

Name:

Duration: 15 min

ID:

Grade:/30

Questions

Part I: Understand

(10 pts) Using only the data you have taken during the experiment, explain how you can calculate the **motor drive efficiency**, **motor efficiency** and **overall efficiency** at a given operating condition.

Part II: Solve

Consider a light rail vehicle weight of which is 100 tons. The vehicle is going on a level track (straight rail) with 150 km/h speed. The diameter of the wheels is 0.5 m. The total mechanical output power of the traction motors is 200 kW. Neglect friction and windage throughout the question.

(5 pts) How much time does it take for the train to stop, if rated torque is applied in reverse direction during deceleration?

(5 pts) How much distance should the train leave before starting the deceleration?

Part III: Think

(10 pts) Consider the recorded harmonic components of the grid side line current in the experiment. Why are the harmonics order of which are integer multiples of 3 are low?