Name: **Enrolment No:**	

UPES

End Semester Examination, December 2024

Course: Application Containerization and Orchestration **Semester: VII**

Program: B.Tech CSE All **Time : 03 hrs.**

Course Code: CSDV4007P **Max. Marks: 100**

Nos. of page(s) : 2

Instructions: Attempt all questions

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q1.	Explain the key differences between virtual machines and containers.	**4 Marks**	**CO1**
Q2.	Explain the concept of *chroot*. How does it contribute to the development of containers?	**4 Marks**	**CO2**
Q3.	Explain how containers contribute to better resource utilization compared to traditional virtual machines.	**4 Marks**	**CO2**
Q4.	Describe the role of Docker-Hub in containerization. How does it help developers?	**4 Marks**	**CO3**
Q5.	Explain the term "FreeBSD", and how is it related to containerization technologies?	**4 Marks**	**CO3**

SECTION B
(4Qx10M= 40 Marks)

Q6.	Discuss the key advantages of containerization in modern software development and deployment. Highlight at least three challenges or drawbacks associated with containerization.	**10 Marks**	**CO4**
Q7.	Explain the differences between Developer, QA, and Production environments. What common issues arise when transitioning software between these environments, and how can they be mitigated using containerization and orchestration tools?	**10 Marks**	**CO4**
Q8.	Compare containers and virtual machines for development and deployment. Highlight the advantages and drawbacks of containerization and provide examples of how tools like Docker Compose and Dockerfiles facilitate efficient workflows.	**10 Marks**	**CO4**
Q9.	Explain Docker Compose, and how does it simplify the management of multi-container applications? Provide an example of a *docker-compose.yml* file. Additionally, explain the purpose of a *Dockerfile* and provide an example for building a simple web server. **OR** Discuss how security is managed in Docker containers, including the use of namespaces and Seccomp. Additionally, explain the role of volumes in data persistence and how container networking facilitates communication between containers.	**10 Marks**	**CO1**

SECTION-C (2Qx20M=40 Marks)			
Q10.	Differentiate between Pods and Containers in Kubernetes. Why are Pods fundamental to Kubernetes, and how do they enhance container orchestration? Provide use cases.	**20 Marks**	**CO5**
Q11.	Define orchestration in the context of containerized environments. Discuss its importance in managing modern distributed systems. Also explain the challenges of managing containerized applications without orchestration tools. Provide examples of how orchestration solves these issues. **OR** Explain the process of deploying services to a Docker Swarm cluster. Discuss how to manage swarm services, including scaling, updating, and monitoring services. Provide relevant examples or commands.	**20 Marks**	**CO2**