

# CHEMISTRY 350 PROBLEMS, USING WADE 7

Chapter Topic	Wade Chap	Wade 7 Problems In the Chapter	Wade 7 Problems Back of the Chapter	Carey Chap	Carey 8 Problems
<b>Intro and Review</b>	<b>1</b>	1(Si only), 2a-f, 3a-g, 4, 5a-c, 6(all!), 7a,b,d,e,g, 8a,e,f,g,h, 9, 10d-h, 11, 15, 17a, 18a-c, 19a-f [determine which is the "nucleophile" (electron pair donor) and which is the "electrophile" (electron pair receiver), and draw the arrows to show bond making and breaking. Do not do the "Bonsted-Lowry" discussion.]	21, 23, 25-29, 31, 32, 34-37, 40-43, (for 42 and 43, you should be able to process H <sub>2</sub> SO <sub>4</sub> by memory, the others by structure without needing to look at a list of acidity values), 44 (use nucleophile/electrophile designation, and definitely practice the arrow pushing), 46	<b>1</b>	1, 3-8, 10, 12-19, 22, 24-26, 29, 30, 31a, 33, 37, 41, 42, 44, 46, 47, 48, 50-52, 54-57, 60, 65, 69-71, 75-78
<b>Structure and Properties</b>	<b>2</b>	1b (draw), 2 (skip part about 104.5° angle as opposed to 109° angle), 3, 4, 5a-f, 7a,b, 8, 9, 10 (three do, three don't; beware of "e", which is deceptive), 11, 16, 17 (omit a), 18-20, 21 (skip d), 22 [Note: for functional group problems, skip the "cyclic" designation!]	27, 28, 29 (we will see this is crucial to the performance of all proteins!), 30, 31, 33-35, 38-40, 41 (skip c), 42, 44	<b>1</b>	See list of problems above from Carey's Chapter 1.
<b>Alkanes</b>	<b>3</b>	1a, 2a, 3, 4a-e, 5, 6a,b, 7a,b, 9a, 11-13, 15b-d, 16, 17a,b, 18-21, 25-29	33, 34 (omit c and d), 35 (omit b), 37 (omit e,g,h), 38, 39, 40b, 42, 43a,b, 44, 46	<b>2,3</b>	Ch 2: 3-5, 8, 10, 11a,b, 18, 19, 21, 22a,b, 23, 24a,b, 25, 26, 29, 30a,b, 43, 44 Ch 3: 1-4, 7, 8, 11, 12, 17, 19-24, 27, 28, 32a-e
<b>Chemical Reactions.</b>	<b>4</b>	1a-c, 2, 3, 4a, 9a, 11-13, 15, 16, 18, 19a-d, 24, 25, 28-32.	35-39, 41, 42a, 43, 44, 46 (skip d) (Be Sure to do 46, very important)		16, 18 (prop. only), 19, 20, 22,
<b>Stereo chemistry</b>	<b>5</b>	2 (label as chiral or achiral. If chiral, also draw the enantiomer.), 3 (star chiral C's, identify each chiral molecule, and be able to draw the enantiomers.), 4, 5 (assign as chiral or achiral), 6 [skip f,g. For all others, give the (R)/(S) designations.], 14, 20a-e, 21 (skip f), 22, 23c	26a,c,d,j-p, 27, 30d, f-h 31a, f-i, 36	<b>7</b>	1, 2, 3c,d, 4, 5, 9, 10, 13, 15, 22, 23, 24, 26, 27, 32-34, 38a,c-f,h-k
<b>Alkyl Halides: SN2, SN1, E2, E1 Reactions</b>	<b>6</b>	1, 2c,e,f, 3 (parts 1 and 3, don't classify B or name k), 6, 7 (the density of chloroform is 1.50), 8a, 10 S <sub>N</sub> 2 Reactions: 11-13, 14a,b,d,e, 15(skip b,g), 16, 18 (skip neopentyl bromide. And, substitution is more important than leaving group), 19a,b, 20(skip c,e,f), 21 [(the catch here is to understand why inversion can occur if (S) goes to (S)] S <sub>N</sub> 1 Reactions: 22, 23, 24, 25, 26 (skip the mechanisms, but note how rearrangement forms a more stable cation), 27, 29 (very interesting. Probably not test fodder.) Elimination reactions: 30, 31, 32, 33b-d, 34-39, 40	42a,c-e, 43a-c,e,f, 44**, 45("solvolysis" is substitution by solvent, and is always S <sub>N</sub> 1), 46, 48-54, 56, 59-61	<b>4, 5, 8</b>	Ch 8: 1-3, 5, 7, 9-11, 15b, 16, 18, 20, 22a-g, 23, 24, 25a-f, 30, 31, 32a,b,d-h, 33a, 34, 40, 47, 49-51  Ch 5 (E2/E1): 22-24, 36, 37a,b,e, 40c,d,g,h,i,j
<b>Alkenes</b>	<b>7</b>	1 (for b, counting geometric isomers, I count 14 possible alkene isomers and 15 possible cyclic isomers! The answer book only shows a few of the possibilities.), 4, 5a,b,c,f,g,h, 6a,d,e, 7a,c,e(name is ambiguous), 8a,c,e, 10a-d (more stable only. Skip the part about how much difference in energy), 12a,c, 13, 16, 17, 18, 19, 24, 25, 27-29 (note: in 28a, 29c,d cation rearrangements occur. I won't ask for mechanisms with cation rearrangement on your test, but a simple elimination of H <sub>2</sub> O such as 29b or c is extremely likely.)	31, 32a,b,d, 33, 34 (for part c: how many rings does it have?), 36a-c, 38 (try to predict the major product. For test purposes I usually wouldn't want the minors), 39a,b,d (the point is to predict the major product), 44, 45	<b>5</b>	1, 2, 4, 11-17, 19, 22-24, 28a-h, 30, 33a-d (rank), 34a,b, 36, 37, 40
<b>Alkene Addition Reactions</b>	<b>8</b>	1-4, 6, 8-11, 13-21(look at answer to e, just for interest sake), 22 (for b, book answer is poor. Should use a hindered base), 23, 24, 29, 30 (mech for ring-opening only), 32b,d, 33, 34b-f, 35 (d,l means racemic mix of chiral products), 36, 37	47 (good practice for "predict the product" reactions.), 48a, b, c,e,f 49a,b,c,d,e,f,h, 50a-l, 59-61, 68	<b>6</b>	1-5, 8, 9, 15, 19, 21, 26a-h, 27, 28, 32, 34, 36a-f,l,k, 37b-d, 42, 58-61, 63, 65-69  Ch 15: 5
<b>Conjugated Systems</b>	<b>15</b>	1, 2, 4, 5, 6, 7(skip c), 9, 10-11(NBS=Br <sub>2</sub> /hv), 12, 13, 14, 15 (skip d), 16 (ignore stereochem), 18	24, 25a-d,g-i, 26, 27, 30, 31, 33a-f	<b>10</b>	1, 2, 4, 7, 8, 9, 10, 13, 14, 16, 17, 18, 19, 25a, 28a-f, 29, 30, 32, 33, 35, 36a-c, 37, 41, 42, 47, 48, 49, 50
<b>Aromatics</b>	<b>16</b>	3(skip cyclooctatetraene), 5, 7b-d, 8, 9a, 10, 11, 12, 15, 16 (purine picture on top of page), 19, 24a, c,e,g	27a-f, 28a-c,e,f, 29, 32, 34 (hint: N lone pairs are strongly basic when sp <sup>3</sup> or sp <sup>2</sup> but weakly basic when p), 35, 36, 37 ("xylene" means dimethyl benzene), 43	<b>11</b>	1, 2, 3a,c, 13, 15, 18, 21, 24, 25, 26, 33f,l, 34, 36a, 39a-d, h, i, 43a, b, e, f, 44, 45, 46, 47, 50, 51, 59, 60, 61, 63
<b>Aromatic Reactions</b>	<b>17</b>	2, 4(p-xylene is 1,4-dimethylbenzene), 6, 7, 8, 9, 12a, 14, 15, 16b(i-iv), 17a,c, 20a-c, 21, 22(skip c,d), 33, 34 (1), 36, 37	44a,b,d,f,h,j,l, 45, 46a,b,c,f,g, 47b-f,h,i,j,l, 48, 49, 51, 57, 60, 61	<b>12</b>	2, 3, 4, 6, 10, 12, 15, 17, 18, 19, 21, 22, 23, 24, 34a-k, 35a-f, 36a,c,d,f, 37, 38, 39a-l,n, 44, 45a-d,g,l,m, 46a,c-e, 47a,b,d, 50, 52 Ch 11: 10, 11

<b>Chemistry 341, Jasperse, Based on Wade Version 7</b>		Reading
Class	Topic	Assignment
	Intro. Octet Rule, Lewis Structure, Electroneg, Polarity, Formal Charge Resonance; Structural Formulas; Acids/Bases, Electrophiles/Nucleophiles Orbitals, $\pi$ -Bonds, Hybridization + Shape; Drawing 3-D Shapes Bond Rotation, Isomerism, Polarity, Intermolecular Forces, Solubility Classification of Organic Compounds. The Functional Groups. Classification, Formulas, Physical Properties, Nomenclature of Alkanes Conformations and Stability of Acyclic Alkanes and Cycloalkanes Conformations and Stability of Cyclohexanes Alkane Chlorination. Factors to Think About in a Chemical Reaction. Transition States, Multistep Reactions, Halogenation of Higher Alkanes. Reactive Intermediates (Radicals, Cations, Anions) Chirality, R/S Classification of Chiral Carbons. Miscellaneous Stereochemistry Diastereomers; More than One Chiral Carbon Catchup Nomenclature, Structure, Properties, Reactivity of Alkyl Halides.	1.1-1.6 1.7-1.14 2.1-2.6 2.7-2.11 2.12-2.14 3.1-3.5 3.6-3.12 3.13-3.16 4.1-4.9 4.10-4.14 4.15-4.16 5.1-5.3 5.4-5.9 5.11-5.16 Catchup 6.1-6.7
		Skip 5.10
	The $S_N2$ Substitution Reaction. The $S_N1$ Substitution Reaction. The $E1$ and $E2$ Elimination Reactions. Substitution vs. Elimination? Catchup Alkenes: Structure, Nomenclature, Isomers. Alkene Stability; Synthesis. Synthesis of Alkenes; Classifying/Recognizing Reaction Mechanisms; Alkenes	6.8-6.12 6.13-6.16 6.17-6.21 Catchup 7.1-7.6 7.7-7.10 7.10-8.2
		Skip 7.11
	Addition of H-Cl, H-Br, and H-OH to Alkenes. Oxymercuration/Demercuration; Hydroboration/Oxidation; Hydrogenation Addition of Halogens, Formation of Halohydrins; Epoxidation	8.1-8.5 8.5-8.7,8-10 8.8-8.9
		Skip 8.11
	Oxidation Reactions of Alkenes Catchup; Practice Problems	8.12-8.16 Catchup
	Intro; Conjugation, Molecular Orbitals, Dienes, Allylic Cations, Diene Additions More allylic cations/radicals/conjugation and Applications; Diels-Alder Reaction Diels-Alder Reaction, Aromaticity Aromaticity; Huckel's Rule, Complex Aromaticity, Application, Nomenclature	14.1-2 14.3-4 14.4-5 15.1-8
		Skip: 14.6-10
	Electrophilic Aromatic Substitution: Intro, Mechanisms Reactions in Detail: Halogenation, Nitration, Sulfonation, Alkylation, Acylation Catchup; Addition to Disubstituted Benzenes; Synthetic Applications Synthetic Applications; Practice	16.1-5 16.1-5 16.6,9-11 Practice