HW # 1

1-32

a. 50 ms

b. 2 ms

c. 40 μs

d. 8400 ps = 8,4 ns = 0,0084 μs

e. $100 \cdot 10^3$ mm = 100 m = 0,1 Km

1-33

a. $1{,}5 \text{ min} \cdot \frac{60 \text{ s}}{1 \text{ min}} = 90 \text{ s.}$

b. $2 \cdot 10^{-2} \text{ h} = 0{,}02 \text{ h} \cdot \frac{60 \text{ min}}{1 \text{ h}} = 1{,}2 \text{ min} \cdot \frac{60 \text{ s}}{1 \text{ min}} = 72 \text{ s.}$

c. $0{,}05 \text{ s} = 50 \text{ ms} = 50 \cdot 10^3 \ \mu s = 5 \cdot 10^4 \ \mu s$

d. $0{,}16 \text{ m} \cdot \frac{1000 \text{ mm}}{1 \text{ m}} = 160 \text{ mm}$

e. $12 \cdot 10^{-8} \text{ s} \cdot \frac{10^{+9} \text{ ns}}{1 \text{ s}} = 120 \text{ ns}$

f. $4 \cdot 10^8 \text{ s} \cdot \frac{1 \text{ h}}{3600 \text{ s}} \cdot \frac{1 \text{ day}}{24 \text{ h}} = 4629{,}6 \text{ days}$

1-41

speed = 600 cm/s

$t = 0{,}016 \text{ h} \Rightarrow t = 0{,}016 \text{ h} \cdot \frac{3600 \text{ s}}{1 \text{ h}} = 57{,}6 \text{ s}$

distance ?

distance = speed x time = $600 \text{ cm/s} \cdot 57{,}6 = 34560$ cm

distance = 345,6 m

1 - 45

a) 5 Joules x 0,000948 = $4{,}74 \cdot 10^{-3}$ Btus

b) 24 ounces $\cdot \frac{1 \text{ gallon}}{128 \text{ ounces}} \cdot \frac{1 \text{ m}^3}{264\,172 \text{ gallons}} = 7{,}1 \cdot 10^{-4} \text{ m}^3$

c) 1,4 days $\cdot \frac{24 \text{ h}}{1 \text{ day}} \cdot \frac{3600 \text{ s}}{1 \text{ h}} = 120\,960 \text{ s} = 1{,}21 \cdot 10^5 \text{ s}$

d) $1 \text{ m}^3 \cdot \frac{264\,172 \text{ gallons}}{1 \text{ m}^3} \cdot \frac{8 \text{ pints}}{1 \text{ gallon}} = 2113{,}38$ pints

2-11

$V = 9 \text{ V}$ $\quad Q = \frac{W}{V} = \frac{72 \text{ J}}{9 \text{ V}} = 8 \text{ C}$ $\quad \boxed{Q = 8 \text{ C}}$

$W = 72 \text{ J}$

2-12

a) W? $\quad Q = 10^6 \cdot 10^6 = 1 \cdot 10^{12}$ electrons $\quad V = 40 \text{ V}$

$W = Q \cdot V = 1 \cdot 10^{12} \cdot 40 \text{ V} = 40 \cdot 10^{12} = \boxed{4 \cdot 10^{13} \text{ eV}}$

b) $4 \cdot 10^{13} \text{ eV} \cdot \frac{1 \text{ C}}{6{,}242 \cdot 10^{18} \text{ e}} = \boxed{6{,}41 \, \mu\text{J}}$

2-15

$I = 40 \text{ mA}$ $\quad t = 0{,}8 \text{ min} = 48 \text{ s}$

$Q = I \cdot t = 40 \cdot 10^{-3} \text{ A} \cdot 48 \text{ s} = \boxed{1{,}92 \text{ C} = Q}$

2-19

$t = 1{,}5 \text{ min} = 90 \text{ s}$ $\quad I = 4 \text{ mA} = 4 \cdot 10^{-3} \text{ A}$

$Q = I \cdot t = 4 \cdot 10^{-3} \text{ A} \cdot 90 \text{ s} = 360 \text{ mC}$ $\quad 360 \text{ mC} \cdot \frac{6{,}242 \cdot 10^{18}}{1 \text{ C}} = \boxed{2{,}25 \cdot 10^{18} \text{ electrons}}$

TOPS 35500