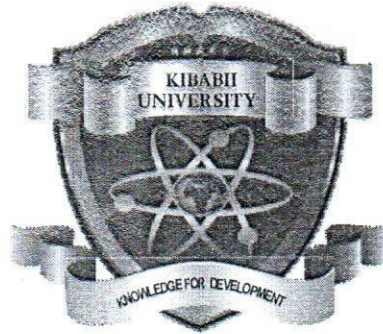


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(Knowledge for Development)

KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS
2021 / 2022 ACADEMIC YEAR**

**SPECIAL / SUPPLEMENTARY 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: 25 / 07 / 2022 TIME: 08:00 A.M – 10:00 A.M

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE [COMPULSORY] [30 MARKS]

- a Define the following terms:
- i. Context switching [1 Mark]
 - ii. Scheduling [1 Mark]
 - iii. Time Sharing [1 Mark]
 - iv. Deadlock [1 Mark]
 - v. Critical section [1 Mark]
- b By use of a well labeled diagram, describe the steps taken by a processor in executing an instruction. [5 Marks]
- c Discuss "Facilities", "Cost" and "Adaptability" as desired qualities of Operating Systems. [6 Marks]
- d Briefly describe the following scheduling algorithms:
- i. First-Come-First-Served (FCFS) [2 Marks]
 - ii. Shortest Remaining Time (SRT) [2 Marks]
 - iii. Priority [2 Marks]
- e Describe the four (4) conditions required for deadlock to occur. [8 Marks]

QUESTION TWO [20 MARKS]

- a List and briefly discuss the two (2) internal registers of the processor clearly stating their main function. [4 Mark]
- b Discuss the main goals of Operating Systems. [6 Marks]
- c Draw a Resource Allocation Graph for the Circular Wait as a condition necessary for a

deadlock to occur.

[6 Marks]

d State four (4) reasons that may cause a process to terminate.

[4 Marks]

QUESTION THREE [20 MARKS]

a. Briefly discuss the functions of an operating system.

[8 Marks]

b Briefly discuss any three (3) goals of scheduling.

[6 Marks]

c Shortest-Job-First provides the minimal average turnaround time for jobs. Show why this is true. What is a disadvantage of this batch scheduling algorithm?

[6 Marks]

QUESTION FOUR [20 MARKS]

a Using a well labeled diagram, describe the five-state process model including the suspend states.

[10 Marks]

b Differentiate between the following terms:

i. Semaphores and monitors

[2 Marks]

ii. Process and thread

[2 Marks]

iii. Ready, Suspend and Blocked, Suspend

[2 Marks]

iv. Preemptive and Non-preemptive scheduling

[2 Marks]

v. Deadlock and Starvation

[2 Marks]

QUESTION FIVE [20 MARKS]

- a. Briefly discuss the four (4) control structures namely Memory tables, I/O tables, Files tables and Process tables used by the operating system to manage processes. [8 Marks]
- b. Identify the circumstances that may force the processor to switch execution of one process to another. [5 Marks]
- c. Define the following terms:
- i. Kernel [1 Mark]
 - ii. Dispatcher [1 Mark]
 - iii. Program counter [1 Mark]
 - iv. Scheduler [1 Mark]
- d. Discuss the benefits of multiprogramming. [3 Marks]