| Name:
Enrolment No:	

UPES
End Semester Examination, December 2023

Course: Application Containerization and Orchestration   Semester: 5th
Program: B. Tech CSE DevOps   Time   : 03 hrs.
Course Code: CSDV3010   Max. Marks: 100

Instructions: Attempt all Questions

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q1.	YAML accommodates a variety of data types. Please identify and illustrate with examples, at least three commonly used data types in YAML.	4 Marks	CO1
Q2.	What is FreeBSD, and how does it relate to the Unix-like operating system family? Describe its key features and goals.	4 Marks	CO2
Q3.	Elaborate on the concept of Docker Hub and its connection to Docker. Clarify the role of Docker registries and their contribution to the dissemination and collaborative usage of Docker images.	4 Marks	CO1
Q4.	Define the term "Kubernetes", and why is it commonly referred to as an orchestration platform for containerized applications?	4 Marks	CO3
Q5.	Provide comparison between Virtualization and Containerization.	4 Marks	CO2

SECTION B
(4Qx10M= 40 Marks)

Q6.	Explain the architecture of Azure Kubernetes Service in detail, including its control plane components, node pools, and how they interact. Discuss the role of Azure Resource Manager (ARM), Kubernetes API server, and other Azure services integrated with AKS.	10 Marks	CO2, CO4
Q7.	Explain what Docker Swarm is and how it relates to container orchestration. Describe its key features and advantages over standalone Docker containers. Discuss when and why you might choose Docker Swarm over other orchestration tools.	10 Marks	CO3, CO4
Q8.	Elaborate on the notion of Kubernetes Pods and their role in container management. Explain Kubernetes management of container lifecycles with focus on pods, deployments, and scaling. Make use of illustrative examples where required.	10 Marks	CO2, CO3

Q9.	Explain the architecture of EKS in detail, including its control plane components, worker nodes, and how they interact. Discuss the role of core components like the API server, etcd, and the various EKS managed services. **OR** Explain the core components and architecture of Kubernetes in detail, including the Kubernetes Control Plane (Master), worker nodes, and how they interact. Discuss the roles of key components like etcd, API Server, Scheduler, Controller Manager, and kubelet.	**10 Marks**	**CO2, CO4**

SECTION-C
(2Qx20M=40 Marks)

Q10.	Explain the role of load balancing in Kubernetes and why it's essential for containerized applications. Describe the different types of load balancing in Kubernetes, such as service load balancing and Ingress load balancing. Discuss the advantages and use cases for each.	**20 Marks**	**CO4, CO5**
Q11.	Explain the role of Docker Compose and how it simplifies the management of multi-container applications. Describe container orchestration tools like Docker Swarm and Kubernetes, their key features, and when to use them for scaling and managing containerized applications. **OR** Walk through the steps involved in creating an EKS cluster. Discuss VPC configuration, worker node provisioning, and integrating with AWS Identity and Access Management (IAM) for authentication and authorization. Explain best practices and considerations during the cluster creation process.	**20 Marks**	**CO5**