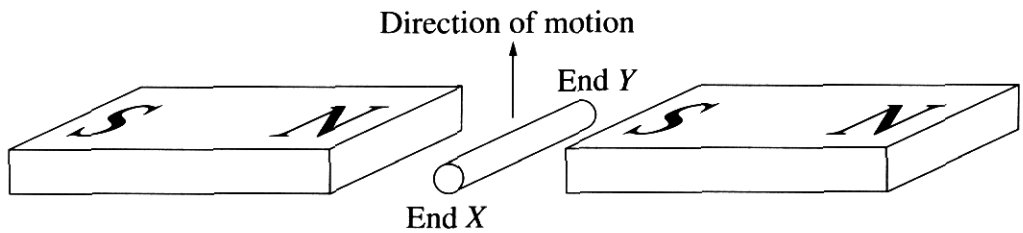
Question 23 (7 marks)

(a) State Lenz's law. **1**

All charged particles experience a force when moved through a magnetic field.

(b) When the metal rod is moved upwards through the magnetic field as shown in the diagram, an emf is induced between the two ends.



(i) Which end of the rod is negative? **1**

End Y is negative

(ii) Explain how the emf is produced in the rod. **3**

Emf is produced in the rod because the electrons in the rod experience a force when moved through a magnetic field shown in the formula $F = BIl \sin\theta$ and Lenz's Law.

(c) Explain how the principle of induction can be used to heat a conductor. **2**

the principle of induction can be used to heat a conductor because the flow of electrons causes resistance and gives out heat. This flow of electrons is in the form of eddy currents created by a magnetic field.