Power lines

➔At large distances, the resistance of power lines becomes significant. To transmit maximum power, is it better to transmit high V, low I or high I, low V?

- (a) high V, low I
- (b) low V, high I
- (c) makes no difference

Power loss is I^2R, so want to minimize current.

➔Why do birds sitting on a high-voltage power line survive?

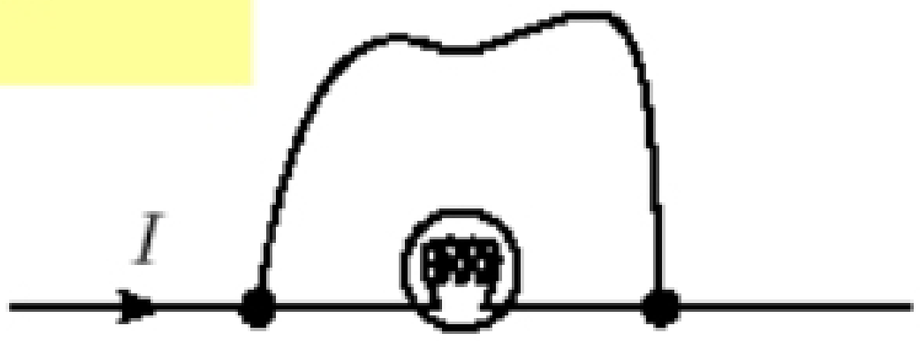
- They are not touching high and low potential simultaneously to form a circuit that can conduct current

Resistors

➔Current flows through a light bulb. If a wire is now connected across the bulb as shown, what happens?

- (a) Bulb remains at same brightness
- (b) Bulb dims to 1/4 its former brightness (1/2 current)
- (c) Bulb goes out
- (d) None of the above

The wire "shunt" has almost no resistance and it is in parallel with a bulb having resistance. Therefore voltage across shunt (and bulb) is ~ 0. Thus almost all the current follows the zero (or extremely low) resistance path.



Circuits

➔Two light bulbs A and B are connected in series to a constant voltage source. When a wire is connected across B, what will happen to bulb A?

- (a) burns more brightly than before
- (b) burns as brightly as before
- (c) burns more dimly than before
- (d) goes out

The wire shunt effectively eliminates the second resistance, hence increasing the current in the circuit by 2x. The first bulb burns 4x brighter ($I^2 R$).