Subject: Operating System

Attempt all questions. [10\*4=40]

1. What is the role of file systems in an operating system? Describe different file allocation methods and their respective advantages and disadvantages [3+7]
2. Explain the importance of disk scheduling in an operating system. Given the following disk request sequence for a disk with 500 cylinders (0-499): 95, 180, 34, 119, 11, 123, 62, 64, and the disk head starts at cylinder 50. Calculate the total seek time using the SSTF, SCAN, and LOOK algorithms. [3+7]
3. What is semaphore? Compare semaphore with monitors. Explain producer consumer problem and provide solution using semaphore with appropriate code snippet. [2+2+6]
4. What is thrashing and how does it occurs? Given the page reference string: 1, 3, 0, 3, 5, 6, 3, 1, 0, 5, 6, 2, 4, 1, 2, and 4 page frames, calculate the number of page faults using FIFO, LRU, LFU and Optimal algorithms. Compare the results.