Name: Enrolment No:	

UPES
End Semester Examination, December 2023

Course: App. Containerization & Orche. Semester: VII
Program: BTech CSE All spec. Time : 03 hrs.
Course Code: CSDV4007P Max. Marks: 100

Instructions:Attempts all questions.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Write down the steps to use docker compose	4	CO1
Q 2	Discuss Docker tags usage and write a command to explicity tag an image	4	CO1
Q 3	Define developer,QA and production enviornments.	4	CO2
Q 4	Compare Pods and containers.	4	CO2
Q 5	Describe Minikube's role in the context of Kubernetes, and why is it a popular choice among developers?	4	CO4

SECTION B
(4Qx10M= 40 Marks)

Q 6	Imagine a company, ApCo Inc., is considering a major architectural shift for its existing software application. They are deliberating between transitioning from a monolithic architecture to a microservices architecture. Evaluate and discuss the pros and cons of both architectural approaches in the context of ApCo Inc.'s situation. Provide recommendations based on the specific requirements and challenges they face,. Ultimately, the choice should align with ApCo Inc.'s business goals, development team capabilities, and scalability needs.	10	CO1
Q 7	Design a Dockerfile to enable the execution of a Python web application within a Docker container. Specify the necessary instructions and commands in the Dockerfile. Also, describe the steps to build a Docker image from this Dockerfile and push it to a container registry of your choice	10	CO2
Q 8	Describe the key features and benefits of Docker Trusted Registry (DTR) in the context of containerized application deployment and management. How does DTR enhance security and control in a containerized environment?	10	CO3

Q 9	Discuss Docker volumes in detail. Explain what they are, their significance in containerized applications, and the various types of Docker volumes. Describe how they address data management challenges in container orchestration. Provide real-world use cases and compare Docker volumes to other data storage options within the Docker ecosystem. **OR** Write short notes on a)Container Volume b) DockerHub c) Kubeclt d) Kubeadm	**10**	**CO4**

SECTION-C
(2Qx20M=40 Marks)

Q 10	Examine the concept of container networking in detail. Define what container networks are, discuss their significance in container orchestration, and explore various network modes and plugins in Docker. Provide insights into how container networks enhance application deployment and security. Furthermore, compare container networks to host networking and bridge networking modes, and discuss when to use each in different containerized application scenarios	**20**	**CO3**
Q 11	Explain the architecture of Kubernetes in detail. Provide a comprehensive overview of its components, their roles, and how they work together **OR** Consider a fast-growing tech startup, TechNex, is exploring options to scale its microservices-based application infrastructure efficiently. They are considering the use of Docker Swarm for orchestration. As an expert in containerization and orchestration, you've been tasked with explaining the architecture of Docker Swarm in detail. • Provide a comprehensive overview of Docker Swarm's architectural components. • Elaborate on the roles and responsibilities of each component within the Docker Swarm ecosystem. • Describe how these components work together to facilitate the management, scaling, and high availability of containerized applications. • Offer insights into the advantages that TechNex can gain from adopting Docker Swarm, including improved resource utilization, load balancing, and ease of maintenance. • Discuss potential challenges and considerations TechNex should be aware of when transitioning to a Docker Swarm-based architecture, taking into account the dynamic nature of the tech industry and the need for rapid scaling and updates.	**20**	**CO4**