National Institute of Technology, Silchar

(UG) End Semester Examination, December 2021

Subject Code: CS 303 Subject: Operating System

Semester: 5th Department: Computer Science and Engineering

Duration: 1 hour 15 minutes Total Marks: 30

Answer five questions.

Q1 to Q4 are compulsory. Choose any one from Q5 and Q6

Q No.	Question	Marks	CO
1	The kernel of a multiprogramming system classifies a program as CPU-bound or I/O bound and assigns an appropriate priority to it. What would be the effect of a misclassification of programs in relation to the throughput and response times? What would be the effect for the throughput vs. the degree of multiprogramming.	6	CO1
2	An OS using a preemptive scheduling policy uses dynamically changing priorities. The rate at which the priority changes is dependent on its state as follows: α : Rate of change of priority when a process is running β : Rate of change of priority when a process is ready. γ : Rate of change of priority when a process is performing I/O Process priority is initialized to 0 on creation. Higher the numerical value higher is the priority. Comment on the resulting scheduling policies if (a) $\alpha > 0, \beta = 0, \gamma = 0$ (b) $\alpha = 0, \beta > 0, \gamma = 0$	6	CO2
3	A file is frequently accessed by users in a system. The following alternatives are proposed to simplify access to data: (a) Set up links from every user's home directory to data. (b) Copy data into every user's home directory. Compare advantages and drawbacks of these approaches.	6	CO2 CO3
4	A system containing 4 processes uses a multiple resource Banker's algorithm for allocation. The system has been operating for some time. (a) A new process arrives in the system. It is initially not allocated any resources. Is the new resource allocation state of the system safe? (b) A process is aborted by the OS as it tries to access a file for which it lacks appropriate privileges. Is the new resource allocation state of the system safe?	6	CO3 CO4
5	What is the cause of thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem?	6	CO3 CO4
6	Is it possible for a process to have two working sets, one representing data and another representing code? Explain.	6	CO3 CO4

Course Outcomes (CO):

1. Describe and explain the fundamental components of a computer operating system.
2. Define, discuss and explain the policies for scheduling, deadlocks, memory management, synchronization, system calls, and file systems.
3. Describe and extrapolate the interactions among the various components of computing systems.
4. Design and construct the following OS components: System calls, Schedulers etc.