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Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science and Engineering
Midterm Examination, Fall 2025
Course Code: CSE 315, Course Title: Software Engineering
Level: 3 Term: 2

Time: 1:5 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.]***

The **Smart Public Transport Management System** is a cloud-integrated platform aimed at improving urban transit operations using IoT sensors, AI analytics, and GPS tracking. The system tracks buses in real time, optimizes route planning based on traffic and passenger density, and provides predictive maintenance alerts for vehicles. Features include automated ticketing, driver monitoring, fuel consumption reports, and centralized dashboards for transit authorities. It supports mobile apps for passengers showing live bus locations, expected arrival times, and digital fare payments. Third-party vendors like fuel suppliers and maintenance contractors can also use the system to track their services. The platform ensures data security, supports multi-tenant access, and is scalable across cities. Integration with government transport data enables compliance checks, route planning, and policy insights. In summary, it is a large, complex system that combines AI, IoT, and cloud integration, and needs risk analysis and iteration.

1(a).	Identify a suitable traditional software process model for developing this system. Explain your choice with appropriate reasoning.	[3]	CO1
1(b).	Based on the above public transport system, list and differentiate its functional and non-functional requirements.	[2]	CO1
2.	Design a graphical user interface (GUI) layout for the centralized dashboard used by transit authorities. Your design should include: • Sections such as map view, performance analytics, and alerts • Labels or icons that show real-time information clearly	[5]	CO2

The **AI-Based Personal Fitness Assistant** is a wearable device and mobile app that helps users monitor fitness goals, track workouts, and analyze physical performance. The system uses IoT sensors to monitor heart rate, step count, and sleep patterns. It provides AI-driven suggestions for personalized workout plans, dietary recommendations, and daily activity goals. Users can receive motivational messages, alerts for irregular health signs, and weekly progress reports. Fitness trainers can use a connected dashboard to monitor clients and adjust routines accordingly.

3.	Draw a use case diagram for the AI-Based Personal Fitness Assistant, including at least three actors and five use cases. Use at least one «include» and «extend» relationship.	[5]	CO2
4.	Write detailed use case descriptions for the following two use cases from the AI-Based Personal Fitness Assistant system: • Set Fitness Goal • View Weekly Report	[5]	CO1
5(a).	Draw an Activity Diagram to illustrate the process of tracking workouts.	[2.5]	CO2
5(b).	Develop a Sequence Diagram showing how a user receives AI suggestions from the system.	[2.5]	CO2

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