

Homework for CLRS 303 Radiation Units

1. _____ MBq = 35 mCi.

$$35 \text{ mCi} \times \frac{3.7 \times 10^{10} \text{ dps}}{1 \text{ mCi}} = 129.5 \times 10^7 \text{ dps} \text{ or } 1295 \text{ MBq} \text{ or } 1.295 \text{ GBq}$$

2. 100 GBq = _____ Ci.

$$100 \text{ GBq} \times \frac{1 \times 10^9 \text{ dps}}{1 \text{ GBq}} \times \frac{1 \text{ Ci}}{3.7 \times 10^{10} \text{ dps}} = 2.7 \text{ Ci}$$

3. Your well counter has an efficiency of 55% what is the dpm of 37,500 counts that was acquired in 5 minutes?

$$\frac{37,000}{0.55} = 67,273 \text{ (5 min)} / 5 = 13,455 \text{ dpm}$$

4. _____ R/hour = 44.5 mSv?

$$44.5 \text{ mSv} \times \frac{100 \text{ mR}}{1 \text{ mSv}} \times \frac{1 \text{ R}}{1000 \text{ mR}} = 4.45 \text{ R/hr}$$

5. 750 rad/hour = _____ mGy

$$750 \text{ rad/hr} \times \frac{1 \text{ Gy}}{100 \text{ rad}} \times \frac{1000 \text{ mGy}}{1 \text{ Gy}} = 7500 \text{ mGy}$$

6. How many mBq are in pBq?

$$1 \text{ mBq} \times \frac{10^9 \text{ pBq}}{1 \text{ mBq}} = 10^9 \text{ pBq} \text{ (what's the difference } 10^9)$$

7. There are _____ GBq is 5.7×10^8 nBq.

$$5.7 \text{ nBq} \times \frac{1 \text{ GBq}}{10^{18}} = 5.7 \times 10^{-18} \text{ GBq} \text{ (Difference } 10^{18})$$

8. How many roentgen are there in 3.55×10^7 mR?

$$3.55 \times 10^7 \text{ mR} \times \frac{1 \text{ R}}{1000 \text{ mR}} = 3.55 \times 10^4 \text{ R}$$

9. (extra credit) If you have 1 μ Ci that measures 22200 cpm in a well counter, what is its efficiency?

$$\frac{2.22 \times 10^4 \text{ cpm}}{2.22 \times 10^6 \text{ dpm}} = 1 \times 10^{-2} \times 100 (\%) = 1\%$$

$2.22 \times 10^{12} \text{ dpm} = 1 \text{ Ci}$

$3.7 \times 10^{10} \text{ dps} = 1 \text{ Ci}$