Name: Key Date: 10.2

$I = \frac{Q}{t}$

1000mA = 1 A

$1\,\mu C = 10^{-6} C$ $1 \times 10^{6}\,\mu C = 1 C$

Electric Current Problems

1. The filament of a light has 3150 C of charge flow through it in 35 min. What is the current in the filament?

$Q = 3150 C$

$t = 35 min \times \frac{60 s}{min} = 2100 s$

$I = \frac{Q}{t} = \frac{3150 C}{2100 s}$

$= 1.5 A$

1.5A

2. A load has a current of 88 mA flow through it. What quantity of charge flows through the load in 51 s?

$I = 88 mA \times \frac{1 A}{1000 mA}$

$= .088 A$

$Q = It$

$= (0.088 A)51$

$= 4.488 C$

4.488C

3. A heater has a current of 11 A flow through it. How many hours will it take for 80 kC of charge to flow through the heater?

$I = 11 A$

$Q = 80 kC$ or $80\,000 C$

$t =$ hrs

$t = \frac{Q}{I} = \frac{80\,000}{11}$

$= 7272.72\ldots s$

$7272.725 \times \frac{1 hr}{3600 s}$

t = 2.02 hrs

4. How many electrons are in a charge of 33 C?

$33 C$

$1 C = 6.25 \times 10^{18}$ electrons

$N = 33 \times 6.25 \times 10^{18}$

$N = 2.06 \times 10^{20}$ electrons.

5. A student from a different universe calculates that 4.6 μC of charge is 3.1×10^{13} electrons. What is the charge on an electron in that universe?

$4.6\,\mu C = 3.1 \times 10^{13}$ electrons

$4.6 \mu C \times \frac{1 C}{1 \times 10^{6} \mu C} = 3.1 \times 10^{13}$ electrons

$4.6\,\mu C = 3.1 \times 10^{13}$ electrons

$\frac{4.6 \mu C}{3.1 \times 10^{13}} = \frac{\text{electron}}{1.48 \times 10^{-19} C}$

$1.5 \times 10^{-13} \frac{\mu C}{\text{electron}}$

6. In a high voltage transmission line, 1.4×10^{22} electrons go past a tower in 25 s. What is the current in the transmission line?

$I = ?$ $t = 25 s$

$Q = 1.4 \times 10^{22}$ electrons $\times \frac{1 C}{6.25 \times 10^{18}\ ele.}$

$= 2240$

$I = \frac{2240}{25}$

$= 89.6 A$

I = 89.6 A

7. A load has a current of 12 mA flow through it. How many electrons flow through the load in 35 s?

$12 mA \times \frac{A}{1000 mA} = .012 A$

$Q = It$

$= (35 s)(0.012 A)$

$= 0.42 C$

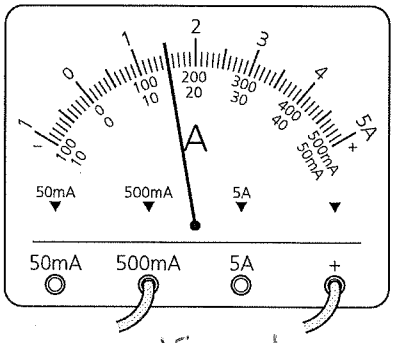
$N = 0.42 C \times \frac{6.25 \times 10^{18}}{1 C}$

$N = 2.6 \times 10^{18}$ electrons.

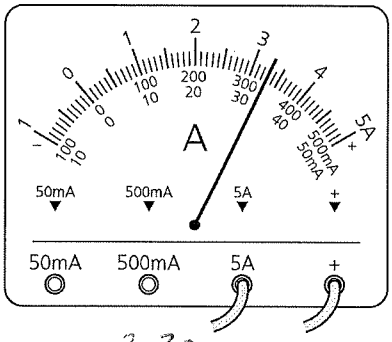
Name: _____ Date: _____ 10.2

Reading an Analog Ammeter Problems

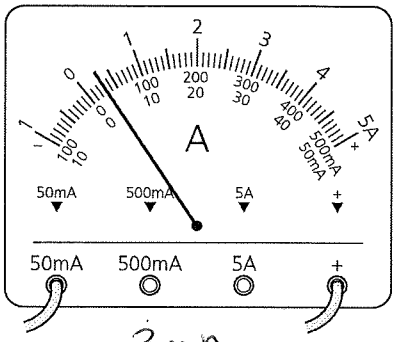
Determine the value of current indicated in the following ammeters.



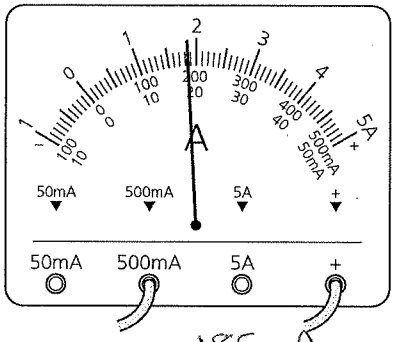
(a) 150mA



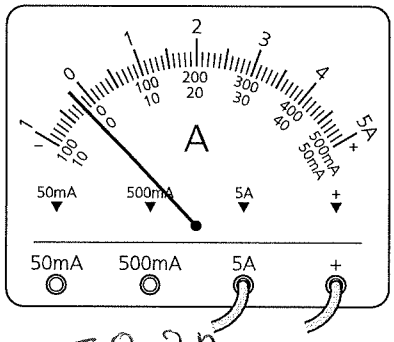
(b) 3.3A



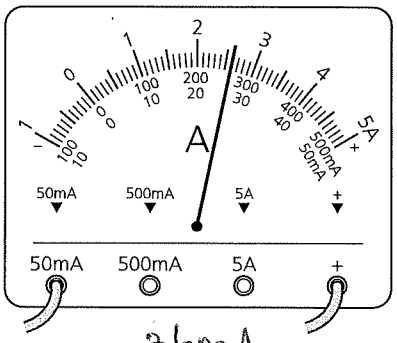
(c) 3mA



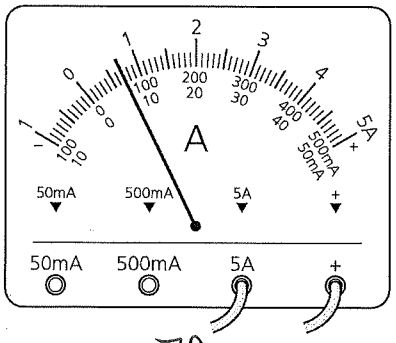
(d) 185mA



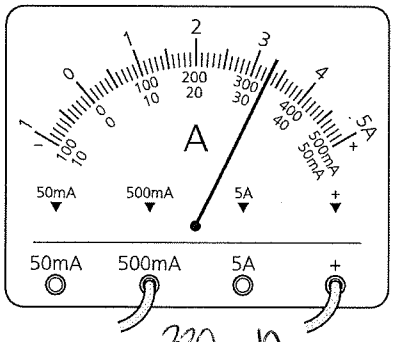
(e) -0.2A



(f) 26mA



(g) 7A



(h) 330mA