MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND SEMESTER EXAMINATION FOR DEGREE IN BACHELOR OF SCIENCE IN INFORMATION SCIENCE

SIT 304: OPERATING SYSTEMS

Date: 8/8/2016 **Time: 8:30 – 10:30 AM**

INSTRUCTIONS

Answer Question One and Any Other Two Questions

QUESTION ONE (30 MARKS) (COMPULSORY)

(a) Discuss any two roles played by operating system while implementing the following functions associated with computer based systems.

(i) Programs and subroutines loading (2 marks)

(ii) Processor Management (2 marks)

(iii) Main Memory Management (2 marks)

(b) Critically discuss any three reasons that would cause an executing process to terminate i.e. relinquish the CPU. (6 marks)

(c) Explain how priority scheduling algorithm deals with the problem of indefinite blocking process with lower priority. (2 marks)

(d) Suppose we have 4 processes that arrived in the order P3, P1, P4 and P2 and their burst times is as provided.

Process	Burst Time
P1	5
P2	8
P3	4
P4	1

Considering the First Come First Served (FCFS) scheduling algorithm,

(i) Draw the Ghant chart or the schedule (3 marks)

(ii) Calculate the waiting time for each process (1 mark)

(iii) Calculate the waiting time for the four processes (2 marks)

(e) While preventing deadlock from happening, explain how the hold and wait condition can be eliminated. (2 marks)

(f) With reference to variable partition, discuss any two techniques which can be employed by Operating System to handle external Fragmentation. (4 marks)

(g) Explain two ways through which one-time password can be implemented by systems. (4 marks)

QUESTION TWO (20 MARKS)

(a) With the help of a diagram, explain the various process states. (8 marks)

(b) Operating system employs a number of strategies to determine where to place incoming process. Critically discuss any two memory placement strategies that can be employed to achieve this. (4 marks)

(c) Priority scheduling algorithm is both pre-emptive and non-preemptive. Explain how this is achieved. (4 marks)

(d) Explain any two queues associated with system processes. (4marks)

QUESTION THREE (20 MARKS)

(a) Suppose we have 4 processes with the following heir burst times.

Process	Burst Time
P1	8
P2	9
P3	5
P4	2

Considering the round robin scheduling algorithm with a Quantum time of 3,

(i) Draw the Ghant chart for the schedule (3 marks)

(ii) Critically discuss any three conditions that must exist for a deadlock to hold (8 marks)

(b) Differentiate between contiguous and non-contiguous memory allocation. (4 marks)

(c) Explain any two limitations associated with Shortest Job First(SJF). (4 marks)

QUESTION FOUR (20 MARKS)

(a) Critically discuss any three types of operating systems that have been in existence since the emergence of the first generation computers. (6 marks)

(b) Suppose we have 5 jobs in the ready queue and their required CPU cycles are as follows:

Jobs	Arrival Time	CPU Cycles
A	0.0	5
B	1.1	2
C	1.3	4
D	1.5	2
E	2.0	4

Considering the Shortest Job First(SJF) scheduling algorithm,

(i) Draw the Ghant chart for the schedule. (4 marks)

(ii) Calculate the average turn around for the five Jobs. (2 marks)

(c) Critically discuss the two major categories of scheduling algorithms giving an example for each. (4 marks)

(d) List any TWO program threats and TWO system Threats as used with Operating systems. (4 marks)

QUESTION FIVE (20 MARKS)

(a) Critically discuss any three page replacement techniques used by operating system to determine which page needs to be allocated. (6 marks)

(b) Each process which is executing in a system is represented by operating system using the Process Control Block(PCB). Discuss three major contents found in the PCB and their role. (6 marks)

(c) Critically discuss how the Round Robin (RR) scheduling algorithm works. (8 marks)