



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

**SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR
SCIENCE**

SCO 107 : OPERATING SYSTEM

DATE: FRIDAY 13TH APRIL 2012

TIME: 11.00 A.M. – 1.00 P.M.

INSTRUCTIONS

ANSWER QUESTION ONE (1) AND ANY OTHER TWO (2) QUESTIONS

QUESTION ONE

- (a) Write down the most appropriate answer by selecting the answer that best represents the statement:
- i) The function of long term scheduler is to:
- Move the process from secondary storage to ready queue
 - Move the process from ready queue to CPU
 - Move the process from memory to secondary storage
 - Move processes between different queues
- ii) From ready state, a process can only enter into:
- Running state
 - Terminated state
 - Swapped blocked
 - Zombie state
- iii) A program interrupt can be generated by a:
- A timer within the processor.
 - An I/O controller to signal normal completion of an operation.
 - A hardware failure
 - Reference outside a user's allowed memory space.

iv) The part of the operating system that manages the essential peripherals, such as the keyboard, screen, disk drives, and parallel and serial ports is called:

- Basic input output system
- Complementary metal oxide system
- Auxiliary input output system
- Memory input output system

v) When a computer is switched on, the operating system is loaded in:

- CMOS
- RAM
- ROM
- BIOS

(b) For each of the following statements below write T(true) or F(false)

(5 Marks)

No.	STATEMENT	T or F
1	A system can enter from user mode to kernel mode by use of an interrupt	
2	An interrupt is a condition indicative of an error	
3	Users may address I/O directly from user mode	
4	There can be more than one process in running state at any given time	
5	a process that has halted its execution but a record of its process is still maintained by the OS is said to be in a blocked state	

c) Differentiate between the following terms as used in operating system:

(4 Marks)

- i) CPU burst and I/O burst
- ii) Thrashing and convoy effect

(c) Differentiate between preemptive and nonpreemptive scheduling and state why strict nonpreemptive scheduling is an unfair scheduling method when used in a university computer center.

(6 Marks)

- (d) Outline four (4) benefits of using the operating system as a virtual machine. (4 Marks)
- (e) Why is it important for the scheduler to distinguish between I/O bound programs from CPU bound programs? (4 Marks)
- (f) Describe two (2) different types of criterion that may be used by operating system to schedule processes. (2 Marks)

QUESTION TWO

- (a) With the aid of a block diagram briefly describe the four (4) components of an operating system. (15 Marks)
- (b) Outline three (3) general tasks that must be performed by any of the components regardless of the size or configuration of the system. (3 Marks)
- (c) Four jobs A, B, C, D arrive in that order where the jobs have CPU burst of 8 ms, 4 ms, 9 ms, and 5 ms respectively. Using Round Robin algorithm of 4 ms, calculate the turnaround time for each job and the average turnaround time. (2 Marks)

QUESTION THREE

- (a) Explain what you understand by the term “Kernel”. (2 Marks)
- (b) Explain why the layered approach is important when designing operating systems. (4 Marks)
- (c) Illustrate the three (3) state process model, clearly indicating the states and state transitions involved. (3 Marks)
- (d) Define the term “deadlock” and explain whether it is possible to have a deadlock involving only ONE process. (3 Marks)

- (e) Consider the following set of processes that are assumed to have arrived at time 0 in the order P1, P2.....P5 with the length of CPU burst given in milliseconds

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	4
P4	1	5
P5	5	2

- i) Describe using a Gantt chart, how the processes would be scheduled using priority scheduling. Assume low numbers represent high priority. (4 Marks)
- ii) What is the average waiting time?. (2 Marks)
- iii) Suggest one major limitation of this algorithm and suggest how it can be avoided. (2 Marks)

QUESTION FOUR

The CPU is responsible in controlling minute details of the devices in I/O.

REQUIRED

- (a) Briefly describe three (3) techniques that are used in performing of I/O function. (6 Marks)
- (b) Briefly explain the six (6) evolutionary steps of the I/O function. (6 Marks)
- (c) Outline the information that is sent to the DMA module when the processor wishes to read or write a block of data. (4 Marks)
- (d) Outline four (4) functions that may be required by the operating system to be implemented for each device. (4 Marks)

QUESTION FIVE

- (a) Outline five (5) activities that are carried by the operating system in regard to file management. (5 Marks)
- (b) Outline five (5) types of information stored in a directory in relation to files. (5 Marks)
- (c) Outline six (6) controlled operations that determine the operations to be performed on files. (6 Marks)
- (d) Briefly explain how locking and blocking mechanisms are applied on files. (4 Marks)

