Major Project

Problem Statement

ElectriX, an electric vehicle company, is introducing its revolutionary electric car in direct competition to Tesla. The all-new ElectriX electric car is designed to offer superior features and performance as compared to Tesla Model S, particularly in the areas of aerodynamic efficiency, driving safety and battery management. The objective is to address the following parameters with superior features :

1. Due to poor aerodynamics, the current EV design has a shorter range and higher drag when compared to Tesla Model S. The difficulty lies in identifying the major aerodynamic inefficiencies, optimising the vehicle's outside design, and coming up with creative methods to reduce drag and boost overall aerodynamic performance, thus increasing the range and effectiveness of the EV. Make changes to the current EV design using CAD software while keeping the following factors in mind:

   (i) Delivers similar or greater range than Tesla Model S' max of 395-405 miles. (10 marks)

   (ii) Achieves a coefficient of drag similar to or lesser than Tesla Model S' 0.208. (20 marks)

2. Develop a Anti-lock Braking System (ABS) for the car that ensures safe driving in tough physical conditions.

   (i) Describe the key steps involved in the algorithm. (10 marks)

   (ii) Using appropriate simulation software, model the behaviour of the ABS design. (10 marks)

   (iii) Determine the vehicle speed, stopping distance and slip over time. Present your findings in a comprehensive manner. (10 marks)