



JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
UNIVERSITY EXAMINATION 2021/2022
YEAR ONE SEMESTER TWO
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY
ICS2202 COMPUTER OPERATING SYSTEMS

Date: DEC 2021

Duration: 2 hours

Instructions: Do question one and any other two questions

Question 1

- a) Discuss four components of a computer system (4 marks)
- b) Define the term kernel (1 mark)
- c) List and briefly discuss at-least five operating system services (5 marks)
- d) Briefly discuss the 5 states of a process (5 marks)
- e) With the aid of diagrams discuss at least three multi-threading models (6 marks)
- f) Discuss at-least three solutions to the critical section problem (6 marks)
- g) List three types of CPU scheduling algorithms (3 marks)

Question 2

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

- a) Use the table above:
- i. To draw a Gantt chart for preemptive SJF scheduling (5 marks)
 - ii. Calculate the average waiting time in the queue (3 marks)
- b) With the aid of a diagram explain base and limit registers (4 marks)
- c) Define the following terms

W1-2-60-1-6

- i. Internal fragmentation (2 marks)
- ii. External fragmentation (2 marks)
- iii. Preemptive scheduling (2 marks)
- d) Explain the need for re-locatable code (2 marks)

Question 3

- a) Using FIFO Page and frame replacement algorithm. Calculate the number of page faults that will be generated for the sequence below assuming 3 pages can be in memory at a time per process

7,0,1,2,0,3,0,4,2,3,0,3,0,3,2,1,2,0,1,7,0,1 (5 marks)

- b) Define the following terms (6 marks)

- i. Thrashing
- ii. Demand paging
- iii. Demand segmentation

- c) List any three busses that a device can attach to computer for I/O (3 marks)

- d) With the aid of a diagram calculate the number of cylinders for FCFS disk scheduling algorithm assuming a request queue (0-199) with head pointer at 53 for the following requests 98, 183, 37, 122, 14, 124, 65, 67 (6 marks)

Question 4

- a) Discuss any five file attributes (10 marks)

- b) Broadly I/O devices can be grouped by the OS into four groups. List them (4 marks)

- c) Define (6 marks)

- i. Breach of confidentiality
- ii. Breach of integrity
- iii. Breach of availability
- iv. Theft of service
- v. Denial of service (DOS)
- vi. ACL