**Problem for Question 1 to 5**

The flux density between the magnets is 0.08 T. The length of the conductor $AB$ is $L = 5$ cm and the current is $i = 4$ A. The conductor $AB$ is pulled at a constant velocity of $0.5$ m/s, the resistance between $A$ and $B$ is $10$ ohms.

1. Calculate the force $F$ applied on the conductor $AB$.

2. Calculate the power $P$ (in W) required to keep the conductor moving at a constant velocity of $0.5$ m/s.

3. If we stop to pull the conductor suddenly, then the conductor will continue to move for a while and its induced emf will be generated during this time (when the conductor is moving due to inertia without any pull). Calculate the total heat generated in the period of $0.1$ sec.

4. **Common Data for Questions 6 to 11**

The length of the current is $L = 5$ cm. The flux density between the magnets is $0.08$ T. The length of the conductor $AB$ is $L = 5$ cm. The battery $E = 1$ V. The total resistance of the circuit (conductor + battery) $R = 10$ ohms.

5. If there is no friction at all, then at what velocity ($v$ in m/s) will the conductor move in steady state?

6. **Common Data for Questions 12 to 15**

The length of the current is $L = 5$ cm. The flux density between the magnets is $0.08$ T. The length of the conductor $AB$ is $L = 5$ cm. The battery $E = 1$ V. The total resistance of the circuit (conductor + battery) $R = 10$ ohms.

7. If there is a constant frictional force of $1.0$ N, then at what velocity ($v$ in m/s) will the conductor move in steady state?