**Intern’s Details**

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| **Smart Task No.** | 2 |
| **Project Topic** | Electric Vehicle - Techno Commercial Analysis |

**Smart Task (Solution)**

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| **Task Q1 : Write down a detailed technical specification of any Electric Car in the market. Also define the terms in the technical specifications.** |
| **Task Q1 Solution :**  The detailed technical specification of Tata Nexon EV are as follows-  **Performance and Drive** :  Acceleration 0 - 100 km/h – Acceleration is the rate of change of velocity with respect to time : 9.9 sec .  Top Speed - Top speed is the fastest speed a vehicle can move : 120 km/h  Electric Range – Electric Range refers to the distance an electric vehicle can travel before the battery needs to be recharged : 312 km  Total Power - Power is defined as the rate at which an object does work : 127 bhp  Total Torque – Torque is the rotating force produced by the engine crankshaft : 245 Nm  Drive – to control or operate a car : Front  **Battery and Charging** :  For charging the EV, we use the charging method 30.2 KW. For 0-80% we use CSS 2(Fast Charging) which takes about 60 min. to charge from 0% to 80%. And the Range/hour is 86m/30min.  Now for 10-90% we use Home(15 AMP Plug) which takes about 8.5hr to charge from 10% to 90%.  And the Range/hour is about 510min.  Battery : A battery is a power source consisting of one or more electrochemical cells with external connections for powering electrical devices.  **Energy Consumption** :  Range – Range is the approximate distance a car can travel with residual fuel in the fuel tank : 212 km  Vehicle Consumption – it refers to all the energy used to perform an action : 193 Wh/km  CO2 Emissions - Carbon dioxide emissions or CO2 emissions are emissions stemming from the burning of fossil fuels and the manufacture of cement; they include carbon dioxide produced during consumption of solid, liquid, and gas fuels as well as gas flaring : 0 g/km  Vehicle Fuel Equivalent : 2.2 l/100km |

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| **Task Q2 : Write down the commercial analysis of Electric Car, such as Price, Taxes, Availability, Dealers, Auto Loan etc.** |
| **Task Q3 Solution :**  The commercial analysis of TATA NEXON EV are as follows :  Tata Nexon EV price in New Delhi start at Rs. 13.99 Lakh. The lowest price model is Tata Nexon EV XM and the most priced model of Tata Nexon EV XZ Plus LUX priced at Rs. 16.56 Lakh.  The price classification with taxes of Tata Nexon EV are as follows :  Ex-showroom price : ₹13,99,000  RTO : ₹1,51,900  Insurance (The total amount paid to insure the vehicle. This includes the Own Damage, Third Party and Personal Accident premiums in accordance with law effective 1-Aug-2020) : ₹55,620  Tax Collected at Source(TCS) : ₹13,990  FASTag : ₹500  So the total On Road Price: ₹16,21,010  There are other optional charges and taxes as Freight, set-up, insurance and delivery to a location of worth ₹12950.  The Nexon all-electric compact SUV is being sold in at least 30 cities; launched on January 28. At the time of launch, the Tata EV was most likely to go on sale at 66 dealerships across 30 cities in 12 states. The city-wise list of availability of sales locations is mentioned below:  **Delhi NCR**   * Delhi – 4 * Gurgaon – 1 * Faridabad – 1 * Noida – 1 * Greater Noida – 1 * Ghaziabad – 1   **Punjab**   * Ludhiana – 1 * Chandigarh – 1   **Uttar Pradesh**   * Lucknow – 2 * Kanpur – 1   **Rajasthan**   * Jaipur – 3   **Gujarat**   * Ahmedabad – 3 * Surat - 2   **Maharashtra**   * Mumbai – 5 * Navi Mumbai – 1 * Vasai – 1 * Mira Road – 1 * Kalyan – 1 * Dombivali – 1 * Ambernath – 1 * Nagpur – 1 * Pune – 7   **Karnataka**   * Bangalore – 9   **Kerala**   * Cochin – 1 * Thiruvananthapuram – 1   **Tamil Nadu**   * Chennai – 4 * Coimbatore – 1   **Telangana**   * Hyderabad – 5   **Andhra Pradesh**   * Visakhapatnam – 2   **West Bengal**   * Kolkata – 2   Location of 5 Tata Showrooms in New Delhi. All information on Tata Cars Price, Offers, EMI options and test drive are provided at below mentioned dealers in New Delhi :   * Arya Motors : 3535, Daryaganj, Netaji Subhash Marg, New Delhi, 110002 [customercareshowroom@aryamotors.in](mailto:customercareshowroom@aryamotors.in) * Autovikas Tata : 26/3-4, Najafgarh Road, Indl. Area Moti Nagar, Block C, New Delhi, 110015   [crm.motinagar@autovikas.com](mailto:crm.motinagar@autovikas.com) , [hitesh.bhatia@autovikas.com](mailto:hitesh.bhatia@autovikas.com)   * Autovikas Tata : K-1/36, Rajapuri Matiala Road, Dwarka, Nanhey Park,Sector 5, New Delhi, 110075   [crm.motinagar@autovikas.com](mailto:crm.motinagar@autovikas.com) , [hitesh.bhatia@autovikas.com](mailto:hitesh.bhatia@autovikas.com)   * Malwa Automobiles : A1/16, Prashant Vihar Outer Ring Road, Andhra Bank, Near Rohini Court, New Delhi, 110085   [salestata\_rohinidel@malwagroup.co.in](mailto:salestata_rohinidel@malwagroup.co.in) , [gmtata\_rohinidel@malwagroup.co.in](mailto:gmtata_rohinidel@malwagroup.co.in)   * Sab Motors - Lajpat Nagar : 56, Lajpat Nagar 3, Main Ring Road, New Delhi, 110024   [salesmanager.delhi@sabmotors.com](mailto:salesmanager.delhi@sabmotors.com)  Tata Nexon EV EMI starts at Rs 27,941 per month for a tenure of 60 months @ 9.8 for a loan amount of Rs 13.21 Lakh. The detailed break-up of the total payable amount is :  Tata Nexon EV XM : 9.8% : Rs.1.46 Lakh : Rs.27,941  Tata Nexon EV XZ Plus : 9.8% : Rs.1.63 Lakh : Rs.31,069  Tata Nexon EV XZ Plus LUX : 9.8% : Rs.1.73 Lakh : Rs.33,045  On a down payment of Rs.3,61,910 and on a interest rate of 9.5% p.a. for a tenure of 5 years, after calculating we get an EMI of Rs.26,443 for 5 years. |

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| **Task Q3 : Make a techno-commercial comparison between Electric Car and Diesel Car of the same features.** |
| **Task Q3 Solution :**  Comparison of technical specifications of Electric and Diesel car :  1. Electric Car :-   * Vehicle mass – 1605 kg * Dimensions (mm) - 4748x2041x1458 * Engine Type - Synchronous Motor Rotor Winding * Power – 70 kW * Gear Box - Direct drive (1 speed) * Storage Energy Type - Lithium-ion battery * Stored Energy - 22 kWh * Range – 185 km * Maximum Speed – 135 km/h * Acceleration 0-100 km/h - 13.7 s * Rated Fuel consumption (L/100 km) - 0 * Rated Carbon dioxide emissions (g/km) - 0   2. Diesel Car :-   * Vehicle mass – 1307 kg * Dimensions(mm) - 4559x1804x1469 * Engine Type - Turbocharged Diesel common-rail * Power – 77 kW * Gear Box - 6 speed * Storage Energy Type - Diesel fuel * Stored Energy - 701.4kWh * Range - 1363 (combined) km * Maximum Speed – 190 km/h * Acceleration 0-100 km/h - 11.9 s * Rated Fuel consumption (L/100 km) - 4.5 * Rated Carbon dioxide emissions (g/km) – 120   Contrasting the two vehicles, the electric has a lot higher weight (23%) because of the added weight of the batteries and has less force (10%). Therefore it's anything but astonishing that it is a more slow vehicle, both in greatest speed and in speed increase. But, there is another reason for these differences. The EV has just one gear while the Diesel vehicle has a 6-speed gear-box.  Diesel costs have arrived at an unsurpassed high in the Indian market. A litre of diesel presently costs Rs 88.90 in Delhi and Rs 87.94 in Mumbai.  From a customer's perspective, electric vehicles are as yet a slippery choice to a larger part of car buyers. However, one thing that electric vehicles have going for them is the low running cost. Here we look at the running costs of a normal diesel vehicle with that of an electric vehicle (Mahindra e2o).  The calculations have been made with a supposition that the two vehicles EV and Diesel vehicles - travel 50 kms per day for 24 days in a month (6 days every week).  **Electric car (Mahindra e2o)**  Full Range: 140km  Total consumption of electricity in a full charge: 16.5 units  Electricity Usage per km: 16.5/140= 0.12 unit  Maximum cost of electricity in Delhi (domestic): Rs 8 per unit  Total cost of running for 1 km: Rs 8 x 0.12= 0.96 or 96p  Total expenditure in a day: Rs 0.96 x 50= Rs 48  Total expenditure in a month: Rs 48 x 24= Rs 1152  The calculations clearly show that the electric car just needs an investment of Rs 1152 per month, owing to the relatively low price of electricity per unit.  **Diesel Cars**  Mileage assumed: 20 kmpl  Price this year (April 2021): Rs 88.90  Average consumption (distance travelled/mileage) 50/20= 2.5 litres per day  Cost of running in 2021 (per day) = Rs 88.90 x 2.5 = Rs 222.25  Average working days in a week = 6  Total working days in a month = 6 x 4 = 24  Total expenditure in a month: 24 x 222.25 = Rs 5340  Difference in running cost of both cars= Rs 5340 – 1152 = Rs 4188  As found in the computations above, high diesel cost prompts a higher running expense of Rs 222.5 each day which is 463.5 percent higher contrasted with a pitiful Rs 48 every day for an electric vehicle. The distinction in cost further intensifies when broke down consistently. Our computations show that an individual running a similar distance in a diesel vehicle should pay an additional Rs 4188, when contrasted with an electric vehicle. |