

DEVOPS
(CSEN 4122)

Time Allotted : 2½ hrs

Full Marks : 60

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 4 (four) from Group B to E, taking one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A

1. Answer any twelve:

12 × 1 = 12

Choose the correct alternative for the following

- (i) Which tool is commonly used for Continuous Integration and Continuous Deployment (CI/CD)?
(a) Jenkins (b) Docker
(c) Git (d) Ansible
- (ii) How can you view the commit history in Git?
(a) git logs (b) git history
(c) git commits (d) git log
- (iii) In Git, which command is used to upload local repository content to a remote repository (e.g., GitHub)?
(a) git fetch (b) git pull
(c) git push (d) git clone
- (iv) What is a Jenkinsfile?
(a) A file that defines the build process in Jenkins
(b) A file that contains the code for a Jenkins plugin
(c) A file that contains the Jenkins configuration
(d) A file that contains the results of a Jenkins build
- (v) In Jenkins, which file is typically used to define a pipeline as code?
(a) pipeline.yml (b) Jenkinsfile
(c) build.gradle (d) config.xml
- (vi) Which command is used to remove a Docker image?
(a) docker rmi (b) docker remove
(c) docker del (d) docker erase
- (vii) Which of the following is the default registry used by Docker?
(a) Kubernetes Hub (b) Container Store
(c) Docker Hub (d) Image Hub

- (viii) By default which Docker Network driver is assigned to containers if no network is specified?
 - (a) host
 - (b) bridge
 - (c) overlay
 - (d) hub
- (ix) Which module is commonly used to install packages in Ansible?
 - (a) `apt`
 - (b) `yum`
 - (c) `install`
 - (d) `pkg`
- (x) What is the purpose of the Ansible `debug` module?
 - (a) To display debugging information during playbook execution
 - (b) To pause playbook execution for manual intervention
 - (c) To print variable values for troubleshooting
 - (d) To enable verbose mode for tasks

Fill in the blanks with the correct word

- (xi) _____ command connects a local repository to a remote server.
- (xii) A machine that is configured to execute builds for a Jenkins Master is called _____.
- (xiii) _____ command allows you to see all Docker images available on your local machine.
- (xiv) Infrastructure provisioning is the main objective of the tool _____.
- (xv) _____ is a YAML file containing one (or more) plays.

Group - B

- 2. (a) Explain the waterfall model and its challenges. [[CSEN4122.1](Understand/LOCQ)]
 - (b) What are the main stages of the DevOps life cycle? Explain. [[CSEN4122.2](Understand/LOCQ)]
 - (c) Name one tool for each stage of the DevOps life cycle. [[CSEN4122.2](Remember/IOCQ)]
- 4 + 4 + 4 = 12**
- 3. (a) Write down the steps to connect your local git repository with the remote git repository. [[CSEN4122.2](Apply/IOCQ)]
 - (b) State the differences between git fetch and git pull. [[CSEN4122.2](Analyse/IOCQ)]
 - (c) What are the steps that should be followed to avoid merge conflicts? [[CSEN4122.2](Apply/IOCQ)]
- 5 + 3 + 4 = 12**

Group - C

- 4. (a) Present Jenkins architecture used for CI/CD environment (Continuous Integration/Continuous Deployment). [[CSEN4122.3](Apply/IOCQ)]
 - (b) Write down the steps to check the log file after starting the BUILD for a Jenkins job. [[CSEN4122.2](Remember/LOCQ)]
- 7 + 5 = 12**
- 5. (a) What is the Jenkins tool section used for? [[CSEN4122.2, .3](Understand/LOCQ)]

- (b) A Jenkins job will require a specific version of JDK and any available version of Maven. Explain the steps/modifications to be done in the tools section so that JDK and Maven are available to the project. *[[CSEN4122.3](Understand/IOCQ)]*
- (c) Write the steps to create a Jenkins freestyle job that creates a new text file and writes one line in it. Where can I find the file for download? *[[CSEN4122.3](Understand/IOCQ)]*
- 2 + 5 + 5 = 12**

Group - D

6. (a) What is docker swarm? *[[CSEN4122.2](Remember/LOCQ)]*
- (b) Mention the key features of docker swarm. *[[CSEN4122.2, .5](Remember/LOCQ)]*
- (c) What is a swarm node? *[[CSEN4122.2](Remember/LOCQ)]*
- 4 + 4 + 4 = 12**
7. (a) Describe the architecture of a Kubernetes cluster. Include the roles of the master and worker nodes in your explanation. *[[CSEN4122.1, .2](Remember/IOCQ)]*
- (b) Differentiate between Pods, ReplicaSets, and Deployments. How do they work together to ensure high availability and scalability? *[[CSEN4122.2, .5](Remember/IOCQ)]*
- (c) Explain the concept of Persistent Volumes (PVs) and Persistent Volume Claims (PVCs). How do they help in managing storage in Kubernetes? *[[CSEN4122.2, .5](Understand/HOCQ)]*
- 4 + 4 + 4 = 12**

Group - E

8. (a) What is Ansible playbook? What language are playbooks written in? *[[CSEN4122.5, .6](Understand/LOCQ)]*
- (b) What is the function of a play in a playbook? *[[CSEN4122.5, .6](Understand/LOCQ)]*
- (c) Explain the different YAML tags. *[[CSEN4122.2, .6](Remember/IOCQ)]*
- (3 + 2) + 3 + 4 = 12**
9. (a) What is an Ansible Inventory? Differentiate between static and dynamic inventory with examples. *[[CSEN4122.6](Understand/LOCQ)]*
- (b) Explain the steps to set up a Master-Slave architecture in Ansible. *[[CSEN4122.6](Remember/LOCQ)]*
- (c) Write a sample Ansible Ad-hoc command to install a package on a remote machine and explain its components. *[[CSEN4122.6](Apply/IOCQ)]*
- 4 + 4 + 4 = 12**

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	44.8	51	4.2

