Name: **Enrolment No:**	

UPES

End Semester Examination, Dec 2024

Course: Container Orche. &Infra.Auto **Semester: VII**

Program: BTech CSE All spec.(For CCVT minor) **Time : 03 hrs.**

Course Code: CSVT4013P **Max. Marks: 100**

Instructions:Attempts all questions.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	What kind of API is being used by Docker for client-server communication?	**4**	**CO1**
Q 2	Compare Docker Swarm and docker compose.	**4**	**CO1**
Q 3	Differentiate between Staging and production enviornment	**4**	**CO2**
Q 4	Define functionality of Container as a service	**4**	**CO2**
Q 5	Describe MiniKube in short.	**4**	**CO4**

SECTION B
(4Qx10M= 40 Marks)

Q 6	Create a Dockerfile to containerize a Node.js web application, including all dependencies and configurations for smooth execution within a Docker container. The Dockerfile should include: • Commands to set up a working directory. • Instructions to install dependencies listed in a `package.json` file. • Steps to define any necessary environment variables. • A command to expose the application's running port. • An entry point to start the application. Additionally, outline the steps to: 1. Build a Docker image from this Dockerfile. 2. Test the Docker container locally to verify its functionality. 3. Tag and push the image to a container registry (Docker Hub, Amazon ECR, etc.).	**10**	**CO1**

Q 7	Describe the structure and key stages of a CI/CD pipeline, highlighting how each stage contributes to efficient software delivery. List and explain various tools used for implementing CI/CD pipelines, detailing how they support different stages. Provide examples of scenarios where specific CI/CD tools would be especially beneficial.	**10**	**CO2**
Q 8	Monitoring is a critical aspect of IT infrastructure to ensure 24/7 site availability. Explain the importance of monitoring to assess application performance, detect lags, and address potential issues proactively. Describe the various categories of monitoring in detail and provide examples of tools commonly used for each type of monitoring.	**10**	**CO3**
Q 9	Discuss in detail the key benefits of Amazon Web Services (AWS) Elastic Container Service (ECS) and explore its architecture. Explain how ECS supports containerized application management, including its integration with other AWS services. **OR** Write short notes on a) Kubeclt b) Kubeadm c)Jenkins d)EKS	**10**	**CO4**
SECTION-C (2Qx20M=40 Marks)			
Q 10	Explore the concept of container networking in detail. What are container networks, and why are they important in container orchestration? Discuss different Docker network modes and plugins, highlighting their role in application deployment and security. Compare container networks with host and bridge networking modes, and explain their use cases in containerized applications.	**20**	**CO3**
Q 11	Describe the architecture of Kubernetes in detail, outlining its core components, their specific roles, and the interactions that enable efficient container orchestration and management. Provide a comprehensive explanation of how these components collaborate to deliver scalability, reliability, and resource optimization. **OR** A growing startup, AppSphere, is exploring Docker Swarm for scaling its microservices infrastructure. Explain Docker Swarm's architecture, detailing its components, their roles, and how they work together to manage, scale, and ensure high availability of containers. Highlight its benefits and discuss potential challenges AppSphere should consider during adoption.	**20**	**CO4**