Machakos University College

(A Constituent College of Kenyatta University)

UNIVERSITY EXAMINATIONS 2013/2014

SCHOOL OF COMPUTING AND APPLIED SCIENCE

FIRST YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO 107: OPERATING SYSTEMS

DATE: 4/4/2014 **TIME:** 8.30 a.m. – 10.30 a.m.

Answer Question ONE and any other TWO Questions

Question One (30 Marks)

a) Give a broad definition of an operating system. (2 marks)

b) Explain the following types of systems: (8 marks)

i. Real Time
ii. Distributed
iii. Multi programmed
iv. Client-Server

c) Explain any t**hree** advantages of multiprocessor systems (6 marks)

d) Explain any **four** pieces of information associated with a specific process as contained in a PCB (8 marks)

e) Illustrate any **three** states that a process in the running states may proceed to. Cite appropriate reason for each. (6 marks)

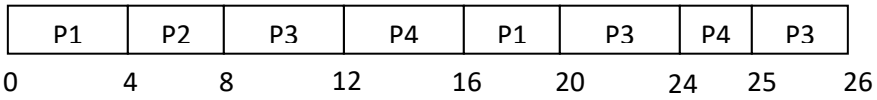
Question Two (20 Marks)

a) Explain any three reasons why a parent may terminate the execution of one of its children (6 marks)

b) Define deadlock (2 marks)

c) State **four** necessary condition for a deadlock to occur (8 marks)

d) Using the Gantt chart below for **Round Robin (RR)** Scheduling Algorithm of Quantum of **4** ms.



Calculate the average waiting time (4 marks)

Question Three (20 Marks)

a) Explain the main reasons why concurrent processes executing in the operating system may cooperate (8 marks)

b) Consider the following four processes, with the length of the CPU-burst time given in milliseconds:

Process	Arrival Time	Burst Time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

If the processes arrive at the ready queue at the times shown and need the indicated burst times, calculate the average waiting time for a preempted shortest job First (SJF) algorithm (6 marks)

c) Suppose that the following processes arrive for execution at the times indicated. Each process will run the listed amount of time. In answering the questions, use nonpreemptive scheduling and base all decisions on the information you have at the time the decision must be made.

Process	Arrival Time	Burst Time
PI	0.0	8
P2	0.4	4
P3	1.0	1

Calculate average turnaround time for these processes with the FCFS scheduling algorithm (6 marks)

Question Four (20 Marks)

a) Under the normal mode of operation, explain how a process may utilize a resource (6 marks)

b) Using a neat diagram, explain the process of Swapping two processes using a disk as a backing store (4 marks)

c) A set of holes, of various sizes, is scattered throughout memory at any given time, explain any three strategies that may be used to select a free hole from the set to satisfy a request of size *n*. (6 marks)

d) Elucidate any two main advantages of multiprocessor systems (4 marks)

Question Five (20 Marks)

a) Explain by the use of a neat diagram the process of paging (6 marks)

b) Describe any four activities the operating system is responsible for in connection with process management (8 marks)

c) Describe any three activities the operating system is responsible for in connection with memory management (6 marks)