

**NOTE:**

1. Answer question 1 and any FOUR from questions 2 to 7.
2. Parts of the same question should be answered together and in the same sequence.

**Time: 3 Hours**

**Total Marks: 100**

**1.**

- a) What is process control block? Write down its main components.
- b) What is an access control list? How is it used for securing data from the malicious users?
- c) Write two basic differences between program and process. Give one example for each.
- d) Why is multithreaded programming more efficient than multi-processing?
- e) What is distributed operating system and how is it different from network operating system?
- f) How is short term scheduler different from medium term scheduler? How is system performance depend upon the working of STS.
- g) Why is translation look aside buffer important in paging technique?

**(7x4)**

**2.**

- a) Why is operating system known as a 'Resource Manager'? Briefly explain service provided to each resource by the OS.
- b) What are system threats? How does an operating system monitor and manages threat to provide secure computer system environment.

**([3+6]+9)**

**3.**

- a) What is deadlock? What are the conditions for a deadlock to occur? How can it be avoided?
- b) Consider the following table of 4 processes and determine whether the current allocation is in safe state for deadlock avoidance.

Process	Max Need	Current usage
P1	7	3
P2	4	1
P3	6	2
P4	6	1

**(9+9)**

**4.**

- a) Draw process state transition diagram. When a process can transit from start (1) "start" to "end" (2) Running to wait.
- b) What would be the effect of the system running too many I/O Jobs .
- c) Differentiate between Internal and external memory Fragmentation.

**(6+6+6)**

**5.**

- a) What is a critical-section problem? How is a race condition avoided in the critical section? Explain giving one suitable example.
- b) Differentiate between:
  - i) Multiprogramming and Multiprocessing
  - ii) NTFS and FAT32
  - iii) KERNEL mode and User mode

**[(3+3+3)+(3x3)]**

**6.**

- a) What is demand paging memory management technique? How is it different from demand segmentation? Explain giving one example for each technique.
- b) Briefly explain LRV page replacement technique. Give one scenario in which LRU is better than optimal page replacement technique.

**[(3+3+3)+(5+4)]**

**7.** Write short note on the following topics: -

- a) Program threats and Security Threats
- b) Tertiary Storage devices
- c) Virtual Machines and Hypervisor

**(6x3)**