

(3 Hours)

Total Marks: 80

- N.B. 1) Question **no.1** is compulsory  
2) Solve any **Three** questions from remaining five.  
3) Assume suitable data wherever required.

Q 1) a) What are the types of services provided by operating systems for the convenience of the programmer and also for the efficient operating of the system? (10)

b) Illustrate the principles of process scheduling, with necessary diagrams. (10)

Q 2) a) What is meant by critical section problem? What are the conditions to be satisfied by a solution to the problem? (10)

b) Illustrate the use of semaphores to deal with n-process critical section problem. (10)

Q 3) a) What are the necessary conditions for deadlocks? What are the methods for handling deadlocks? (10)

b) Illustrate the paging scheme of memory management, with an example. (10)

Q 4) a) Explain the file system layout. Discuss the issues in implementing file storage. (10)

b) Suppose  $w = 23\ 43\ 243\ 24\ 56\ 75\ 67\ 45\ 67\ 21$  is a page reference stream. Assuming a page frame allocation of 3, how many page faults occur in optimal, FIFO, LRU. (10)

Q 5) a) What are the methods for selecting a disk scheduling algorithm? Explain the disk scheduling algorithms? (10)

b) Explain about preemptive and non preemptive strategies. (10)

Q 6) a) Explain the various protection and security mechanisms need to be implemented by Operating System. (10)

b) Classify and explain about the functions provided by an Operating System. (10)