

- N. B.: (1) **All** questions are **compulsory**.
 (2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
 (3) Answers to the **same question** must be **written together**.
 (4) Numbers to the **right** indicate **marks**.
 (5) Draw **neat labeled diagrams** wherever **necessary**.
 (6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt any three of the following:

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- List various operating systems. Explain any two.
- Define Operating System. How operating system can be used as a resource manager.
- What do you mean by system call? Write the system calls for directory management.
- Write a short note on process termination.
- What is race condition? How to avoid race condition?
- Explain the shortest job first scheduling algorithm with suitable example.

2. Attempt any three of the following:

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- What is the purpose of base and limit registers?
- How memory is managed with linked list?
- List various page replacement algorithms. Explain any one with example.
- List and explain different types of files.
- List and explain various operations on files.
- Write the meaning of following file attributes.
 1. Owner 2. Creation time 3. Current size 4. Key position 5. Protection

3. Attempt any three of the following:

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- Explain the concept of direct memory access.
- Write a short note on device driver.
- Explain various levels of RAID.
- Define deadlock. Write the conditions for resource deadlock.
- How deadlock is prevented?
- Explain the working of banker's algorithm for a single resource.

4. Attempt any three of the following:

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- Write a short note on memory virtualization.
- Write the requirement for virtualization.
- Write the essential characteristics of cloud.
- Explain the crossbar switch structure used for UMA multiprocessors.
- List various multiprocessor operating types. Explain any one.
- List and explain various interconnection technologies for multicomputer.

5. Attempt any three of the following:

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- Explain the booting process of Linux.
- Discuss the process-management system calls in Linux.
- Explain the concept of shell in Linux.
- Explain the fundamental concept of memory in Windows.
- Write a short note on catching in Windows.
- How scheduling is carried out in Windows.