

NAME/TEAM: _____

GC/MS of Gasoline Postlab

Last modified: June 17, 2014

1. List the elution times from your gas chromatogram for benzene, toluene, and o-xylene. Can you find the qualitative relationship between these elution times and the structural attributes of the compounds?

Compound	Elution Time
Ethanol	
Benzene	
Toluene	
o-xylene	

2. You identified the molecules at specific retention times by their mass spectra. Fill the following table based on your observations. Explain why the mass corresponding to the highest peak in the observed mass spectrum is not the same as the molecular weight.

Compound	Molar Mass (g/mol)	1 st highest peak in mass spectrum	2 nd highest peak in mass spectrum	3 rd highest peak in mass spectrum
Ethanol				
Benzene				
Toluene				
o-xylene				

NAME/TEAM: _____

3. List your (v/v) % values in the following table:

Compound	Volume concentration (%)	(w/w) %
Ethanol		
Benzene		_____

Convert your v/v % ethanol in gasoline to units of mass % (w/w %) of oxygen in gasoline. (Density of ethanol = 0.789 g/mL, Density of gasoline = 0.66 g/mL). Use dimensional analysis properly for this one! List your answer in the Table above.

4. The 1990 Clean Air Act Amendment required a minimum value of 2.0 % oxygen by mass in gasoline. Compare this to the value you measured in step 4 using % relative error.
5. The 1990 average v/v % of benzene in gas is approximately 0.95%. Compare this to the value you measured using % relative error.
- $$\%RE = \frac{|\text{true value} - \text{your value}|}{\text{true value}} \times 100$$