Answer on Question#55903 - Physics - Electromagnetism

14. Electrical energy is sold by PHCN in units of kilowatt-hour (kWh). The lighting of a house is done with five $W_0 = 60W$ bulbs which are switched on for approximately three hours per day. What is the lighting bill for the household over a period of 30days at the rate of N1.20 per kilowatt-hour?

    N1.50

    N25.30

    N32.40

    N52.20

15. A battery has emf $\varepsilon = 13.2V$ and internal resistance $r = 24m\Omega$. If the load current is $I = 20.0A$, find the terminal voltage of the battery

    12.7V

    14.5V

    16.8V

    17.7V

Solution:

14. The total power of 5 bulbs is
$$W = 5W_0 = 5 \cdot 60W = 300W$$
They are switched on for $t = 30 \cdot 3h = 90$ hours over the period of 30 days. Therefore the total waste of energy over this period is given by
$$E = W \cdot t = 27kWh$$
This will cost the following sum for the household
$$S = 27 \cdot N1.20 = N32.40$$

15. The terminal voltage of the battery is given by the difference between its emf and the voltage drop in the internal resistance:
$$V = \varepsilon - I \cdot r = 13.2V - 20A \cdot 24m\Omega = 12.7V$$

Answer:

14. N32.40

15. 12.7V