

b.  $\lambda_{\max} = 275 \text{ nm}$

c. this is the UV (ultraviolet) region

d.  $A = 1360$  or  $1.360$  (if you change  $\text{mAU} \rightarrow \text{AU}$ )

$A = \epsilon bc$  if  $c$  is  $\text{M}$  and  $b$  is  $\text{cm}$  (then  $\epsilon = \text{molar absorptivity}$ )

1360 = a standard spec has  $b = 1.00 \text{ cm}$

$1360 = \epsilon (1.00 \text{ cm})(0.00135 \text{ M})$

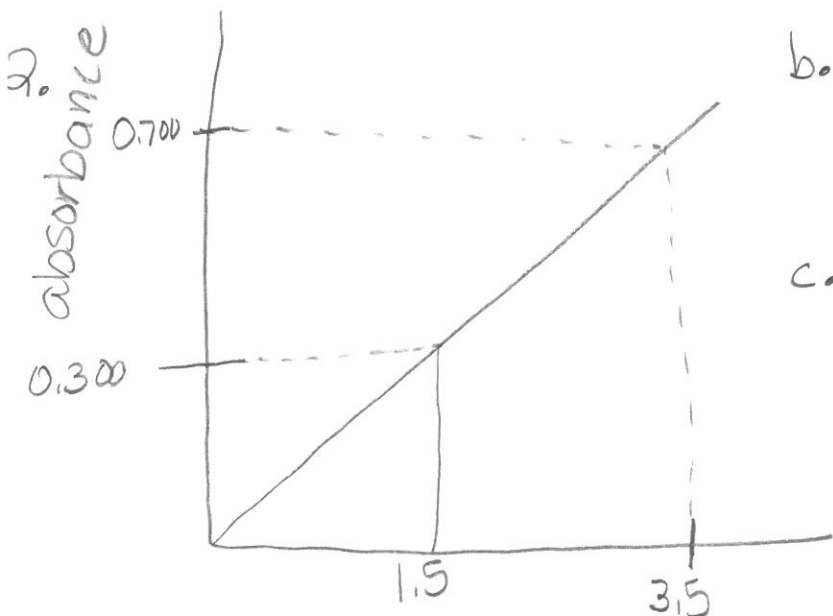
$1.360 = \epsilon (1.00 \text{ cm})(0.00135 \text{ M})$

$1.01 \times 10^6 \text{ M}^{-1} \text{ cm}^{-1} = \epsilon$

or

$1.01 \times 10^3 \text{ M}^{-1} \text{ cm}^{-1} = \epsilon$

no units on  $\epsilon$  is acceptable as they are "understood"



b.  $m = \frac{\Delta y}{\Delta x} = \frac{0.7 - 0.3}{3.5 - 1.5} = \frac{0.4}{2.0} = 0.200 \text{ ppm}^{-1}$

$b = \text{zero}$

c.  $a = \text{slope}$

$a(2.00 \text{ cm}) = 0.200 \text{ ppm}^{-1}$

$a = 0.100 \text{ ppm}^{-1} \text{ cm}^{-1}$

concentration (ppm) - values too high for  $\text{M}$ .

2d.

Sol'n
1.354g Sample
$V_1 = 100.0 \text{ mL}$

$$A = 0.360$$

$$A = abc$$

$$0.360 = (0.100 \text{ ppm}^{-1} \text{ cm}^{-1})(2.00 \text{ cm})c$$

$$1.80 \text{ ppm} = c$$

$$1.80 \frac{\text{mg}}{\text{L}} (0.100 \text{ L}) = 0.18 \text{ mg analyte}$$

$$\frac{0.18 \text{ mg analyte}}{1.354 \text{ mg sample}} \times 100 = 0.0133\%$$

3. a.  $35.4\%T \Rightarrow T = 0.354$

$$A = -\log T = -\log(0.354) = 0.451$$

b.  $A = 0.269$

$$0.269 = -\log T \quad T = 10^{-0.269} = 0.538$$

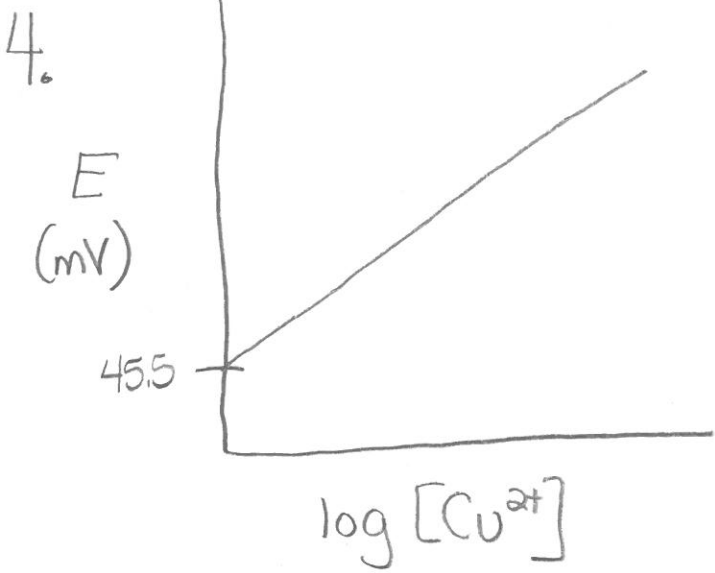
$$53.8\%T$$

c. oops forgot concentration = using 10.0 ppm for no particular reason

$$\%T = 15.9\% \Rightarrow T = 0.159 \Rightarrow A = 0.799$$

$$0.799 = a(1.00 \text{ cm})(10.0 \text{ ppm})$$

$$0.0799 \text{ ppm}^{-1} \text{ cm}^{-1} = a$$



b. use Ag/AgCl ref

c. Slope  $\approx \frac{60 \text{ mV}}{n}$

for ISE  $n = \text{charge}$

Slope =  $\frac{60 \text{ mV}}{+2} = 30 \text{ mV}$

d.  $y = mx + b$

$E = 30 \log[\text{Cu}] + 45.5$

$84.0 = 30 \log[\text{Cu}] + 45.5$

$38.5 = 30 \log[\text{Cu}]$

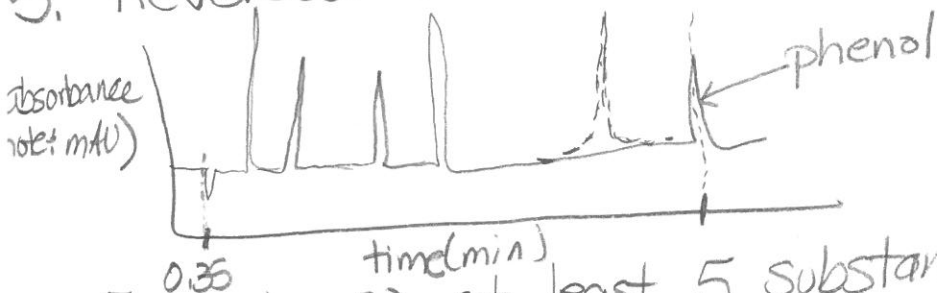
$1.28 = \log[\text{Cu}]$

$19 \text{ M} = [\text{Cu}]$

f. use 100% (100%)

1.28 =

### 5. Reversed-Phase HPLC



a. 5 peaks so at least 5 substances

b. dead time @ first signal  $t_m = 0.35 \text{ min}$

c. time @ top of last peak  $t_R = 2.9 \text{ min}$

d. more polar has shorter  $t_R$  in reversed-phase  
new substance  $\Rightarrow$  new peak

f. any polar solvent  
e.g. water  
methanol  
isopropyl alcohol  
acetonitrile

g. only 2 peaks  
and phenol  
peak would  
be smaller