

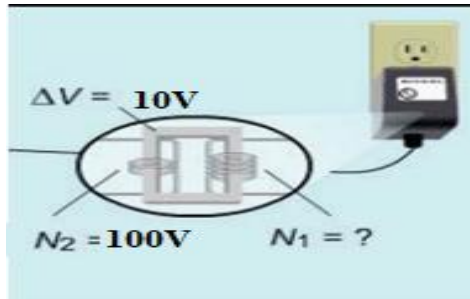
Assignment PHY101

(Solution)



Question # 1

A video game console operates potential difference of 10.00 V as shown in fig. The potential difference supplied by the power receptacle is 120 V AC. A transformer is used to convert one voltage to the other. If the secondary coil of the transformer (the 12.00 V side) has 100 loops, how many loops does the primary coil have?



Solution:

The turn equation for transformer is

$$\frac{\Delta V_1}{\Delta V_2} = \frac{N_1}{N_2}$$

$$\Delta V_1 = 120$$

$$\Delta V_2 = 10$$

$$N_2 = 100$$

We will solve it for primary number of loop

$$N_1 = \frac{\Delta V_1}{\Delta V_2} \times N_2$$

$$N_1 = \frac{120}{10} \times 100 = 1200$$

$$N_1 = 1.2 \times 10^3$$

Question # 2

- a) Is it true or wrong to say that components in series must have the same potential difference across them? Either yes or no explain it. **Marks = 5**

Solution:

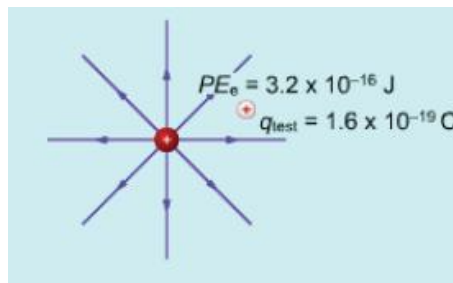
No, they have the same amount of current flowing through them. Potential difference has different values.

- b) Is it true or wrong to say that magnetic force vectors on charged particles point in the same direction as the magnetic field? Either yes or no explain it. **Marks = 5**

Solution:

No, the magnetic force vectors which act on moving, electrically charged particles are perpendicular to the magnetic field, and to the particles' velocities, as well.

- c) What is the electric potential at the location of the test charge in the figure shown below? **Marks = 5**



Solution: As we know that

$$V = \frac{P.E_e}{q_{test}}$$
$$V = \frac{3.2 \times 10^{-16}}{1.6 \times 10^{-19}}$$
$$V = 2.0 \times 10^3 V$$

Question # 3

Discuss the following statement.

“When I use the right-hand rule for any charged particle moving in a magnetic field, my thumb points in the direction of the magnetic force” either yes or no explain it with solid reason.

Solution:

No, the right-hand rule gives the direction of the force on a **positively charged particle**. For **negative particles**, the thumb points opposite to the direction of the magnetic force.

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