Generators and Transformers

Magnetism and electromagnetism · 4 questions · step-by-step answers at the end

Name: Date: Score: / 4

USEFUL EQUATIONS

$V_p / V_s = N_p / N_s \quad V_p I_p = V_s I_s$

Questions

Show your working in the space under each question.

1. Why is electricity sent along power lines at 400 000 V?

2. A transformer has 1000 turns on its primary coil and 50 on its secondary. The primary is connected to 230 V. Find the secondary voltage, and the primary current when the secondary supplies 4.0 A.

3. A magnet is pushed into a coil and a meter flicks to the right. What happens when the magnet is (a) held still inside, (b) pulled out quickly?

4. A transformer changes 230 V to 12 V and supplies 24 W. Find the primary current.

Step-by-step answers

Generators and Transformers

1. High voltage means **low current** for the same power, so much less energy is wasted heating the cables ($P = I^2R$).

2. 1. $V_s = V_p \times N_s/N_p = 230 \times 50/1000 =$ **11.5 V** (a step-down transformer).
2. Power out = $11.5 \times 4.0 = 46$ W = power in.
3. $I_p = 46/230 =$ **0.20 A**.
Answer: 11.5 V; 0.20 A

3. (a) **No reading**. (b) A **larger** flick to the **left**.

4. $I = P/V = 24/230 =$ **0.10 A**.