PHYSICS-2

Elementary Physics of Energy

Solution of

Quiz 1

Date: May 12, 2011 in class,   Time 30 minutes. [10] points total.

1. In each case tick one answer.

a) A power transmission line uses AC current because

(i) The transmission losses are made minimum in AC but cannot be changed in DC. (x)

(ii) AC travels quicker than DC

(iii) AC currents are safer for health.

[1]

b) A bird perching on a transmission line at 1000V will not be electrocuted because:(single line answer please)[1]

The potential drop across its body is negligible since all of its body is suspended on the line and not grounded.

c) To step up the voltage in an AC transformer, the primary coil has

(i) more windings than the secondary

(ii) less windings than the secondary. (x)

[1]

2. Two resitsors of magnitude 3 and 5 Ohms are connected (a) in series and (b) in parallel. Which resistor heats up more in the two cases? [2] *When*

in series the 5 Ohm resistor heats up more, but in parallel the 3 Ohm resistor heats up more.

3. The power of 10000 MW generated by a power plant is transmitted by a transmission line, and the current flowing through the line is 1 Ampere. Given that the final voltage at the end of the line is 9,000V, what is the resistance of the line?[5] (Show formulas used. If necessary use flip side to calculate).

Initial voltage $= Power/Current = 10000$ Volts.

Final voltage $= 9000$ *Volts (given).*

Hence voltage drop $= 1000$ *Volts across the line. But current is* 1 *Ampere hence the resistance is given from Ohms law as* $R = VoltageDrop/I = 1000\,Ohms.$