Exam. Code: 0922
Sub. Code: 33529

2055
B.E. (Information Technology)
Fourth Semester
PCIT-403: Operating System

Time allowed: 3 Hours Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part.*

x-x-x

Q1: Explain the following in brief **(2*5=10 marks)**

(a) Multitasking is a logical extension of multiprogramming.
(b) Thrashing
(c) Necessary conditions for deadlock
(d) RAID levels in disk management
(e) Remote services in distributed operating systems

Part A

Q2. (a) Following table illustrates the arrival time and CPU burst time of 4 processes. System implements round robin algorithm with quantum time of 3 time units. Calculate the average turnaround time, average waiting time and average response time of the scheduling algorithm. (5)

Process	Arrival Time	Burst Time
P1	0	10
P2	3.001	6
P3	4.001	10
P4	7.001	7

(b) Following table illustrates the arrival time, CPU burst time of 3 processes. System implements dynamic priority scheduling algorithm with aging. A process's priority while waiting in ready queue for 2 consecutive time units is increased by 1 and priority of a process will decrease by 1 if it executes consecutively for 2 time units on CPU. Calculate the average turnaround time, average waiting time and average response time of the scheduling algorithm. (5)

Process	Arrival Time	Burst Time	Priority
P1	0	4	3
P2	3	4	2
P3	4	4	4

Note: Lower the number, higher the priority

Contd.....P/2

Q3 (a) Consider a machine with 64 GB of main memory and 32 bits virtual address space, with page size of 4 KB. Calculate the size of page table (assuming all the entries in the page table are filled). Memory in the system is one byte addressable. (5)

(b) Process Control Block (PCB) is a data structure that contains information of the process related to it. List the pieces of information associated with a specific process that are stored in PCB. (5)

Q4 (a) A system uses 3 page frames for storing process pages in main memory. Assume that all the page frames are initially empty. What is the total number of page faults that will occur while processing the page reference string given below in case of following page replacement algorithms? (5)

(i) FIFO
(ii) Optimal

4 , 7, 6, 1, 7, 6, 1, 2, 7, 2, 4, 6, 7, 2

(b) How inverted page tables are different from conventional page tables? Explain your answer with the help of appropriate diagram(s). (5)

Part B

Q5 Consider a disk with 200 cylinders (0-199) and the queue has random requests from different processes in the order: 55, 58, 39, 18, 90, 160, 150, 38, 184. Initially head is at 100. Find the average seek length (total head movements) using following disk scheduling algorithms **(10 marks)**

(a) FCFS
(b) SSTF

Q6. (a)What is the purpose of the shell in UNIX architecture, and how does it interact with the kernel to execute user commands? (5)

(b) Describe the concept of process management in UNIX. How does the operating system handle process creation, scheduling, and termination? (5)

Q7 Write short notes on the following in context of distributed file systems: **(10 marks)**

(a) Stateful vs Stateless service
(b) File replication

x-x-x