

**M.Sc. II Semester Degree Examination, Sept./Oct. - 2024****COMPUTER SCIENCE****Operating System****(NEP)**

Time : 3 Hours

Maximum Marks : 70

Note : Answer **any five** of the following questions with Question No. 1 compulsory, each question carries **equal** marks

1. (a) Discuss the role of system calls in an operating system. Provide examples of different types of system calls. **7**
- (b) Explain the structure of an operating system using a layered approach. What are the advantages and disadvantages of this structure ? **7**
2. (a) Consider the following set of processes with their respective arrival times and burst times : **7**

Process	Burst Time
P1	4
P2	3
P3	1
P4	2
P5	5

Calculate the average waiting time using the following scheduling algorithms :

- First-Come, First-Served (FCFS)
 - Round Robin (RR) with a time quantum of 2
- (b) Define process scheduling and explain the different types of scheduling queues used in operating systems. Why are scheduling queues important ? **7**
 3. (a) Explain the concept of the critical section problem. Describe Peterson's solution for the critical section problem. **7**
 - (b) Explain the semaphore concept and its role in process synchronization. **7**



4. (a) Define paging and its role in memory management. Describe the concept of inverted paging. **7**
- (b) Consider five memory partitions of size 100 KB, 500 KB, 200 KB, 450 KB and 600 KB in same order. If sequence of requests for blocks of size 212 KB, 417 KB, 112 KB, and 426 KB are in same order come, then which of the following algorithm makes the efficient use of memory ? **7**
- A. Best fit algorithm
- B. First fit algorithm
- C. Worst fit algorithm
5. (a) Explain the concept of virtual memory and its benefits in modern operating system. **7**
- (b) Consider the page references 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 3 with 4 page frame. Find number of page fault using FIFO algorithm. **7**
6. (a) Describe the process creation and termination mechanisms in an operating system. What system calls are involved in these operations ? **7**
- (b) Explain resource allocation graph in detail with an example of showing deadlock. **7**
7. (a) Describe the process of standard swapping with a neat sketch. **7**
- (b) Provide a brief history of the Linux operating system and discuss its approach to process management, scheduling, and memory management. **7**
8. Write short notes on the following : **5+5+4**
- (a) Preemptive and non-preemptive scheduling
- (b) Process state diagram
- (c) Deadlock

