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Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering
Midterm Examination, Spring 2026
Course Code: CSE 315, Course Title: Software Engineering
Level: 3 Term: 1 Batch: 65

Time: 01:30 Hrs **Marks: 25**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

A Smart Urban Traffic Intelligence System (SUTIS) is being developed to support traffic monitoring and control across a metropolitan region. The system receives continuous data streams from road-side sensors, surveillance cameras, GPS-enabled vehicles, and public transportation services. Using this information, it evaluates traffic density, identifies unusual patterns, and supports adaptive signal control at major intersections.

Traffic authorities access a centralized platform to monitor city-wide traffic conditions, coordinate responses to incidents, and communicate with emergency services. Commuters interact with mobile applications that provide route guidance, estimated travel times, and notifications related to traffic disruptions. The system also exchanges data with external platforms such as digital mapping services, weather information providers, and law enforcement systems to enhance operational decisions.

The platform must support concurrent access by multiple user groups, process large volumes of data in near real time, and maintain reliable operation throughout the day.

1(a).	Analyze the characteristics of the Smart Urban Traffic Intelligence System and identify a suitable software development model for its implementation. Justify your choice by relating the system context to the key features of the selected model.	**[2]**	**CO1**
1(b).	Assume that the system requirements are captured using user stories. Explain how functional and non-functional requirements can be identified from user stories for this system, and how they can be clearly differentiated during requirements analysis. Support your explanation with relevant examples derived from the given scenario.	**[3]**	**CO1**
2.	Draw a graphical user interface (GUI) for the centralized dashboard used by traffic authorities. Shortly describe how information is organized on the screen, how real-time traffic conditions are presented, and how critical situations are made noticeable to system users.	**[5]**	**CO2**
3.	Construct a Use Case Diagram for the Smart Urban Traffic Intelligence System showing how different users interact with the system.	**[5]**	**CO2**
4.	Illustrate the use case descriptions for the following system functionalities: • Adjust Traffic Signal Timing • View Traffic Pattern Report	**[5]**	**CO1**

For this Traffic Intelligence System, when traffic conditions change significantly, the system continuously collects live data from sensors and connected vehicles and processes it through its analysis module. Based on the analysis results, appropriate control actions are determined and

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applied. such as updating signal timings or issuing route guidance. At the same time, relevant information is communicated to users through the system interface, and key events are logged for monitoring and review purposes.			
5(a).	Draw an Activity Diagram showing how traffic data is collected, analyzed, and used to generate control actions and system responses.	**[2]**	**CO2**
5(b).	Draw a Sequence Diagram illustrating the interaction between a commuter and the system when traffic conditions are analyzed and route guidance is provided.	**[3]**	**CO2**