

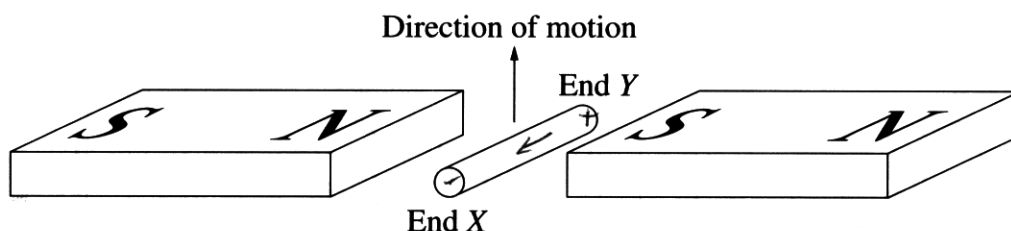
Question 23 (7 marks)

(a) State Lenz's law.

1

A current carrying wire ~~in~~ will ~~cause~~ induce a magnetic field that creates a current to oppose the original ~~cause~~ ~~the~~ cause.

(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 X

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

3

By Faraday's law, a change in flux over time creates an emf. Since the rod 'cuts' the magnetic field lines, this is a change in flux, and hence causes an emf.

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

2

Induction heating uses eddy currents within charged metal sheets to cause resistance in the conductor. The induction cooktop is an example.