C3-R3: OPERATING SYSTEMS

NOTE:

> 1. **Answer question 1 and any FOUR from questions 2 to 7.**
> 2. **Parts of the same question should be answered together and in the same sequence.**

Time: 3 Hours   **Total Marks: 100**

1.

a)   What is the difference between Process & Thread?

b)   What is striping? What are its advantages & disadvantages?

c)   What is a virtual machine? Explain.

d)   What do you understand by pipes in Unix? What is the difference between pipes & queues?

e)   What do you understand by a Distributed File System?

f)   Write short note on a typical memory hierarchy.

g)   Explain the process of user authentication.

                                                                                         (7x4)

2.

a)   What is the difference between internal and external fragmentation in main memory? How can the problem of internal and external fragmentation be overcome?

b)   What is thrashing. A computer has 16 pages of virtual address space but only 4 page frames. Initially the memory is empty. A program references the virtual pages in the order: 0, 7, 2, 7, 5, 8, 9, 2, 4

   i)   which references cause a page fault with LRU

   ii)   which references cause a page fault with FIFO

                                                                                         (8+10)

3.

a)   Discuss linked and indexed allocation methods for free space on hard disk. List their advantages and disadvantages.

b)   Disk requests came in to the disk driver for cylinders 10, 22, 25, 4, 38, 8, 3, 71 in that order. A seek takes 5 MSec. per cylinder moved. How much seek time is needed for

   i)   FCFS algorithm

   ii)   Shortest-seek-time-first algorithm

   iii)   Elevator algorithm

   Assume that the arm is initially at cylinder 15.

                                                                                         (9+9)

4.

a)   What is the difference between traps and interrupts? Give an example of each.

b)   Differentiate between short term, medium term and long term scheduling. What is the role of dispatcher in scheduling?

c)   What do you understand by the term Direct Memory Access? How it works? What is Cycle Stealing in DMA? What are its advantages & disadvantages?

                                                                                         (4+5+9)

5.

a) Assuming three states of a process (Running, Ready, Blocked), draw and explain the state transition diagram.

b) What is a critical section? What are the four conditions that a solution for critical section must satisfy?

c) What is a semaphore? What are the two operations that can be done on a semaphore?

(6+8+4)

6.

a) How can authentication be done by Symmetric keys. Why symmetric keys are used for providing authentication in wireless mobile communication.

b) When is a set of processes said to be deadlocked? What are the four conditions that must hold for deadlock to occur?

c) With 3 resources and 3 processes, draw a resource allocation graph showing a deadlock.

(9+6+3)

7.

a) Given the following data about the process load on a system.

Process	Running time	Priority
A	10	3
B	6	5
C	2	2
D	4	1
E	8	4

Draw the Gantt Charts and compute average turn around timings of each process using following algorithms

i) Round Robin Scheduling

ii) Non preemptive Priority Scheduling

b) With the help of a diagram, explain the file system of Unix operating system.

(12+6)