

(2½ Hours)

[Total Marks: 75]

- 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. What is Operating System? Explain the role of operating system as extended machine.  
 b. Write a short note on Fifth Generation of Operating System.  
 c. Explain multithreaded and multi-core chips.  
 d. Using suitable diagram explain the structure of disk drive.  
 e. Write a short note on Process Model.  
 f. Explain the dining philosopher's problem.
2. **Attempt any three of the following:** 15  
 a. Explain the concept of running multiple programs without memory abstraction.  
 b. How swapping helps to hold large programs in RAM? Explain Using suitable diagram.  
 c. Explain Clock page replacement algorithm using suitable example.  
 d. List and explain any five operations performed on Files.  
 e. Explain the Unix V 7 File system.  
 f. List and explain any five operations performed on Directories.
3. **Attempt any three of the following:** 15  
 a. What are block devices and character devices? Explain.  
 b. Write a short note on Memory Mapped IO.  
 c. Explain Direct Memory Access using suitable diagram.  
 d. Explain preemptable and non-preemptable resources.  
 e. List Coffman's four conditions that must hold for a resource to be in deadlock.  
 f. Explain the process of Deadlock Detection with One Resource of Each Type.
4. **Attempt any three of the following:** 15  
 A Write a note on Type-1 and Type-2 Hypervisor.  
 B Explain any five advantages of virtualization.  
 C List and explain five essential characteristics of Cloud.  
 D Write a note on Virtual Machine Migration.  
 E What is Master-Slave Multiprocessors Operating System?  
 F List the different Multicomputer Interconnection Technologies. Explain any two.
5. **Attempt any three of the following:** 15  
 a. Explain the kernel structure of Linux.  
 b. List and explain any five file-system related system calls in Linux.  
 c. Using suitable diagram explain the architecture of Android Operating System.  
 d. Explain the programming layers in modern windows operating System.  
 e. Explain the booting process of windows OS.  
 f. Write a note on windows power management.

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