

[Time: 2½ Hours]

[Marks: 75]

Please check whether you have got the right question paper.

- 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: 15
 - a. Define Operating System. Explain the role of OS as extended machine.
 - b. Write a short note on fifth generation Operating System.
 - c. Explain the micro kernel approach of Operating System design.
 - d. List and explain any five system calls used in process management.
 - e. Explain process states and possible transitions among these states using diagram.
 - f. List the three categories and goals of scheduling algorithms.

2. Attempt **any three** of the following: 15
 - a. Explain the concept of running multiple programs without memory abstraction.
 - b. Write a note on swapping.
 - c. Explain page table and Structure of a Page Table Entry using suitable diagram.
 - d. Write a short note on Single-Level & Hierarchical Directory Systems.
 - e. Define file. Explain any four operations associated with file.
 - f. Explain disk quotas.

3. Attempt **any three** of the following: 15
 - a. Write a note on device controller.
 - b. Explain RAID in details with its different levels (any four).
 - c. Write a short note on Touch Screen.
 - d. What are Preemptable and Non-preemptable Resources? Explain.
 - e. Define Deadlock. List the four conditions that must hold for there to be a deadlock.
 - f. Explain recovery from deadlock through preemption and rollback.

4. Attempt **any three** of the following: 15
 - a. Explain type- 1 and type -2 hypervisor using suitable diagram.
 - b. Write a note on clouds.
 - c. What are the requirements of virtualization?
 - d. Write a note on I/O virtualization.
 - e. Explain using suitable diagram multicomputer hardware interconnection technology.
 - f. Write any five comparisons between multiprocessor and distributed system.

5. Attempt **any three** of the following:
- a. Explain using suitable diagram the kernel structure of Linux operating system.
 - b. Explain the booting of Linux operating system.
 - c. List and explain the design goals of android operating system.
 - d. List Win 32 calls for managing processes and threads.
 - e. Explain using suitable diagram NTFS master file table and its attribute.
 - f. Briefly explain windows power management.
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