Note Title 29/05/2011

Quiz 6a

A blender requires 210 W while working at full speed in order to frappe a smoothie. The blender motor has a resistance of 90 Ω. If the blender draws from a 120 V power source,

a. How much current does it initially draw when the motor is turned on?

b. How much back EMF is generated when the motor is running at full speed?

A blender requires 210 W while working at full speed in order to frappe a smoothie. The blender motor has a resistance of 40 Ω. If the blender draws from a 120 V power source,

a. How much current does it initially draw when the motor is turned on?

b. How much back EMF is generated when the motor is running at full speed?

a.) $V_{Back} = 0 \quad \therefore \mathcal{E} = Ir \quad I = \frac{\mathcal{E}}{r} = \frac{120V}{40\Omega} = 3\,A$

b.) $P = I^2 r \quad I = \sqrt{\frac{P}{r}} = \sqrt{\frac{210}{40}} = 2.29\,A$

$$V_{Back} = \mathcal{E} - Ir$$
$$= 120V - (2.29A)(40\Omega)$$
$$= 28V$$