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**326409**

**May 2026**

**B.Sc. (MATHS & COMPUTING) IV SEMESTER**

**Design of UNIX Operating System (BCA-23-204)**

Time : 3 Hours]

[Maximum Marks : 75

*Instructions :*

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any **four** questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

**PART-A**

1. (a) What is an inode? (1.5)
- (b) Define shell. (1.5)
- (c) What is the need of context switching in Unix? (1.5)
- (d) Write commands to display the list of last 10 files present in the current directory. (1.5)
- (e) What is a superblock? (1.5)
- (f) What does a sticky bit for a directory signify? (1.5)
- (g) Differentiate between swapping & paging in UNIX. (1.5)

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(h) What is a daemon? (1.5)

(i) List 3 communication based commands in UNIX. (1.5)

(j) What is a kernel in UNIX. (1.5)

**PART-B**

2. (a) Define Operating system. Explain, in detail, block diagram of Unix System Kernel. (10)

(b) How is directory different from a file? Explain any 4 directory related commands. (5)

3. (a) What is the need of Double and Triple Indirection in an Inode Block of a file? Explain. (5)

(b) Differentiate between UNIX & LINUX. Explain data structures of file subsystem in UNIX. (10)

4. (a) Write a shell script to print all prime numbers between 1-300. (5)

(b) Explain various process scheduling supported by UNIX. (10)

5. (a) Define File in UNIX. Explain various types of files and the structure of a regular file in Unix. (10)

(b) Explain in detail layout of system Memory. (5)

6. (a) What is the difference between a program and a process in UNIX? Explain various states of a process with the help of State Transition Diagram. (10)

(b) Define System administration. Explain the role of a system Manager. (5)

7. (a) Write short notes on (any 3) : (5×3=15)

(i) Fair Share Scheduler.

(ii) Page Stealer Process.

(iii) I/O Redirection.

(iv) Demand Paging.