

Complete the following problems. You must show your work to receive full credit. Show your answers to the correct number of significant figures with the correct units.

1. One prescription medication for asthma is an inhaler containing albuterol, whose molecular formula is  $C_{13}H_{21}NO_3$ . Over 18 million prescriptions for albuterol were filled in 2016, making it the third most prescribed drug in the US. Answer the following regarding albuterol.
  - a. What is the mass percent of nitrogen in albuterol? (8 pts.)
  
  
  
  
  
  
  
  
  
  
  - b. If 100.0 doses of albuterol retail for \$85.00 and each dose contains 180  $\mu\text{g}$  of the active ingredient, what is the price of one mole of albuterol? (8 pts.)
  
  
  
  
  
  
  
  
  
  
2. Adenine, a component of nucleic acids, has a mass percent composition of 44.45% C, 3.73% H and 51.82% N. Its molecular mass is 135.14 grams per mole. What are the empirical and molecular formulas for adenine? (9 pts.)

## Possibly Useful Information

$\% \text{ by mass} = \frac{\text{g component}}{100 \text{ g sample}}$	$N_A = 6.02 \times 10^{23}$
Don't walk between parked cars... ...or moving ones!	$1 \text{ cm}^3 = 1 \text{ mL}$ $1000 \text{ cm}^3 = 1 \text{ L}$

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*Lanthanide series	58 Ce 140.115	59 Pr 140.908	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.965	64 Gd 157.25	65 Tb 158.925	66 Dy 162.50	67 Ho 164.930	68 Er 167.26	69 Tm 168.934	70 Yb 173.04	71 Lu 174.967
†Actinide series	90 Th 232.038	91 Pa 231.036	92 U 238.029	93 Np 237.048	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)

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