**Birla Institute of Technology & Science, Pilani**

**Work-Integrated Learning Programmes Division**

**Third Semester 2024-2025**

**Mid-Semester Test (EC-2 Regular)**

**CISCO Collaboration**

Course No. : CCCSZG506

Course Title : API Driven Cloud Native Solutions

Nature of Exam : Closed Book

No. of Pages = 2

# No. of Questions = 6

Weightage : 30%

Duration : 2 Hrs

Date of Exam : 18/01/2025

Note:

1. Please follow all the *Instructions to Candidates* given on the cover page of the answer book.
2. All parts of a question should be answered consecutively. Each answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.
4. You are designing APIs for "SkillLearn," an online learning platform where users can register for courses, interact in forums, and track progress. **[6 Marks]**
5. **Dynamic Querying (2 Marks)**

Propose how GraphQL can be used to fetch both course details and forum interactions in a single API call.

1. **API Gateway Role (2 Marks)**

Explain how an API Gateway facilitates communication between the platform's microservices (e.g., course management, forum, and analytics).

1. **Handling User Feedback (2 Marks)**

Describe how a POST /feedback endpoint can be designed to collect user feedback and process it asynchronously for real-time admin dashboard updates.

1. You are part of a team implementing DevOps practices in an organization transitioning from a monolithic application architecture to microservices. **[6 Marks]**

**Role Comparison (3 Marks)**  
As part of the transition, the team debates whether the roles of Data Scientists and Machine Learning Engineers should remain the same or evolve in the microservices setup.

* 1. Challenge the idea that their roles are identical. Provide a short justification (2–4 lines each).

**CI/CD Pipeline Design (3 Marks)**  
The organization plans to redesign its CI/CD pipeline to support microservices.

* 1. Compare the current monolithic CI/CD pipeline with the proposed microservices-based pipeline.
  2. Discuss how team structures will need to adapt during the transition.

1. Cisco has recently launched an AI-powered network management platform designed to enhance enterprise network efficiency and security. The platform offers features such as real-time network monitoring, automated issue resolution, predictive maintenance, and intelligent traffic management. Users can configure network settings, receive multilingual alerts, and access detailed analytics. **[6 Marks]**

**Differentiation (3 Marks)**  
Differentiate between the roles of **DataOps** and **MLOps**, providing suitable examples in the context of Cisco’s AI-powered network management platform.

**Application (3 Marks)**  
Discuss the specific roles of DataOps and MLOps in supporting key functionalities of Cisco’s platform, such as real-time monitoring, automated issue resolution, and predictive maintenance.

1. How can Prefect be used to orchestrate a data science workflow? Briefly explain how tasks such as data ingestion, preprocessing, model training, and evaluation can be automated using Prefect. Provide a simple example. **[4 Marks]**
2. Explain the importance of API versioning and semantic versioning in managing evolving APIs. Provide examples of major, minor, and patch updates in a versioning system. **[3 Marks]**
3. CISCO wants to predict whether customers are likely to discontinue their subscription to a network security product to improve retention strategies. The dataset includes subscription details, usage metrics (e.g., bandwidth consumption, firewall utilization), customer support interactions, contract length, and payment history. The target variable is binary: Churn (1 for customers who churned, 0 for those who continued the subscription).

How would you apply the **SEMMA (Sample, Explore, Modify, Model, Assess)** methodology to solve this churn prediction problem? Provide a concise stage-wise explanation. **[5 Marks]**