Task 1: Technical Analysis of Autonomous Vehicle Technology

Objective:

Develop a comprehensive technical report on autonomous vehicle technology, covering all key technological elements, industry trends, and major stakeholders. The report should be interactive and data-driven, leveraging PowerPoint (PPT) or Power BI for visualization, and incorporating insightful coding elements where applicable.

Key Deliverables:

1. **Technology Breakdown:**
   - Overview of autonomous vehicle (AV) technology and levels of automation (SAE Levels 0-5).
   - Core enabling technologies, for example:
     - Sensors (LiDAR, radar, cameras, ultrasonic sensors).
     - AI & Machine Learning in perception and decision-making.
     - Vehicle-to-Everything (V2X) communication.
     - High-Definition (HD) mapping and localization.
     - Computing infrastructure (edge/cloud computing, AI chips).
2. **Industry Landscape & Key Players:**
   - Overview of global leaders in AV development (Tesla, Waymo, Baidu, Mobileye, etc.).
   - Comparative analysis of technological approaches adopted by different companies.
   - Key regulatory and legal challenges impacting AV deployment.
3. **Implementation & Use Cases:**
   - AV applications in public transport, logistics, and shared mobility.
   - Success stories and case studies of real-world deployments.
4. **Data-Driven Insights & Coding Component:**
   - Use Python or relevant programming tools to analyze AV datasets (e.g., sensor data processing, AI model demonstration, or traffic pattern prediction).

- Provide interactive Power BI visualizations for key trends and insights.

Expected Output Format:

- PowerPoint presentation (well-structured, with visuals and data insights) OR
- Power BI dashboard (interactive, with dynamic insights and coding-based analytics).

Task 2: Strategic Comparative Analysis – Plug-in Hybrid DMi vs EV vs ICE

Objective:

Develop a strategic comparative report evaluating Plug-in Hybrid DMi (Dual Mode Intelligent), Battery Electric Vehicles (EVs), and Internal Combustion Engine (ICE) Vehicles based on key performance indicators (KPIs) using Power BI for data visualization.

Key Deliverables:

1. **Technology Overview:**
   - Explanation of **Plug-in Hybrid DMi**, **EV**, and **ICE** powertrains.
   - Breakdown of key components, energy sources, and drivetrain efficiency.
2. **Comparative Performance Analysis:**
   - Energy Efficiency
   - Environmental Impact
   - Total Cost of Ownership (TCO) – use Chinese vehicles as a reference
   - Range & Refueling/Recharging Time
   - Market Trends & Adoption
3. **Data-Driven Insights & Power BI Visualizations:**
   - Utilize real-world public data sets to generate comparative Power BI dashboards.
   - Provide dynamic filters for energy cost comparisons across different regions.
   - Include predictive analysis on future trends using basic Python or statistical modeling.