

ORGANIC CHEMISTRY I PROBLEMS, USING Klein 4

- Organic Chemistry (4th Edition) by David Klein. Published by Wiley.
- [Google for solutions manual:](#)
- Other Textbooks: <https://web.mnstate.edu/jasperse/Chem350/Other-Textbooks.html>

<u>Chapter Topic</u>	<u>Klein Chap</u>	<u>Klein 4 Problems Back of the Chapter Screened by Jasperse</u>	<u>Klein 4 Problems In the Chapter Not fully screened</u>
Test 1 (Wade 10-11)			
Alcohols and Phenols	12	Skillbuilder: All listed skills Nomenclature: 29, 30a-d,f, 31 Acidity: 32, 63 Redox recognition: 49, 50, 74 Hydride: 38, 44, 45c, 46e,f, 51, 55, 72 Grignard: 37, 39b, 52, 54, 56, 58, 65b,h,n,o,q, 70 Oxidation: 34e-f, 36, 46 Functional Group Conversions: 38, 46, 61, 64, 66, 67 Synthesis design: 36, 37, 39, 43, 65, 68, 71 Miscellaneous: 34a, 3, g, I, j	Skillbuilder: All listed skills Nomenclature: 1,2, Acidity: 6,7 Redox recognition: 10, 11 Hydride: 12, 13 Grignard: 15-27 Oxidation: 22, 23 Functional Group Conversions: 24, 25 Synthesis design: 27, 28
Alkyl Halides: Nucleophilic Substitution + Elimination	7	47, 49a, 53, 55, 56, 58, 62, 64a, 72, 75b-e,h, 76a,c,f, 77a-c, 78a-c, 79, 85, 87, 88	Tosylates: 32 (skip d) 33, 34 (skip c)
Test 2 (Wade 12,13)			
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	14	Calculating Elements of Unsaturation: 42b, 48, IR: 33a-c, 37, 57, 59	Calculating Elements of Unsaturation: 30, 31 IR: 10, 12 (alcohol, ester, and diacid)
Test 3 (Wade 18, 22)			
Aldehydes and Ketone	19	Nomenclature: 1-4 Acetal addition: 6a, 28, 30, 31 Acetal Mechanism: 8,9a,b, 10b,c, 12, 13 Imine Mechanism: 14-16, 17, 18 Hydrolysis: 23a-c Wittig Reaction: 34a, 35, 36, -37 Synthesis Design: 40, 41	Nomenclature: 43-48, 77 Acetal Mechanism: 55,58, 65, 75, 76 Imine Mechanism: 59, 70, Wittig Reaction: 50, 51, 79, 96 Synthesis Design: 53, 65-67, 69, 73, 96, 97
Alpha Substitutions and Condensations of Enols and Enolate Ions	21	Enol: 3 Drawing Enolates: 4, 5, 6, 7 Aldol Reactions (aldehyde electrophile): 14-16 Aldol Condensations: 17, 18 Crossed Aldol Reagents: 19, 20 Claisen Reaction (ester electrophile): 25, 26, 27, 28 Alpha-Alkylation: 29 Dicarbonyl alkylation/decarboxylation: 31-34	Drawing Enolates: 49, 53, 89 Acidity: 50 Enol: 51, 52 Aldol Reactions (aldehyde electrophile): 57, 58, 62, 104, 105 Aldol Condensations: 61, 74c, 90, 95 Crossed Aldol Reagents: 57, 58, 102 Dicarbonyl alkylation/decarboxylation: 68, 69, 93, 111-114
Test 4 (Wade 19, 20, 21)			
Amines	22	Nomenclature: 1-3 Miscellaneous: 4a vs b Acid/base: 6 (skip b), 7, 8, Amine Synthesis from Ketones by NaBH ₃ CN/H ⁺ : 14, 15	Miscellaneous: 33 Nomenclature: 37, 40 (skip c, f), 41, 42 Acid/base: 34a, 35, 36, 38, 43, 59, 73 Amine Synthesis from Ketones by NaBH ₃ CN/H ⁺ : 60, 61, 74, 95 Proposing Synthesis of Amine: 45a,b, 46
Carboxylic Acids and Their Derivatives	17	Nomenclature: 1b,c,e, 2a,b, 3 Acidity: 4, 9 Synthesis: 10a,b,d, f Reactions: 14, 15, 16e,f, 17, 19, 20 (2 ways), 21a, 22, 23, 24a,b, 26b, 27a,b,d, 28b, 30 (skip3,h,i)	Nomenclature: 39, 73 Acidity: 35, Synthesis: 42 Reactions: 41a,b, 42a, 44a,c,d,e,f, 45, 46 (skip c, e), 47, 48 (skip F), 49, 53, 57, 68, 70, 71, 75, 76, 77

Chemistry 360, Jasperse, Klein Version 4 (43 class days, 39 lectures)		
Video	Topic	Reading
	TEST 1 LECTURES. Alcohol Chemistry. Synthesis, Reactions, Retrosynthesis	
1	Intro; Structure, Nomenclature, Properties, Weak Acidity of Alcohols	12.1-6
2	Synthesis of Alcohols; Organometallic Reactions.	23.1,2, 12.1-6
3	Synthesis of Alcohols; Organometallic Reactions.	12.1-6
4	Side Reactions; Reduction of Carbonyl Compounds	12.4
5	Oxidation of Alcohols	12.10
6	Conversion of Alcohols to Tosylates or Halides; Uses of Tosylates and Halides	12.9
7	Miscellaneous; Chemical Tests; Multistep Synthesis	12.7-13
8	Retrosynthetic Analysis	
9	Catchup, Multistep Synthesis Problems	Catchup
10	Review for Test 1 Additional Practice Sets/Videos: Retrosynthesis Problems; Acid-Base Practice; Mechanisms Problems Test 1 Practice Tests: V1, V2, V3, V4	---
	TEST 2 LECTURES. NMR and Spectroscopy	
11	¹ H NMR Overview: Chemical Shift, Integration, and Splitting; ¹ H NMR Problem Solving	15.1-10, 14.16
12	¹ H-NMR Interpretation and Problem Solving	15.1-10, , 14.16
13	Overlap, Symmetry, Integration, Splitting, Spectrum Prediction	15.1-10
14	More Problem Solving; Complex Splitting; Stereochemical Nonequivalence of Protons	15.1-10
15	¹³ C NMR; Infrared Spectroscopy	15.11-12, 14.1-7
16	Spectroscopy Catchup, Integrated Problems Additional Practice Sets/Videos: Jasperse NMR Problems (>40 pages) Test 2 Practice Tests: V1, V2, V3, V4	catchup
	TEST 3 LECTURES. Carbonyls Chemistry; Enolates.	
17	Ketones/Aldehydes. Nomenclature, Properties, Intro.	19.1-2
18	Synthesis of Ketones/Aldehydes.	19.3
19	Reactions of Ketones/Aldehydes	19.4-10,12
20	Reactions of Ketones/Aldehydes	19.4-10,12, 24.1-9
21	Catchup; Enols and Enolates Intro. Acid/Base Considerations; Proton as Electrophile	21.1-2
22	Enols and Enolates Intro. Acid/Base Considerations; Proton as Electrophile	21.3,5
23	Halogenation; Alkylation; Double Activation; Ester Hydrolysis; Decarboxylation	21.5
24	The Aldol Reaction (Aldehyde/Ketone as Electrophile)	21.3
25	Claisen Reaction (Ester as Electrophile)	21.4
26	Catchup	Catchup
27	The Wittig Reaction and Alkene Synthesis; Catchup	19.20
28	Catchup, Integrated Practice Problems. Additional Practice Sets/Videos: Mechanism Practice (Many); Retrosynthesis Practice Test 3 Practice Tests: V1, V2, V3	Catchup
	TEST 4 LECTURES	
29	Amines. Intro, Nomenclature, Properties; Basicity of Amines; Structural Factors; Salts	22.1-3, 12 25.1-4
30	Amino Acids, Peptides, Proteins, Reactions of Amines	22.8, 12
31	Diazonium Chemistry; Amine Synthesis by Reductive Amination of Carbonyls	22.4-6, 10,11
32	More Synthesis of Amines	22.4-6
33	Carboxylic Acids: Nomenclature; Properties; *ACIDITY*; Salts; Soap; SYNTHESIS	20.1-5
34	Acid Synthesis; Reactions	20.6-11
35	Reactions of Acids: Nucleophilic Acyl Substitution; Carboxylic Acid Derivatives	20.7-12
36	Interconversions Among Acids and Derivatives; Synthesis and Mechanism; Catchup	20.7-12
37	Interconversions Among Acids and Derivatives; Synthesis and Mechanism; Catchup	20.7-12
38	Practice Problems	-
39	Polymers and Biopolymers: Additional Practice Sets/Videos: Acid-Base Practice (Easy); Acid-Base Practice (Less Easy); Mechanisms, Retrosynthesis + Synthesis Design Test 4 Practice Tests: V1, V2, V3	Ch 24, 25
	Final Exam, Cumulative.	Final Exam