

# ORGANIC CHEMISTRY I PROBLEMS, USING WADE 8

Amazon link, for Used Textbooks and Solutions Manuals (Cheap)

- Organic Chemistry (8th Edition) by L. G. Wade Jr

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<u>Chapter Topic</u>	<u>Wade Chap</u>	<u>Wade 8 Problems In the Chapter</u>	<u>Wade 8 Problems Back of the Chapter</u>
<b>Intro and Review</b>	<b>1</b>	2a-f, 3a-h, 4, 5a-c, 6 (omit boron ones), 7a,b,d,e,g, 8a,e,f,g,h, 9, 10, 11, 15, 17a, 18a,c,e,f, 19.1,2a-f [determine which is the "nucleophile" (electron pair donor) and which is the "electrophile" (electron pair receiver).]	23, 25-29, 31, 34, 35.1, 36, 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), 45 (use nucleophile/electrophile designation, and definitely practice the arrow pushing), 46, 47a,b,d
<b>Structure and Properties</b>	<b>2</b>	1b (draw), 3, 4, 5, 8, 9, 10 (three do, three don't), 11, 16 (structures are on previous page), 17 (omit a), 18-20, 21 (skip d), 22 [Note: for functional group problems, skip the "cyclic" designation!]	23, 26, 27, 33-35, 38-40, 41 (skip c), 42, 44
<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, 49
<b>Chemical Reactions.</b>	<b>4</b>	1a-c, 2, 4a, 9a, 11-13, 18, 19a-d, 24, 25, 28-32.	34-39, 41-44, 46a,b,e
<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	25, 26a,c,d,j-p, 27, 30d, f-h 31a, f-i, 36
<b>Alkyl Halides: SN2, SN1, E2, E1 Reactions</b>	<b>6</b>	1, 2c,e,f, 3.1,3, 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), S <sub>N</sub> 1 Reactions: 22, 23, 24, 25, 27, 29 (very interesting. Probably not test fodder.) Elimination reactions: 30, 31, 32, 33b-d, 34-39, 40	41, 42a,c-e, 43a,b,e,f, 44**, 45("solvolysis" is substitution by solvent, and is always S <sub>N</sub> 1), 46, 48-53, 56, 59-61
<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, h, 6a,d,e, 7a,e, 8a,c,e, 10b-d (more stable only. Skip the part about how much difference in energy), 12a,c, 13, 16, 17, 18, 19, 24, 25, 27, 28b,c (c first one), 29a,b (ignore 3 <sup>rd</sup> product.)	30, 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>Alkene Addition Reactions</b>	<b>8</b>	1-4, 6, 8-11, 13-20, 21a-d, 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	46 (good synthesis design practice), 47 (.skip o; good practice for "predict the product" reactions.), 48a, b, c,e,f 49a,b,c,d,e,f,h, 50a-l, 59, 61
<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, 14, 15 (skip d), 16 (ignore stereochem), 18	24, 25a-d,g-i, 27, 30, 31, 33a-f
<b>Aromatics</b>	<b>16</b>	3(skip cyclooctatetraene), 5, 7b-d, 8, 12, 15, 16 (pyrrole picture on top of page, Fig 16.12), 17 (purine picture in section 16-9c), 19, 24a, c,e,g	26a-f, 27a-c,e,f, 28, 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>Aromatic Reactions</b>	<b>17</b>	2, 3(p-xylene is 1,4-dimethylbenzene), 5, 6, 7, 8, 11, 12, 13, 14b(i-iv), 15a,c, 18, 19a, 20a-c	44a,b,d,f,h,j,l, 46a,b,e,f,g, 47b-f,h,i,j,l, 48, 51, 57

## Schedule: Which Lecture Videos and Practice-Set Videos Go with Each Test

<b>Organic Chemistry 1, Jasperse, Based on Wade Version 8</b>		Reading
<b>MSUM Videos</b>	Topic	Assignment
<b>TEST 1 LECTURES</b>		
1	Intro. Why Carbon is Special, Normal bonding, Lewis Structures in Organic	1.1-1.6
2	1. Normal Bonding. 2. Formal Charge and Abnormal Bonding. 3. Electronegativity	<b>1.7</b> , 1.4-1.8
3	1. Structural formulas: Full, Condensed, and Skeletal 2. Resonance Structures	1.9-1.12
4	1. Mechanism/Arrow-pushing. 2. Acid-Base Chemistry. 3. Anion Stability Patterns.	<b>1.13-14</b>
5	VSEPR 3D Shape. Drawing 3D; Hybridization; Pi bonds; Isomers,	2.1-2.8
6	Polarity IMF, Boiling Points, Solubility. Catchup. Functional Groups	2.9-2.11
7	Functional Groups. Alkane Nomenclature	2.12-2.14
8	Alkane Nomenclature. Newman Projections; Torsional and Steric Strain; Cycloalkanes	3.1-3.9
9	Cyclohexane Chairs, Cis-and-Trans, Structural Isomers	3.9-3.15
10	Catchup/Practice. First 38 minutes of video 10. <b>Additional Practice Sets/Videos:</b> Mechanism Practice; Acid-Base Practice; 3D-Drawing Practice; Newman Projection Practice; Cyclohexane Practice <b>Test 1 Practice Tests:</b> V1, V2, V3, V4	
<b>TEST 2 LECTURES</b>		
10	Radical Halogenation; Mechanism; Radicals; Bond Energies; Reaction Energies. Last 12 minutes of Video.	4.1-4.7
11	Rate Laws, Transition States, Stability-Reactivity Principles	4.7-4.13
12	Radical Brominations. Major product, mechanism, structure isomers. Stability patterns for carbon radicals, cations, and anions.	4.13-4.16
13	Chiral vs achiral, Enantiomers, Recognizing/Drawing Mirror Images.	5.1-5.3
14	Chiral Carbons; Attachment Priorities; R/S Designation; Drawing Chiral Molecules	5.3-5.8
15	Racemic Mixtures, Optical Activity, Meso, Molecules with More than One Chiral Center	5.11-5.16
16	Drawing Stereoisomers, Meso Compounds. Alkyl Halides Intro, Classification, and Naming	6.1-6.7
17	The Sn2 Substitution Reaction.	6.8-6.12
18	The Sn1 Substitution Reaction.	6.13-6.16
19	SN1 REactions in More Depth. Elimination Reactions	6.17-6.21
20	E1 and E2 Reactions in More Depth; Recognizing Which Reaction Will Occur. Catchup, Practice.	Catchup
21	Catchup/Practice. First ??? minutes of video 21. <b>Additional Practice Sets/Videos:</b> Br2/hv Products/Mechanisms Practice; Introductory Mechanism Practice; Extra Stereochemistry Practice; Extra Mechanisms + Product Prediction Practice <b>Test 2 Practice Tests:</b> V1, V2, V3, V4	
<b>TEST 3 LECTURES</b>		
21	Intro to alkenes, Elements of Unsaturation (EU), Last ??? minutes of video 21	7.1-7.6
22	Hydrogenation + Isomers; Alkene Nomenclature. E/Z; Heats of Hydrogenation	7.7-7.10
23	Alkene Synthesis. From RX. Bulky Bases. From Alcohols via Acid-Catalyzed E1. Mechanism Recognition.	7.10-8.2
24	Addition reactions to Alkenes. Addition of HBr; Acid-Catalyzed HOH Addn.	8.1-8.5
25	Acid-Catalyzed HOH Addn; Indirect HOH Addn (Hydroboration-Oxidation). Synthesis Design	8.5-8.7,8-10
26	anti-Mark HBr and HOH addition; Synthesis Design, H2 addn; Br2 addn	8.8-8.9
27	Br2 and BrOH additions and mechanisms; epoxidation	8.12-8.16
28	Epoxidation, Dihydroxylation, Ozonolysis. Stereospecific Alkene Reactions. Synthetic Design.	Catchup
29	Catchup/Practice. First ??? minutes of video 29. <b>Additional Practice Sets/Videos:</b> Test 3 Extra Practice 1; Test 3 Extra Mechanisms Practice; Test 3 Alkene Reactions Practice; Test 3 Extra Synthesis Practice (6 pages) <b>Test 3 Practice Tests:</b> V1, V2, V3, V4	
<b>TEST 4 LECTURES</b>		
29	Conjugation, Molecular Orbitals, Dienes, Allylic Cations, Additions to Dienes. Last ??? minutes of video.	15.1-6
30	More allylic cations/radicals/conjugation and Applications;	15.7-11
31	Diels-Alder Reaction; Aromaticity	15.11, 16.1-2
32	Aromaticity; Huckel's Rule and Complex Aromatics	16.1-7
33	Complex Aromaticity, Application, Nomenclature (Skip "endo rule" section in 15.11A, p. 684; Skip 15.12,13)	16.8-11, 13
34	Electrophilic Aromatic Substitution: Intro, Mech, Kinetic Effects	17.1,6-8
35	Reactions in Detail: Halogenation, Nitration, Sulfonation, Alkylation, Acylation	17.2-5,10,11
36	Catchup; Addition to Disubstituted Benzenes; Synthetic Applications	17.9, practice
37	Side Chain Reactions; Retrosynthesis; Synthetic Applications; Practice	17.14
38	Review for Test 4	---
39	More allylic cations/radicals/conjugation and Applications; <b>Additional Practice Sets/Videos:</b> HBr Addn to Dienes + NBS Allylic Bromination; Conjugation-Allylic-Diels-Alder Practice; Aromatic Substitution Mechanisms (Products Provided); Aromatic Substitution Product Prediction/Mechanisms/Synthesis Design <b>Test 4 Practice Tests:</b> V1, V2, V3, V4	15.7-11
Final Exam, Cumulative.		Final Exam