

HW#1 ENGR065

#2 a) Which car has the dead battery

- The "B" (Blue) car is having the dead battery due to the current (i) that is going to the direction of car "B" (blue). Hence, car A (red) is supplying the current

b) If this connection is maintained for 1.5 min, how much energy is transferred to the dead battery

seconds

$$P = IV \quad I = 40A \quad V = 12V$$

$$E = \int_0^{t=90} (40)(12) dt$$

$$= (40)(12)[t]_0^{90}$$

$$= (40)(12)(90-0)$$

$$= (40)(12)(90)$$

$$= 43,200J$$

hours

$$E = \int_0^{0.025} (40)(12) dt = 40 \cdot (12)[t]_0^{0.025}$$

$$= 40 \cdot (12) (0.025) = \boxed{12J}$$

#3 a) Find the power supplied to the element at $t=10ms$

$$V(t) = 15e^{-250t}V \quad ; \quad i(t) = 40e^{-250t}mA$$

$$t=10ms$$

$$P(t) = VI = V(t) \cdot I(t)$$

$$P(t) = (15e^{-250t})(40e^{-250t} \cdot 10^{-3})$$

$$= \frac{(15)(40)e^{-250t-250t}}{1000} = \frac{600e^{-500t}}{1000}$$

$$P(t) = \frac{3}{5}e^{-500t} \Rightarrow P(10 \cdot 10^{-3}) = \frac{3}{5}e^{-500(10 \cdot 10^{-3})}$$

$$= 4.043 \cdot 10^{-3}W = \boxed{4.043mW}$$