# MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations 2014/2015

### SCHOOL OF ENGINEERING AND TECHNOLOGY

### DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

**First Year Second Semester Examination for Diploma in ICT**

**DIT 105: OPERATING SYSTEMS**

**Date: 10/12/2014**                                                **Time: 8:30 – 10:30 am**

*INSTRUCTIONS*
*Answer question one (compulsory) and any other two questions*

**Question one (30 MARKS)**
a) Explain the following terminologies as used with operating systems          (5marks)

    i. Process
    ii. Process state
    iii. Program counter
    iv. Dispatch latency
    v. starvation

b) Explain any THREE conditions in which CPU scheduling decisions may take place in a process          (3 marks)

b)Briefly explain any FOUR scheduling criteria in a process          (8marks)

c) Using First-Come, First-Served (FCFS) Scheduling algorithm, calculate the average waiting time for the processes          (4 marks)

| Process | Burst Time *(milliseconds)* |
|---------|------------------------------|
| $P_1$ | 24 |
| $P_2$ | 3 |
| $P_3$ | 3 |

Suppose that the processes arrive in the order: $P_1$ , $P_2$ , $P_3$

d)Using a well-labeled diagram, explain various process states          (10marks)

## Question Two  ( 20 marks)

**a)**Using the shortest job First(SJF) scheduling algorithm for non-preemptive, calculate the average waiting time for the processes.                                                                              (5 marks)

| Process | Arrival Time | Burst Time |
|---------|--------------|------------|
| $P_1$   | 0.0          | 7          |
| $P_2$   | 2.0          | 4          |
| $P_3$   | 4.0          | 1          |
| $P_4$   | 5.0          | 4          |

b) Explain any FIVE ways of optimizing  scheduling criteria in  processes                  (10 marks)

c) List any THREE program threats and TWO system Threats as used with Operating systems.

(5 marks)

## Question THREE  ( 20 marks)

a) using  Round Robin scheduling criteria with time quantum = 20, draw a Gantt chart and calculate the average waiting time for the processes                                              (8marks)

| Process | Burst Time | Waiting Time of each Process |
|---------|------------|------------------------------|
| $P_1$   | 53         |                              |
| $P_2$   | 17         |                              |
| $P_3$   | 63         |                              |
| $P_4$   | 26         |                              |

b) Explain any FOUR conditions that characterizes a deadlock                           ( 8 marks)

c) Explain any TWO ways operating system uses to authenticate users                ( 4 marks)

## Question FOUR  ( 20 marks).

a) Explain FOUR ways of effecting  deadlock prevention                                       ( 8 marks)

b) Explain the following terminologies as used with operating system memory management
   - i.  Segmentation
   - ii.  Paging
   - iii.  Fragmentation
   - iv.  Memory allocation
   - v.  Swapping                                                                                              ( 10 marks)

c) List TWO ways of implementing one time passwords in operating system security

(2 marks)

## Question FIVE  ( 20 marks).

a)i) Outline THREE ways of accessing Files in operating systems                          (3 marks)

ii)  State THREE   main ways operating system uses to   allocate disk space to files.        (3 marks)

b)  Explain any FOUR ways of Recovering from a deadlock condition                   (8 marks)

c)  Explain the following terminologies as used with operating systems                   (6 marks)

   - i.  Pooling
   - ii.  Direct memory access (DMA)
   - iii.  Program status register