CBCS SCHEME

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18EI643

# Sixth Semester B.E. Degree Examination, July/August 2022
# Operating Systems

Time: 3 hrs. Max. Marks: 100

***Note: Answer any FIVE full questions, choosing ONE full question from each module.***





## Module-1

1 a. Categorize the various types of operating system structures. **(10 Marks)**

b. Elaborate the various computing environments available. **(10 Marks)**

**OR**

2 a. Categorize the different types of system calls in an operating system. **(10 Marks)**

b. Elaborate the various services offered by an operating system. **(10 Marks)**

## Module-2

3 a. Highlight on the various threading issues in an operating system. **(10 Marks)**

b. Define threads. Discuss the various threading models in a multithreading system. **(10 Marks)**

**OR**

4 a. Explain the various states of a process with the help of a diagram. **(06 Marks)**

b. Explain the following CPU scheduling algorithm with an example.

i) Shortest job first

ii) Priority scheduling. **(08 Marks)**

c. Elaborate on the scheduling criteria required for analyzing the various cpu scheduling algorithms. **(06 Marks)**

## Module-3

5 a. Discuss the requirements to solve the critical section problem in an operating system. **(05 Marks)**

b. Define the critical section problem in an operating system. **(05 Marks)**

c. What is a semaphore? Discuss the different types of semaphores used in an operating system. **(10 Marks)**

**OR**

6 a. How can deadlock be avoided if multiple instances are present in each resource? **(10 Marks)**

b. Elaborate on how the system can be recovered from a deadlock situation. **(06 Marks)**

c. Summarize the necessary conditions for a deadlock to occur in a system. **(04 Marks)**

## Module-4

7 a. Explain internal and external fragmentation with respect to main memory. What are the solutions to the problem of external fragmentation? **(08 Marks)**

b. Define the virtual memory and discuss how virtual memory is implemented in an operating system. **(06 Marks)**

c. How is page fault handled in an operating system? **(06 Marks)**

**OR**

**8** a. Elaborate the following page replacement algorithms with an example:
i) Fifo page replacement
ii) Least Recently Used (LRU) algorithm. **(10 Marks)**

b. Differentiate between dynamic loading and dynamic linking in an OS. **(04 Marks)**

c. Define the following terms with respect to memory management:
i) Compile time
ii) Load time
iii) Execution time. **(06 Marks)**

## Module-5

**9** a. Discuss how the directory structures are organized in an operating system. **(10 Marks)**

b. Explain the following with respect to file system structure in an operating system:
i) File attributes ii) File operations. **(10 Marks)**

**OR**

**10** a. Elaborate the following disk scheduling algorithms used in case of memory management in an operating system with an example:
i) Shortest seek time first
ii) C-Look algorithm
iii) Scan algorithm. **(10 Marks)**

b. Discuss the major disk allocation methods available in an operating system. **(10 Marks)**

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