B3.4-R4: 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 are the four main functions of a memory manager?
b) Distinguish between zombie and orphan process.
c) What are the main differences between capability lists and access lists?
d) Briefly discuss namespaces in Distributed File Systems.
e) What is FAT in a file system?
f) What are the four layers that Windows NT has in order to achieve independence?
g) How does distinction between monitor mode and user mode function as a simple form of protection (security) system?

(7x4)

2.

a) 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 at cylinder 125. The queue of pending requests, in FIFO order, is

86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130

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 algorithms?

(1) FCFS (2) SSTF (3) C-SCAN

b) A system has four processes P1 through P4 and two resource types R1 and R2. It has 2 units of R1 and 3 units of R2. Given that:

P1 requests 2 units of R2 and 1 unit of R1, P2 holds 2 units of R1 and 1 unit of R2, P3 holds 1 unit of R2, P4 requests 1 unit of R1

Show the resource allocation graph for this state of the system. Is the system in deadlock, and if so, which processes are involved?

c) What is a process?

(9+6+3)

3.

a) What is a semaphore? Give solution of producer-consumer problem with bounded buffer using semaphore.
b) What are computer worms and viruses? What are the safeguards used against worms and viruses?
c) What happens if there is no free frame and a process demands a page from memory?

(9+6+3)

4.

a) Explain critical section problem with the help of an example.
b) How does kernel interact with processes and devices?
c) What are links and symbolic links in UNIX file system?
d) What is the difference between system call and system program?

(7+5+4+2)

5.

a) What is a file system? What are the tasks performed by a file system?
b) What are the resources managed by an operating system?
c) Discuss advantages and disadvantages of caching name translations for computers located in remote domains.

(6+6+6)

6.

a) What are the responsibilities of scheduler? Explain one preemptive and one non-preemptive scheduling algorithm.
b) What the help of two neat diagram, compare linked and index methods for free space management on a hard disk.
c) Explain about protection domain in UNIX.

(9+6+3)

7.

a) Explain the following terms:
   i) Lightweight Process
   ii) User Credentials
   iii) Zombie State
   iv) Pipes
b) Describe the booting process for a Windows XP system.
c) What is the Tertiary-Storage device? Explain about WORM disks and Tapes in detail.

(8+5+5)