MARKS]

Use the table below to answer questions that follow

Process	Arrival Time	Execute Time	Service Time
P0	0	5	0
P1	1	3	5
P2	2	8	8
P3	3	6	16

a. i. Using the SJF algorithm, show how the operating system will execute the tasks [4 Marks]

P1 P0 P3 P2

0 3 8 14 22

ii. Give the formula for calculating the average wait time. [2 Marks]

iii. Calculate the average wait time for the above execution. [4 Marks]

b. i. Summarize what a system call is. [2 Marks]

ii. Give a description on how kernel level threads work in an operating system [4 Marks]

c. i. What is a program threat? [1 Mark]

ii. Examine at least three program threats that can exist in an operating system. [3 Marks]

QUESTION FIVE [20 MARKS]

a. i. With examples, explain two broad categories of resources in computing. [4 Marks]

ii. Critically analyze four conditions that that must exist simultaneously for a deadlock to occur in a working computer. [8 Marks]

b. Justify your choice of variable partition memory over fixed partition memory in a computer that will be used to perform multiple tasks at a go in your place of work. [4 Marks]

c. Illustrate the importance of memory compaction in multiprogramming. [4 Marks]