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KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2022/2023 ACADEMIC YEAR
FOR THE CERTIFICATE IN INFORMATION TECHNOLOGY
CIT 1004 – OPERATING SYSTEMS

Date: 3RD AUGUST 2022
Time: 8:30 – 10:30AM

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

- a) Explain briefly what operating system software is. (2 Marks)
- b) Briefly explain what process synchronization is. (2 Marks)
- c) Briefly explain what a deadlock is in process management. (2 Marks)
- d) Discuss two major functions of an Operating system. (4 Marks)
- e) Differentiate between the following types of operating systems. (4 Marks)
 - i) Multi-user vs Single-user
 - ii) Multi-tasking vs Single-tasking
- f) In process scheduling, explain what is a context switch? (4 Marks)
- g) While giving an example in each case, explain the difference between contiguous memory allocation and non-contiguous memory allocation schemes. (4 Marks)
- h) Explain what is external fragmentation? Suggest a possible solution to this issue both in contiguous memory allocation and non-contiguous memory allocation. (4 Marks)
- i) What is swapping as used in memory management? Explain the role of swapping in operating system memory management. (4 Marks)

QUESTION TWO (20 MARKS)

- a) Discuss the critical section problem in process management. (6 Marks)
- b) Discuss the three requirements that a solution to a critical section problem must satisfy. (6 Marks)
- c) Discuss the four conditions necessary for a deadlock to occur. (8 Marks)

QUESTION THREE (20 MARKS)

- a) State two reasons for processor scheduling by the operating system. (2 Marks)
- b) The table below shows jobs submitted for execution in a computer system with Time-sharing Capability

Job	CPU burst	Arrival time
P1	12	0
P2	6	3
P3	3	6
P4	8	7

The Arrival Time and CPU burst are in arbitrary units. Using the table

- a) Construct Gantt chart for the following scheduling algorithms.
 - i) First Come First Served (4 Marks)
 - ii) Shortest Job First (4 Marks)
 - iii) Round Robin (with a time slice of 4 milliseconds) (4 Marks)
- b) Compute the average waiting time for each algorithm in (a) above. (6 Marks)

QUESTION FOUR (20 MARKS)

- a) With the aid of a diagram, explain the various process states that exist during execution of a program. (6 Marks)
- b) Discuss the two major types of user interfaces provided by the operating systems. (6 Marks)
- c) Discuss four considerations made in CPU scheduling criteria. (8 Marks)

QUESTION FIVE (20 MARKS)

- a) Explain what is a process in operating system concepts? (2 Marks)
- b) Using an illustration, discuss two memory allocation schemes for dynamic memory allocation problem. (4 Marks)
- c) Discuss three major activities of an operating system in regard to memory management? (6 Marks)
- d) Discuss four situations that may trigger CPU scheduling decisions to take place. (8 Marks)