B3.4-R4: OPERATING SYSTEM

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)   Explain the terms: shell, kernel, thread and process.

b)   Describe memory and system protection requirements in multiprogramming and time sharing systems.

c)   Explain the security and protection provisions implemented in UNIX or Windows Operating system.

d)   What are the reasons for providing process cooperation? Justify the answer.

e)   Differentiate between network operating system and distributed operating system.

f)   Discuss the role of virtual machines in detail.

g)   What is thrashing? Explain with the help of an example.

(7x4)

2.

a)   Describe file structure, file attribute and file operations in detail.

b)   Differentiate between FAT and NTFS file system in detail.

(9+9)

3.   How does deadlock avoidance differ from deadlock prevention? Write about avoidance algorithm in detail.

(18)

4.   Why should page replacement be performed? Compare FIFO, optimal and LRU page replacement algorithms, with an example of your choice?

(18)

5.   Consider the following set of processes assigned with CPU burst time in milliseconds (ms). Assume that the processes: P1…P5 have arrived in the same order at time t=0.

Process	Burst time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

Illustrate the execution of the process using:

a)   FCFS

b)   SJF

c)   Non- Pre emptive priority.

(3x6)

6. Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was cylinder 125. The queue of pending requests in FIFO order is

86, 1470, 913, 1774, 960, 1525, 1050, 1800, 140

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests, for each of the following disk scheduling algorithm,

a) FCFS
b) SSTF
c) SCAN
d) C-LOOK

(4+5+4+5)

7.
a) Explain Process control block and its uses in Operating system.
b) Differentiate between symmetric and asymmetric multiprocessing systems.
c) Define semaphore and solve any synchronization problem using semaphore.

(6+6+6)