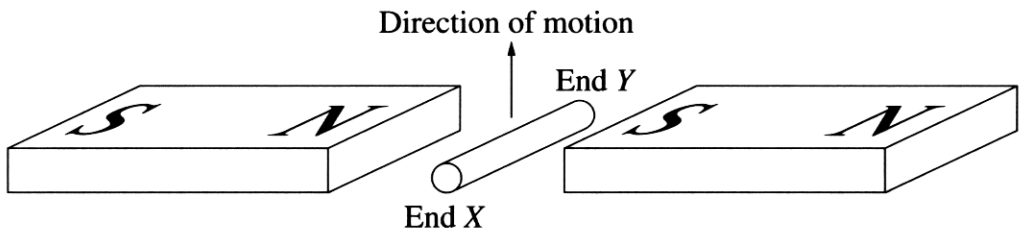
Marks

Question 23 (7 marks)

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

An induced emf will create a current that creates a magnetic field that oppose the original change in flux.

(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**

X

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

When the rod is moved upwards, the magnetic field flux that is threading the rod is changing. So according to electromagnetic induction, the conductor is in relative motion to a magnetic field ~~sinus~~ therefore a emf is induced in the rod.

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

When a conductor is situated in changing magnetic field, an emf is induced. According to Lenz's law, the emf will set up a current (eeldy current) which create ~~the~~ magnetic field that opposes the change. Eddy current causes the temperature of the conductor to increase. This heating of conductor due to eddy current is used in induction cooktops.