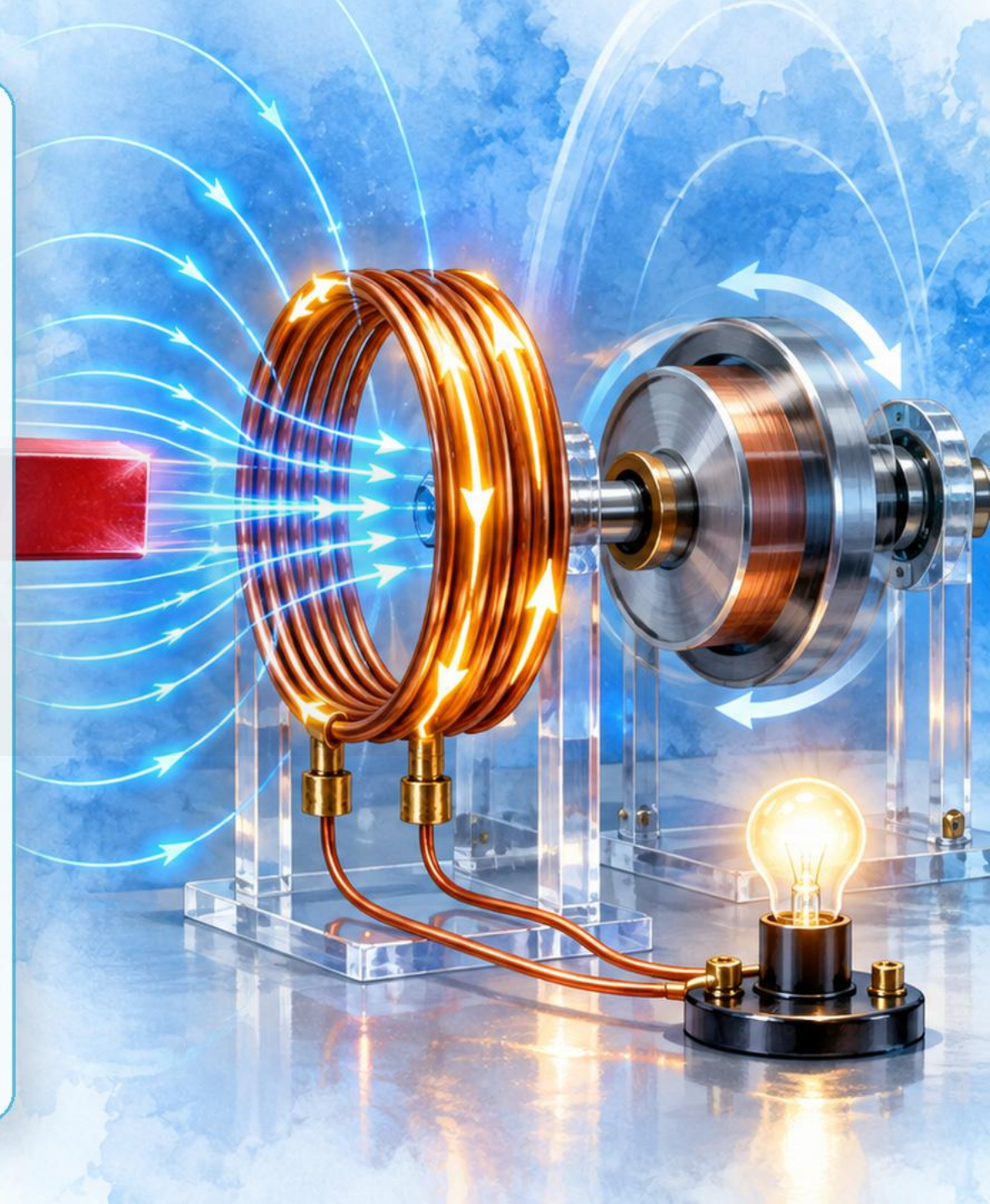


PHYSICS • CLASS 12

CHAPTER 6

Electromagnetic Induction

NCERT SOLUTIONS



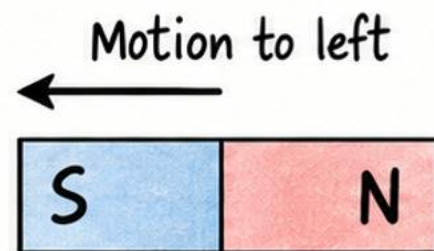
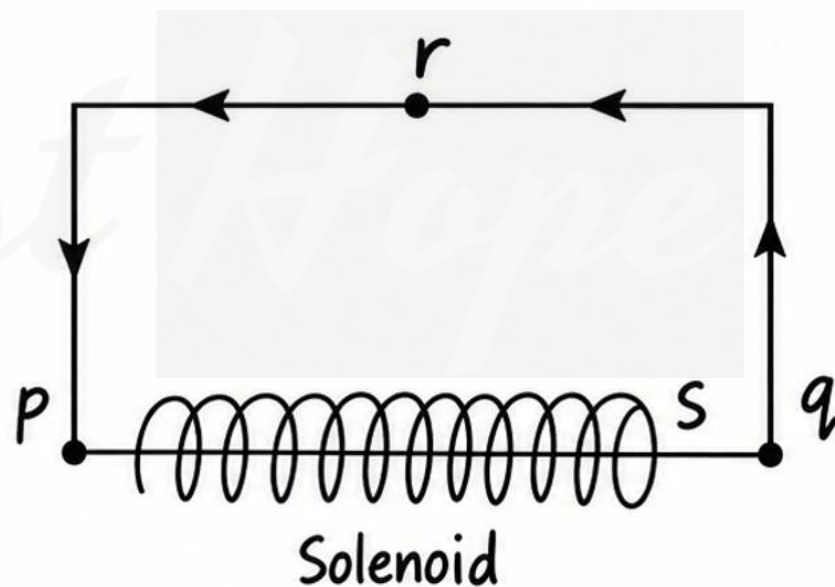
APPROACHING MAGNET — EXERCISE 6.1(a)

Q. In Fig. 6.15(a), a bar magnet moves LEFT towards a solenoid. The pole facing the solenoid is S. Predict the induced-current direction in the labelled p-q-r closed circuit.

Answer:

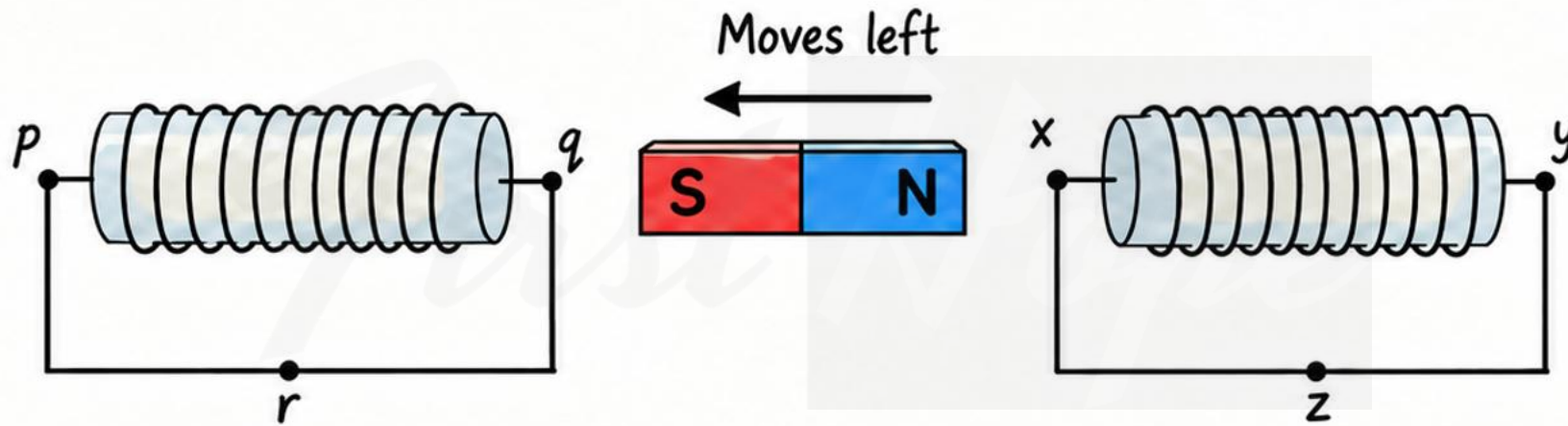
The approaching S pole increases the magnetic flux. By Lenz's law, the near solenoid face becomes S to oppose the approach.

$q \rightarrow r \rightarrow p \rightarrow q.$



MAGNET BETWEEN TWO COILS — EXERCISE 6.1(b)

Q. In Fig. 6.15(b), a S-N magnet moves LEFT between two separate solenoids. Find the induced-current direction in each labelled circuit. The LEFT circuit has p, q, r; the RIGHT has x, y, z.



Answer: The S pole approaches the left coil while the N pole retreats from the right coil. Each induced current opposes its own flux change.

Left circuit: $p \rightarrow r \rightarrow q \rightarrow p$.

Right circuit: $y \rightarrow z \rightarrow x \rightarrow y$.

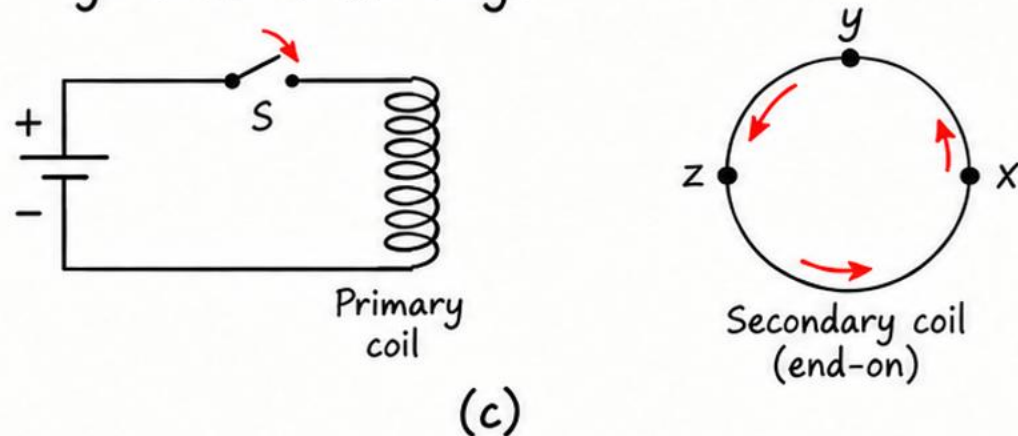
SWITCH AND RHEOSTAT — EXERCISE 6.1(c,d)

Q. In Fig. 6.15(c), a switch in the left coil's circuit has JUST CLOSED. In Fig. 6.15(d), the rheostat setting in the left coil's circuit is being changed as shown. What direction is the induced current in the right coil, whose labelled points are x (right), y (top), z (left)?

Answer:

(c) Closing the switch makes the primary current and linked flux rise. The secondary current opposes this increase. Hence, the direction of induced current in the right coil is

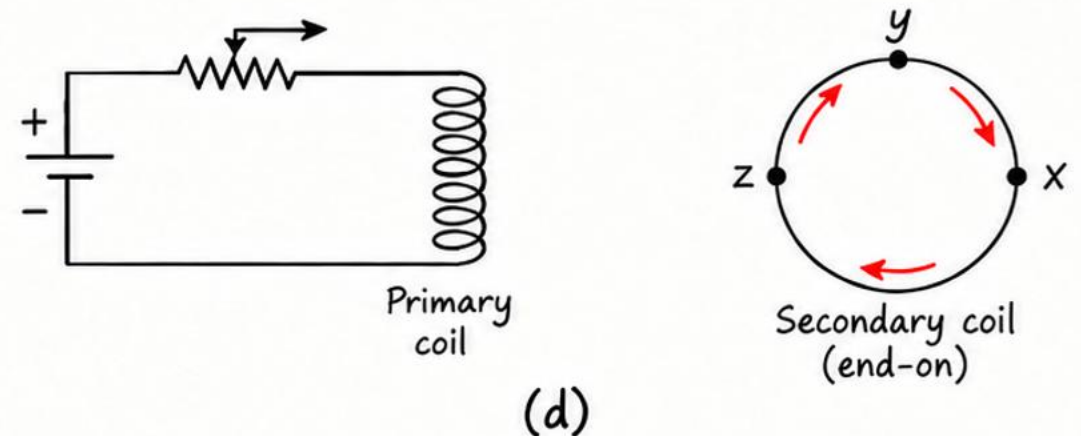
$y \rightarrow z \rightarrow x \rightarrow y$.



Answer:

(d) The shown rheostat adjustment changes the primary flux; the induced current opposes the change. Hence, the direction of induced current in the right coil is

$z \rightarrow y \rightarrow x \rightarrow z$.

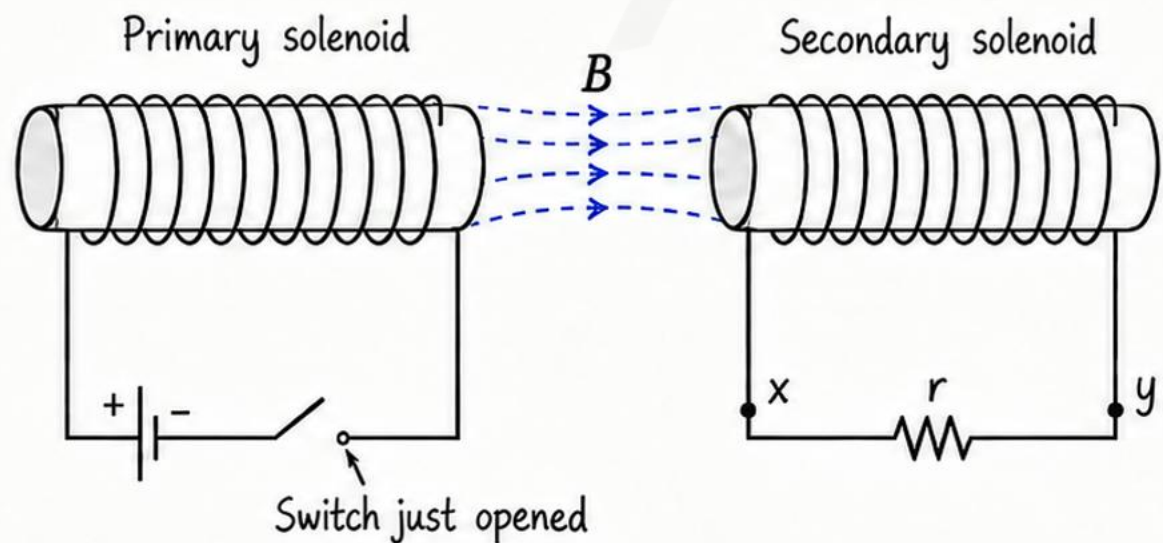


OPEN SWITCH AND ZERO FLUX — EXERCISE 6.1 (e,f)

Q. In Fig. 6.15 (e), the switch in the left solenoid's circuit has JUST OPENED; the right circuit is labelled x , r , y . In Fig. 6.15 (f), current in a straight vertical wire decreases steadily while a horizontal circular loop surrounds it. Predict the induced current in each.

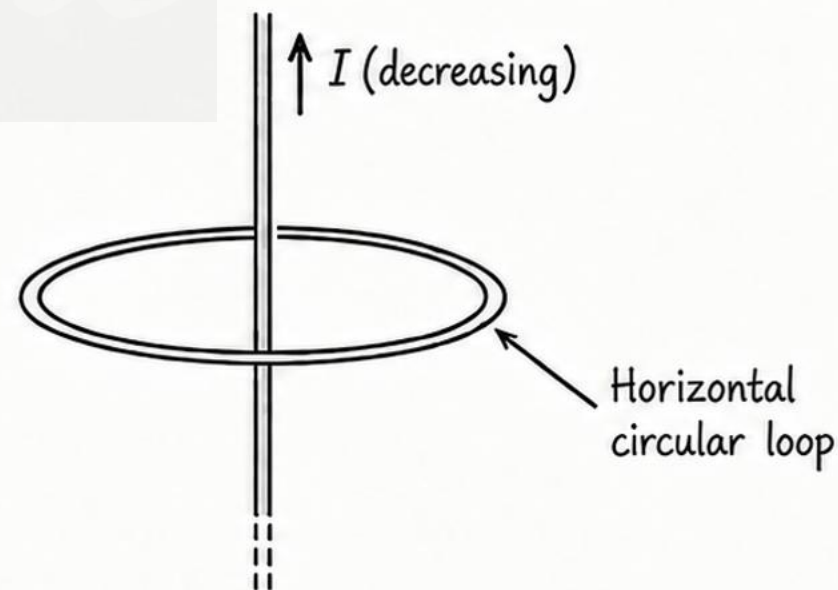
Answer: (e) Breaking the primary circuit makes its linked flux fall; the secondary current tries to keep that flux.

$x \rightarrow r \rightarrow y \rightarrow x$.



(f) The straight wire's magnetic field lies in the plane of the horizontal loop. Flux through it is zero even as current falls.

NO INDUCED CURRENT.



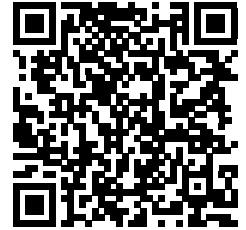


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