Question 23

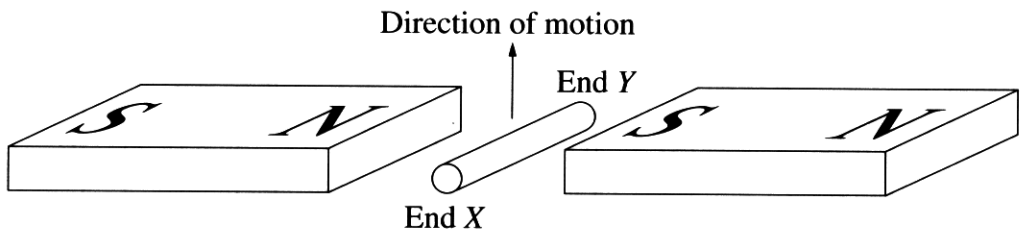
Marks

Question 23 (7 marks)

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

an induced current is such that it's field opposes the field which produced it.

(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**

The electrons due to force $\vec{F}$, accumulate at X.

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

as the conductor is pushed up through the magnetic field $\vec{B}$ at velocity $\vec{V}$, the electrons are subjected to force $\vec{F}$ which is perpendicular to $\vec{V}$

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

If a conductor is placed in a magnetic field $\vec{B}$ with a $\vec{B}$ are the induced current of electrons will bounce of the crystal lattice and kinetic energy will be converted into heat energy.