



(Knowledge for Development)

KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR**

**END OF SEMESTER EXAMINATIONS
YEAR TWO SEMESTER TWO**

**FOR THE DEGREE OF
COMPUTER SCIENCE**

COURSE CODE : CSC 224

**COURSE TITLE : PRINCIPLES OF OPERATING
SYSTEMS**

DATE: 08/02/2021 TIME: 2:00 P.M – 4:00 P.M

INSTRUCTIONS:

ANSWER QUESTIONS ONE AND ANY OTHER TWO

QUESTION ONE [COMPULSORY] [30 MARKS]

- a. List and briefly describe any 5 of the typical services provided by an OS. [5 marks]
- b. For each of the following pairs of terms, define each term, making sure to clarify the key difference(s) between the two terms.
- i. Process and processor [2 marks]
 - ii. Pre-emptive and non-preemptive [2 marks]
- c. What are the primary differences between Network Operating System and Distributed Operating System? [4 marks]
- d. What inconveniences that a user can face while interacting with a computer system, which is without an operating system? [4 marks]
- e. Multi-programming (or multi-tasking) enables more than a single process to apparently execute simultaneously. Explain how this is this achieved on a uniprocessor? [4 marks]
- f. What is the distinction between buffering, caching and spooling? [6 marks]
- g. What is the function of the ready queue? [2 marks]

QUESTION TWO [20 MARKS]

Consider the following set of jobs to be scheduled for execution on a single CPU system.

JOB	Arrival Time	Size (msec)	Priority
J ₁	0	10	2
J ₂	2	8	1
J ₃	3	3	3
J ₄	10	4	2
J ₅	12	1	3
J ₆	15	4	1

- Draw a Gantt chart showing FCFS scheduling for these jobs. [4 marks]
- b. What is the relationship between threads and processes? [2 marks]
- c. Detail three advantages and three disadvantages of user-level threads. [6 marks]

d. Context switching between two threads of execution within the operating system is usually performed by a small assembly language function. In general terms, what does this small function do internally? [4 marks]

QUESTION THREE [20 MARKS]

- a. What is a race condition? Give two examples. [4 marks]
- b. What is deadlock? What is starvation? How do they differ from each other? [4 marks]
- c. i. What are the four conditions required for deadlock to occur? [4 marks]
- ii. Describe four general strategies for dealing with deadlocks. [4 marks]
- iii. Assuming the operating system detects the system is deadlocked, what can the operating system do to recover from deadlock? [4 marks]

QUESTION FOUR [20 MARKS]

- a. i. Describe the difference between external and internal fragmentation. [4 marks]
- ii. With reasons, indicate which of the two are most likely to be an issues on
- a) A simple memory management machine using base limit registers and static partitioning, and [2 marks]
- b) A similar machine using dynamic partitioning. [2 marks]
- b. i. List and describe the four memory allocation algorithms covered in lectures. [8 marks]
- ii. Which two of the four are more commonly used in practice? [2 marks]

QUESTION FIVE [20 MARKS]

- a. i. Describe how buffering in the I/O subsystem of an operating system works. [4 marks]
- ii. Give two reasons why it is required. [2 marks]
- iii. Give a case where it is an advantage, and a case where it is a disadvantage. [2 marks]

- ii. With the aid of a well labeled diagram describe the five state process model. [5 marks]
- iii. Describe round robin scheduling. [4 marks]
- iv. What is the parameter associated with the scheduler? [1 mark]
- v. What is the issue in choosing the parameter? [2 marks]