
 NUMERICAL ANSWERS TO ASSIGNED TUTORIAL PROBLEM SETS FOR CHEM205
 FROM KOTZ & TREICHEL'S CHEMISTRY & CHEMICAL REACTIVITY, 6th Ed.

NOTE: none of the answers from Ch.3 have been verified

Ch.	Q#	Answer	Units	SFs	Comments
3	4				refer to the model on the text's CD to picture the molecule in 3D
3	6a				Se ²⁻
3	6b				F ⁻
3	6c				Fe ²⁺ , Fe ³⁺
3	6d				N ³⁻
3	8a				MnO ₄ ⁻
3	8b				NO ₂ ⁻
3	8c				H ₂ PO ₄ ⁻
3	8d				NH ₄ ⁺
3	8e				PO ₄ ³⁻
3	8f				SO ₃ ²⁻
3	14a				1 Mg ²⁺ , 2 CH ₃ CO ₂ ⁻
3	14b				1 Al ³⁺ , 3 OH ⁻
3	14c				1 Cu ²⁺ , 1 CO ₃ ²⁻
3	14d				1 Ti ⁴⁺ , 2 SO ₄ ²⁻
3	14e				1 K ⁺ , 1 H ₂ PO ₄ ⁻
3	18a				incorrect, CaO
3	18b				correct
3	18c				incorrect, Fe ₂ O ₃ or FeO
3	18d				correct
3	20a				calcium acetate
3	20b				nickel(II) phosphate
3	20c				aluminum hydroxide
3	20d				potassium dihydrogen phosphate
3	22a				Ca(HCO ₃) ₂
3	22b				KMnO ₄
3	22c				Mg(ClO ₄) ₂
3	22d				K ₂ HPO ₄
3	22e				Na ₂ SO ₃
3	24				Mg ₃ (PO ₄) ₃ magnesium phosphate
3	24				Mg(NO ₃) ₂ magnesium nitrate
3	24				Fe(NO ₃) ₃ iron(III) nitrate
3	24				FePO ₄ iron(III) phosphate
3	26				stronger forces in CaO due to greater ion charges.
3	28a				dinitrogen pentoxide
3	28b				tetraphosphorus trisulfide
3	28c				oxygen difluoride
3	28d				xenon tetrafluoride
3	30a				BrF ₃
3	30b				XeF ₂
3	30c				N ₂ H ₄
3	30d				P ₂ F ₄
3	30e				C ₄ H ₁₀
3	32a	446.14	g/mol	5	Fe(C ₆ H ₁₁ O ₇) ₂
3	32b	90.19	g/mol	4	CH ₃ CH ₂ CH ₂ CH ₂ SH
3	32c	324.42	g/mol	5	C ₂₀ H ₂₄ N ₂ O ₂

Ch.	Q#	Answer	Units	SFs	Comments
3	34a	126.07	g/mol	5	H ₂ C ₂ O ₄ ·2H ₂ O
3	34b	246.48	g/mol	5	MgSO ₄ ·7H ₂ O
3	36a	29.8	g	3	C ₁₄ H ₁₀ O ₄
3	36b	36.9	g	3	Pt(NH ₃) ₂ Cl ₂
3	40a	1.80x10 ⁻³	mol	3	C ₉ H ₈ O ₄
3	40a	0.02266	mol	4	NaHCO ₃
3	40a	5.205x10 ⁻³	mol	4	C ₆ H ₈ O ₇
3	40b	1.08x10 ²¹	molecules	3	C ₉ H ₈ O ₄
3	42a				57.82% C, 6.066% H, 16.86% N, 19.26% O
3	42b				76.86% C, 12.90% H, 10.24% O
3	42c				24.77% Co, 29.80% Cl, 5.084% H, 40.35% O
3	46	2.4x10 ³	g	2	FeTiO ₃
3	54				2.630 mol N, 3.948 mol O → ratio 2N:3O → N ₂ O ₃
3	56				molecular formula C ₁₀ H ₁₄ N ₂
3	58	12	waters/formula unit		KAl(SO ₄) ₂ ·12H ₂ O
3	68a	2.3x10 ²²	atoms	2	in 1.0 g BeCl ₂
3	68b	1.9x10 ²²	atoms	2	in 1.0 g MgCl ₂
3	68c	1.7x10 ²²	atoms	2	in 1.0 g CaS
3	68d	2.0x10 ²²	atoms	2	in 1.0 g SrCO ₃
3	68e	1.6x10 ²²	atoms	2	in 1.0 g BaSO ₄ → largest # atoms is in the BeCl ₂ sample.
3	78a	62.07	g/mol	4	38.70% C, 51.55% O
3	78b	90.08	g/mol	4	40.00% C, 53.29% O dihydroxyacetone has larger %C & %O
3	80	36.76%	Fe	4	tablet containing FeSO ₄ → delivers more iron than other tablet
3	80	12.52%	Fe	4	tablet containing Fe(C ₆ H ₁₁ O ₇) ₂
3	84a				saccharin = C ₇ H ₅ NO ₃ S
3	84b	72.69%	C	4	
3	84c	7.57x10 ⁻⁴	mol	3	moles saccharin in 0.125g
3	84d				4.56x10 ²⁰ molecules → 4.56x10 ²¹ C atoms
3	86a				chlorine trifluoride
3	86b				nitrogen trichloride
3	86c				strontium sulfate, ionic
3	86d				calcium nitrate, ionic
3	86e				xenon tetrafluoride
3	86f				phosphorus trichloride
3	86g				potassium iodide, ionic
3	86h				aluminum sulfide, ionic
3	86i				oxygen difluoride
3	86j				potassium phosphate, ionic
3	88				NH ₄ ⁺ Br ⁻ ammonium bromide NH ₄ Br
3	88				Ba ²⁺ S ²⁻ barium sulfide BaS
3	88				Fe ²⁺ Cl ⁻ iron(II) chloride FeCl ₂
3	88				Pb ²⁺ F ⁻ lead(II) fluoride PbF ₂
3	88				Al ³⁺ CO ₃ ²⁻ aluminum carbonate Al ₂ (CO ₃) ₂
3	88				Fe ³⁺ O ²⁻ iron(III) oxide Fe ₂ O ₃
3	92				empirical formula C ₂ H ₆ As; molecular formula C ₄ H ₁₂ As ₂
3	94				Ni(CO) ₄
3	98	148	g	3	of Sb ₂ S ₃
3	102a				T
3	102b				T
3	102c				T
3	102d				F (really 9.07 g H)
3	104	47.9	g/mol	3	M = Ti, titanium
3	108				hint : use 2 equations for 2 unknowns. Z = 18 g/mol; A = 26 g/mol
3	116				see simulation on CD, and end of section 3.3