
 NUMERICAL ANSWERS TO ASSIGNED TUTORIAL PROBLEM SETS FOR CHEM206
 FROM KOTZ & TREICHEL'S CHEMISTRY & CHEMICAL REACTIVITY, 6th Ed.

NOTE: the answers from Ch.13 have not been verified. Please report any errors.

Ch.	Q#	Answer	Units	SFs	Comments
13	2				I ₂ (s): induced dipole - induced dipole
13	2				CH ₃ OH: hydrogen bonding
13	2				I ₂ & CH ₃ OH: induced dipole - dipole
13	4a				induced dipole - induced dipole
13	4b				hydrogen bonding
13	4c				dipole - dipole
13	4d				induced dipole - induced dipole
13	6				increasing forces: He < butane < methanol
13	6				gases at RT / 1atm: He, butane
13	8				HCO ₂ H (formic acid)
13	12	1.99	kJ	3	
13	18				predict bp CH ₄ < CO < NH ₃ < SCl ₂
13	20a				increase
13	20b				increases
13	20c				no change
13	20d				increases
13	22	38.5 402	kJ/mol K		= ΔH _{vap} , via Clausius-Clapeyron equation = T at which P _{vap} = 760 mm Hg (via Clausius-Clapeyron Eqn) = 129°C, while the actual boiling point is 126°C (close!)
13	40a				induced dipole - induced dipole
13	40b				hydrogen bonding
13	43	60.	mol	2	only 17mol is present → all will evaporate (see solutions manual)
13	44				ICI (polar molecule)
13	44				krypton (greater molar mass)
13	44				ethanol (hydrogen bonding)
13	47	350	mm Hg	2	(note: also in solutions manual...)
13	47				ethanol
13	47	84	°C	2	
13	47				CS ₂ 46°C; C ₂ H ₂ OH 78°C; C ₇ H ₁₆ 99°C
13	47				CS ₂ gas; C ₂ H ₂ OH gas; C ₇ H ₁₆ liquid

Ch.	Q#	Answer	Units	SFs	Comments
13	52				increasing forces: $\text{CO}_2 < \text{CH}_3\text{Cl} < \text{HCO}_2\text{H}$
13	60	9.12×10^{-8} 5.49×10^{19}	mol/L atoms/m ³	3 3	using ideal gas law using definition of mole, & L → m ³ conversion
13	72				1-propanol (H-bonding) > methyl ethyl ether (dipole-dipole)
13	76	The volatile liquid has a low boiling point. Warming the lower compartment in your hands increases the number of molecules in the vapour phase, raising the vapour pressure acting on the liquid. The connecting tube reaches to the bottom of the lower chamber (a little hard to see), so the extra pressure forces the liquid up the tube into the upper chamber.			
13	86a	refer to the CD-ROM...			
	86b	There are three C=O groups that are highly polar and can interact with the polarized H atoms of water (C=O are hydrogen bond acceptors). In addition, there are two NH groups (both donor & acceptor) and one –OH group (both donor and acceptor) that can participate in hydrogen bonding with water.			