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Section: CSE 10

Course: CSE 250

Assignment: 1

Ans to the Q. N. 1

We know, charges can only be the integar multiple of electron's charge. We cannot take an electron partially. So, decimal multiple of electron's / ~~charge~~ proton's charge is impossible to exist.

That is why, $-3.25e$ and $+3.25e$ are impossible to exist. All the other charges here are integar multiples of e.

Ans to the Q: N: 2

Electron's charge = -1.602×10^{-19} C

charge we need to create = -9.7 C

∴ Total ~~edee~~ electrons needed = $\frac{-9.7 \text{ C}}{-1.602 \times 10^{-19} \text{ C}}$.

$= 6.0549 \times 10^{19}$

Ans to the Q^n No: 3

We know, Positive charges move from higher (V_{high}) to lower (V_{low}) voltage. and Negative charges move from lower to higher voltage.

But every object want to go to a lower potential energy (U_{low}) from higher potential energy. (U_{high}). so, positive and negative both charges goes from U_{high} to U_{low}.

B. Also, electric current always tends

to ~~for~~ flow from (V_{high}) to (V_{low}).

Because they have opposite direction of flow.

To explain a little more about the movement of the charge and relate with the voltage, we are going to use the formula for work.

For positive charge,

$$W = +qV$$

~~If~~ the work ~~done~~ done is positive, the positive charge goes from V_{high} to V_{low}.

for negative charge,

$W = -q\,\delta v$

As the work done is negative, the negative charge goes from V_{low} to V_{high}.

Ans to the Q: 4

$V_A = -18\ V$

$V_B = -8\ V$

$q = -3\ C$

$V_A < V_B$

For question 3, we explained that negative charges go from V_{low} to V_{high}. So, q goes from A to B. (left to right)

Ans to the Q. No. 5

We know,

Work done, $W = q\Delta V$

$= q(V_A - V_B)$

$= -5(-12 + 7)$

$= 25$ Joules

$q = -5$ C

$V_A = -12$ V

$V_B = -7$ V

Here, the initial voltage and the final voltage matters only. The angle the charge travelled or the ~~charge~~ voltage at the centre doesn't really matter.

Ans to the Q: N: 6

We know,

Work done, $W = q\Delta V$

$= q(V_A - V_B)$

$= -4(-11 + 7)$ Joules

$= 16$ Joules

$V_A = -11\ V$

$V_B = -7\ V$

$q = -4\ C$

Ans to the Q: N: 7

2 seconds needed to flow $9 \times 10^{-6}\ C = 9\mu C$

$\therefore$ 1 " " " " $\frac{9 \times 10^{-6}\ C}{2\ s}$

$= 4.5 \times 10^{-6}\ C$

$\therefore$ Total current $= 4.5 \times 10^{-6}\ A$