

Syllabus for System Admin Position

Considering the System Admin Position and its Roles and Responsibility

- To manage the resources (system, network, database, users, etc.) and security of an IT infrastructure.
- To use the UNIX/Linux utilities and scripting languages effectively.
- To design and manage policies governing IT infrastructure.
- To be able to handle network related hardware devices such as switches, routers, cyberoam, etc.

Part A - General Aptitude

- Written English Communication
- Basic mathematical and logical ability
- General comprehension

Part B - Technical

Basics: Roles and responsibility of the system administrator, Friction between UNIX and Linux, Linux distributions and examples, System-specific administration tools, Man pages and other authoritative documentations. Familiarity with Linux servers and Windows servers.

Scripting and the Shell: Shell basics -Command editing, Pipes and redirection, Variables and quoting, Common filter commands, bash scripting, Regular expressions, Python scripting, Scripting best practices.

Bootstrapping the system: Booting PCs, GRUB: The GRand Unified Boot loader, Booting to single-user mode, Working with startup scripts, init and its run levels, systemd, Rebooting and shutting down.

Access Control and Users: Traditional UNIX access control, Modern access control -Role-based access control, SELinux: security-enhanced Linux, PAM: Pluggable Authentication Modules, Kerberos -third-party cryptographic authentication, Access control lists, Real-world access control -su and sudo, Pseudo-users other than root, The /etc/passwd file, The /etc/shadow file, The /etc/group file, Adding and removing users, Managing users with system-specific tools.

Controlling Processes: Components of a process, The life cycle of a process, Signals, kill, Process states, nice and renice: influence scheduling priority, ps -monitor processes, Dynamic monitoring with top, prstat, and topas, The /proc filesystem, strace: trace system calls, Runaway processes.

Periodic Processes: cron -schedule commands, The format of crontab files, Crontab management, Linux and Vixie-cron extensions, Common uses for cron.

The Filesystem: Pathnames, Filesystem mounting and unmounting, Filetypes, File attributes -The permission bits, The setuid and setgid bits, The sticky bit.

Syslog and log files: Syslog: the system event logger, Syslog architecture, Configuring syslogd, Syslog debugging, Alternatives to syslog, Linux kernel and boot-time logging, logrotate -manage log files, Condensing log files to useful information, Logging policies.

Backups and restore: Introduction and requirements for backups, Backup devices and media, Incremental backups, dump and restore, archiving programs –tar and dd, Commercial backup products.

Networking and Routing: TCP/IP and its relationship to the Internet, Networking road map, Packet addressing, IP addresses, Routing, ARP, DHCP, Basic network configuration, Linux networking.

Miscellaneous : Software installations on Cloud, Amazon EWS, Website maintenance and development, Maintenance of Educational ERP, Email servers, Manage licensed softwares, Deploy and Manage Local Area Network, Cyberoam configuration, Internet service providers, Basic knowledge of maintaining High Performance Computing facility,

Part C - Skills/ Practical Aspects:

OS Installations, VM Installation, Configurations, Printing, etc.

Effectively use shell scripts e.g., Bash, Perl, Python, to monitor and manage IT infrastructure.

Bootstrapping and shutdown, and the related scripts involved during the processes.

Able to configure & debug the startup scripts.

Access control and user management.

Effectively manage (e.g., monitor, start, stop, schedule, etc.) the processes.

Mount/unmounts/ configure/ access-control/ etc. the filesystem.

Network configuration and management.

To generate/configure/debug Syslog and logfiles.

To generate/configure/debug backups and restore