**Part 1: Jenkins Fundamentals (1–25)**

**1. What is Jenkins?**  
Jenkins is an open-source automation server used for continuous integration and continuous delivery (CI/CD).

**2. Why use Jenkins?**  
It automates builds, testing, and deployments, improving development efficiency.

**3. Who created Jenkins?**  
Kohsuke Kawaguchi, originally called Hudson.

**4. What language is Jenkins written in?**  
Java.

**5. What is Continuous Integration (CI)?**  
A process of integrating code changes frequently to detect issues early.

**6. What is Continuous Delivery (CD)?**  
Automatically delivering code to a staging or production environment after testing.

**7. What is the difference between CI and CD?**

* **CI:** Merging code frequently and testing it.
* **CD:** Deploying tested code automatically.

**8. What is a Jenkins job?**  
A task that Jenkins executes, such as building code or running tests.

**9. What are the types of Jenkins jobs?**  
Freestyle, Pipeline, Multibranch Pipeline, and Maven jobs.

**10. What is a Jenkins pipeline?**  
A scripted or declarative process that defines the steps for CI/CD.

**11. What is the difference between scripted and declarative pipelines?**

* **Scripted:** Groovy-based, more flexible.
* **Declarative:** Simpler syntax with predefined structure.

**12. What is a Jenkinsfile?**  
A text file containing pipeline code, stored in version control.

**13. What is the default port for Jenkins?**  
8080.

**14. What operating systems support Jenkins?**  
Windows, macOS, and Linux.

**15. What is a Jenkins plugin?**  
An extension that adds new features or integrations.

**16. How to install plugins in Jenkins?**  
Manage Jenkins → Manage Plugins → Available tab → Install.

**17. What is a Jenkins node?**  
A machine that runs Jenkins jobs (Master or Agent).

**18. What is a Jenkins master?**  
The main server that controls job scheduling and configuration.

**19. What is a Jenkins agent?**  
A worker machine that executes jobs assigned by the master.

**20. How to run Jenkins as a service?**  
Install Jenkins and configure it as a system service.

**21. What is the Jenkins workspace?**  
A directory where job files and builds are stored.

**22. What is a Jenkins build trigger?**  
A way to start jobs automatically (SCM polling, webhook, schedule).

**23. What is SCM polling?**  
Jenkins checks version control for changes at regular intervals.

**24. What is a webhook in Jenkins?**  
An automated trigger from a Git repository when code changes are pushed.

**25. How do you start and stop Jenkins?**

* **Linux:** sudo systemctl start jenkins / stop jenkins
* **Windows:** Use Services panel.

**Part 2: Jenkins Configuration & Usage (26–50)**

**26. How to secure Jenkins?**  
Enable authentication, set permissions, and use HTTPS.

**27. What is Jenkins authentication?**  
Verifying users before allowing access.

**28. What is Jenkins authorization?**  
Granting users specific access levels.

**29. What is Matrix-based security in Jenkins?**  
A fine-grained permission control system.

**30. How to back up Jenkins?**  
Backup the $JENKINS\_HOME directory.

**31. How to restore Jenkins from backup?**  
Copy the backed-up $JENKINS\_HOME into the Jenkins installation directory.

**32. How to configure email notifications in Jenkins?**  
Install Email Extension plugin, set SMTP settings, and configure job post-build actions.

**33. How to integrate Jenkins with Git?**  
Install Git plugin, set repository URL, and configure credentials.

**34. How to integrate Jenkins with Maven?**  
Install Maven plugin and configure Maven in global tool settings.

**35. How to integrate Jenkins with Docker?**  
Install Docker plugin, configure Docker host, and use pipeline steps for Docker.

**36. What is the difference between freestyle and pipeline jobs?**

* **Freestyle:** Simple UI-based configuration.
* **Pipeline:** Code-based, more flexible.

**37. How to schedule jobs in Jenkins?**  
Use cron syntax in the job’s "Build periodically" option.

**38. What is cron syntax in Jenkins?**  
A format like H/15 \* \* \* \* to run every 15 minutes.

**39. How to integrate Jenkins with Slack?**  
Install Slack plugin and configure webhook URL in job notifications.

**40. What is Jenkins Blue Ocean?**  
A modern UI for creating and visualizing pipelines.

**41. How to archive artifacts in Jenkins?**  
Use "Archive the artifacts" post-build action.

**42. How to parameterize Jenkins jobs?**  
Enable "This build is parameterized" and define input parameters.

**43. What are upstream and downstream jobs in Jenkins?**

* **Upstream:** Triggered before another job.
* **Downstream:** Triggered after another job.

**44. How to trigger downstream jobs?**  
Use "Build other projects" in post-build actions.

**45. How to run Jenkins in Docker?**  
docker run -p 8080:8080 jenkins/jenkins:lts

**46. What is a shared library in Jenkins?**  
Reusable pipeline code stored in version control.

**47. How to configure global environment variables in Jenkins?**  
Manage Jenkins → Configure System → Global properties.

**48. How to store credentials in Jenkins?**  
Manage Jenkins → Credentials → Add credentials.

**49. How to access credentials in Jenkins pipelines?**  
Use credentialsId in pipeline scripts.

**50. How to configure parallel builds in Jenkins?**  
Enable concurrent builds in job settings or use pipeline parallel step.

**Part 3: Jenkins Pipelines & Advanced Features (51–75)**

**51. What is a Jenkins declarative pipeline example?**

groovy

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pipeline {

agent any

stages {

stage('Build') {

steps {

echo 'Building...'

}

}

}

}

**52. What is a Jenkins scripted pipeline example?**

groovy

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node {

stage('Build') {

echo 'Building...'

}

}

**53. What is the difference between pipeline stages and steps?**

* **Stage:** Logical phase (Build, Test, Deploy).
* **Step:** A single action within a stage.

**54. How to retry failed steps in Jenkins pipeline?**  
Use retry(n) { ... } in pipeline script.

**55. How to set timeouts in Jenkins pipelines?**  
Use timeout(time: 10, unit: 'MINUTES') { ... }.

**56. How to run a job only on specific branches?**  
Use when { branch 'main' } in a pipeline stage.

**57. How to pass parameters to pipelines?**  
Define parameters { string(name: 'BRANCH', defaultValue: 'main') }.

**58. How to use environment variables in pipelines?**  
environment { VAR\_NAME = "value" } in pipeline.

**59. How to trigger pipelines from other pipelines?**  
Use build job: 'OtherPipeline'.

**60. How to use Jenkins with Kubernetes?**  
Install Kubernetes plugin and configure Jenkins agents as pods.

**61. What is Jenkins master-agent architecture?**  
The master controls job scheduling; agents execute jobs.

**62. How to monitor Jenkins performance?**  
Use the Monitoring plugin or external tools like Prometheus.

**63. How to clean workspace before builds?**  
Enable "Delete workspace before build starts".

**64. How to avoid hardcoding credentials in pipelines?**  
Store in Jenkins credentials store and reference via withCredentials().

**65. How to use secret text credentials in pipeline?**

groovy

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withCredentials([string(credentialsId: 'secret-id', variable: 'SECRET')]) {

sh "echo $SECRET"

}

**66. How to run stages in parallel in Jenkins pipeline?**  
Use the parallel directive inside stages.

**67. How to use shared libraries in pipelines?**

groovy

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@Library('my-shared-library') \_

**68. How to archive build logs in Jenkins?**  
Configure log rotation and archive artifacts.

**69. How to trigger jobs remotely in Jenkins?**  
Enable remote build triggers with a token.

**70. How to implement conditional stages in Jenkins pipeline?**  
Use when conditions.

**71. How to send email notifications in pipelines?**  
Use emailext step with Email Extension plugin.

**72. How to use post actions in pipeline?**  
post { always { ... } success { ... } failure { ... } }.

**73. How to abort a Jenkins build from pipeline?**  
Use error("Stopping build").

**74. How to use input step in pipelines?**

groovy

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input message: 'Approve deployment?'

**75. How to run shell commands in pipelines?**  
Use sh 'command' in Linux or bat 'command' in Windows.

**Part 4: Jenkins Administration & Troubleshooting (76–100)**

**76. How to upgrade Jenkins?**  
Download latest WAR or use OS package manager.

**77. How to check Jenkins logs?**  
View in $JENKINS\_HOME/logs or system service logs.

**78. How to find installed Jenkins version?**  
Check in Manage Jenkins → System Information.

**79. How to restart Jenkins safely?**  
<Jenkins\_URL>/safeRestart.

**80. How to reload Jenkins configuration without restart?**  
<Jenkins\_URL>/reload.

**81. How to disable a job in Jenkins?**  
Click “Disable project” in job settings.

**82. How to clone a job in Jenkins?**  
Use the “Copy existing item” option.

**83. How to delete a job in Jenkins?**  
Open job settings → Delete Project.

**84. How to view build history in Jenkins?**  
Check the job’s Build History panel.

**85. How to analyze build failures?**  
Review console output and logs.

**86. How to prevent concurrent builds in Jenkins?**  
Disable “Execute concurrent builds if necessary” in job settings.

**87. How to configure build retention?**  
Set "Discard old builds" with max builds or days.

**88. How to configure backup automation for Jenkins?**  
Use Backup plugin or cron jobs to back up $JENKINS\_HOME.

**89. How to manage large numbers of jobs?**  
Organize with Jenkins Folders plugin.

**90. How to install Jenkins on Linux?**  
Download WAR file or use apt/yum packages.

**91. How to install Jenkins on Windows?**  
Use MSI installer and run as a service.

**92. How to migrate Jenkins to another server?**  
Copy $JENKINS\_HOME and restore on the new server.

**93. How to troubleshoot plugin issues?**  
Disable suspected plugins and check logs.

**94. How to fix Jenkins “OutOfMemoryError”?**  
Increase JVM heap size in Jenkins startup parameters.

**95. How to secure Jenkins against brute-force attacks?**  
Enable login attempt limits and use strong passwords.

**96. How to enable CSRF protection in Jenkins?**  
Enable “Prevent Cross Site Request Forgery exploits” in settings.

**97. How to check Jenkins environment variables?**  
Access via pipeline step env or System Information page.

**98. How to run Jenkins behind a proxy?**  
Configure proxy settings in Manage Jenkins → Plugin Manager → Advanced.

**99. How to enable audit logging in Jenkins?**  
Use Audit Trail plugin.

**100. Best practices for Jenkins administration**

* Keep Jenkins updated.
* Limit admin access.
* Backup regularly.
* Monitor performance.
* Use folders for job organization.