



(3 hours)

NOTE: Question No 1 is compulsory. Attempt any three questions from remaining.
Assume suitable data if necessary.
Draw neat labelled diagrams wherever needed.

- Q.1. a) Explain the two main categories of services and functions of operating system. Compare and contrast them. 10M
b) What is context-switch? Describe the actions taken by a kernel to context-switch between processes. 10M

- Q.2. a) Explain the differences in how much the following scheduling algorithms discriminate in favor of short processes: 10M
a. FCFS
b. RR
c. Multilevel feedback queues
b) Describe the differences among short-term, medium-term, and long-term scheduling. 10M

- Q.3. a) Explain the timestamp based protocols to ensure serializability with the help of example. 10M
b) Consider the following set of processes, with the length of the CPU burst given in milli seconds. The processes are assumed to have arrived in order P₁, P₂, P₃, P₄, P₅ all at time 0. 10M

Process	Burst Time	Priority
P ₁	10	3
P ₂	1	1
P ₃	2	3
P ₄	1	4
P ₅	5	2

Calculate the average turnaround time and maximum waiting time for pre-emptive priority scheduling algorithm.

- Q.4. a) Compare and contrast paging and segmentation. 10M
b) What is address translation? Consider a logical address space of 32 pages with 1,024 words per page, mapped onto a physical memory of 16 frames. 10M
a. How many bits are required in the logical address?
b. How many bits are required in the physical address?

- Q.5. a) Describe how the Swap () instruction can be used to provide mutual exclusion that satisfies the bounded-waiting requirement. 10M
b) What is deadlock? What are the essential conditions for deadlock to occur? 10M

- Q.6. Write Short Notes on: (Any four) 20M
a) Linked Allocation.
b) Memory segmentation
c) Deadlock detection.
d) Translation Lookaside Buffer
e) Open() and Close () operations.
f) Page replacement algorithms
