Linear Motors Homework

1) A 15V DC linear motor is operating in a steady state mode. The effective length of the moveable bar is 0.3 meters and the rail resistance is 0.01Ω. If the B-field is 0.5T and the bar has a velocity of 90m/s, determine the force of the mechanical load on the bar and the efficiency of the linear motor.

2) We want to design a 20V DC linear motor that operates in a steady state mode with an output power of 5kW. We would like a steady state efficiency of 95%. We have a 0.8T B-field available. Determine the steady state current we expect to draw from the voltage source.

(3) A 30V DC linear motor operates in a steady state mode with a 0.8T B-field and a moveable "bar" with an effective length of 10 meters and a rail resistance of 0.02Ω. If the force of the steady state mechanical load is 40 Newtons, find the velocity of the bar.