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KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2023/2024 ACADEMIC YEAR
FIRST YEAR, FIRST SEMESTER EXAMINATION
FOR THE DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY
DIT 1004 – OPERATING SYSTEMS

Date: 6TH December 2023
Time: 2:30PM – 4:30PM

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

- a) Define the following terms:
- i) An operating system (2 Marks)
 - ii) Deadlock (2 Marks)
 - iii) Thread (2 Marks)
 - iv) Job Queue (2 Marks)
 - v) File management (2 Marks)
- b) Outline at least three goals of an operating system. (3 Marks)
- c) Explain briefly at least three functions of an operating system (6 Marks)
- d) Highlight four functions of the system file management (4 Marks)
- e) Draw a Gantt chart and calculate the average wait time for the question below using FIFO scheduling (7 Marks)

| Process | Arrival time | Burst time |
|---------|--------------|------------|
| P1 | 3 ms | 5 ms |
| P2 | 0 ms | 4 ms |
| P3 | 4 ms | 2 ms |
| P4 | 5 ms | 4 ms |

QUESTION TWO (20 MARKS)

- a) Distinguish between a process and a thread (4 Marks)
- b) Differentiate between real time and time sharing operating systems. (4 Marks)
- c) (i) Explain using a suitable diagram, Deadlocks in operating systems (3 Marks)
(ii) Explain CPU burst time in operating systems and show its relevance in operating system (3 Marks)
- d) Describe any three conditions necessary for a deadlock to occur. (6 Marks)

QUESTION THREE (20 MARKS)

- a) Outline three importance of memory management. (3 Marks)
- b) Define the following under memory management techniques
 - i) Paging (2 Marks)
 - ii) Swapping (2 Marks)
 - iii) Segmentation (2 Marks)
- c) Describe Process Control Block and outline each function of each stage (7 Marks)
- d) Differentiate between External fragmentation and Internal fragmentation. (4 Marks)

QUESTION FOUR (20 MARKS)

- a) Define file management and its importance in operating system. (2 Marks)
- b) Briefly describe the following categories files in file management and give examples:
 - i) Ordinary files (1 Mark)
 - ii) directory files (2 Marks)
 - iii) Special files (2 Marks)
- c) List the disadvantages of sequential files in a file management system. (3 Marks)
- d) Segmentation is a memory management technique that can be categorized into two types. (4 Marks)
- e) Explain three ways in which files can be accessed. (6 Marks)

QUESTION FIVE (20 MARKS)

- a) Using knowledge learnt, show your understanding of these concepts:
 - i) Paging (2 Marks)
 - ii) Page fault. (2 Marks)
- b) During process execution a parent process may terminate the execution of the one of its child processes, explain the circumstances under which the parent can take such an action (6 Marks)
- c) Discuss three reasons for use of multithreading systems (6 Marks)
- d) Explain four importance of memory management. (4 Marks)