MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO 107: OPERATING SYSTEMS

DATE: 22/1/2021 **TIME: 8.30-10.30 AM**

INSTRUCTIONS

Answer Question ONE 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)

c) Briefly explain any FOUR scheduling criteria in a process (6marks)

d) Using First-Come, First-Served (FCFS) Scheduling algorithm, calculate average waiting time for the processes (3 marks)

Process	Burst Time *(milliseconds)*
P1	24
P2	3
P3	3

Suppose that the processes arrive in the order: *P1* , *P2* , *P3*

e) Using a well-labeled diagram, explain various process states (5 marks)

f) State TWO advantages and TWO disadvantages of demand paging as used in operating system virtual memory. (4 marks)

g) Explain services provided by Kernel I/O subsystems in relation to operating system I/O software (4 marks)

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
P1	0.0	7
P2	2.0	4
P3	4.0	1
P4	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 (8 marks)

Process	Burst Time	Waiting Time of each Process
P1	53	
P2	17	
P3	63	
P4	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) Explain THREE main ways operating system uses to allocate disk space to files. (6 marks)

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

c) Explain the following terminologies as used with operating systems (3 marks)

i. Pooling

ii. Direct memory access(DMA)

iii. Program status register