

Library of Organic Chemistry Active Learning Resources LOCAL

Chapter 1 General Chemistry Review - Part 1



Periodic Table of Elements

hydrogen 1 H 1.0079																	helium 2 He 4.0026													
lithium 3 Li 6.941	beryllium 4 Be 9.0122																	boron 5 B 10.811	carbon 6 C 12.011	nitrogen 7 N 14.007	oxygen 8 O 15.999	fluorine 9 F 18.998	neon 10 Ne 20.180							
potassium 19 K 39.098	calcium 20 Ca 40.078	scandium 21 Sc 44.956	titanium 22 Ti 47.867	vanadium 23 V 50.942	chromium 24 Cr 51.996	manganese 25 Mn 54.938	iron 26 Fe 55.845	cobalt 27 Co 58.933	nickel 28 Ni 58.693	copper 29 Cu 63.546	zinc 30 Zn 65.39	gallium 31 Ga 69.723	germanium 32 Ge 72.61	arsenic 33 As 74.922	seletem 34 Se 78.96	bromine 35 Br 79.904	krypton 36 Kr 83.80													
rubidium 37 Rb 85.468	strontium 38 Sr 87.62	yttrium 39 Y 88.906	zirconium 40 Zr 91.224	niobium 41 Nb 92.906	molybdenum 42 Mo 95.94	technetium 43 Tc [98]	ruthenium 44 Ru 101.07	rhodium 45 Rh 102.91	palladium 46 Pd 106.42	silver 47 Ag 107.87	cadmium 48 Cd 112.41	indium 49 In 114.82	tin 50 Sn 118.71	antimony 51 Sb 121.76	tellurium 52 Te 127.60	iodine 53 I 126.90	xenon 54 Xe 131.29													
cesium 55 Cs 132.91	barium 56 Ba 137.33	* 57-70	lanthanum 57 La 138.91	cerium 58 Ce 140.12	praseodymium 59 Pr 140.91	neodymium 60 Nd 144.24	promethium 61 Pm [145]	samarium 62 Sm 150.36	europium 63 Eu 151.96	gadolinium 64 Gd 157.25	terbium 65 Tb 158.93	erbium 66 Er 167.26	thulium 67 Tm 168.93	ytterbium 68 Yb 173.05	lutetium 69 Lu 174.97	hafnium 72 Hf 178.49	tantalum 73 Ta 180.95	tungsten 74 W 183.84	rhenium 75 Re 186.21	osmium 76 Os 190.23	iridium 77 Ir 192.22	platinum 78 Pt 195.08	gold 79 Au 196.97	mercury 80 Hg 200.59	thallium 81 Tl 204.38	lead 82 Pb 207.2	bismuth 83 Bi 208.98	polonium 84 Po [209]	astatine 85 At [210]	radon 86 Rn [222]
francium 87 Fr [223]	radium 88 Ra [226]	* *	actinium 89 Ac [227]	thorium 90 Th [232]	protactinium 91 Pa [231]	uranium 92 U [238]	neptunium 93 Np [237]	plutonium 94 Pu [244]	americium 95 Am [243]	curium 96 Cm [247]	berkelium 97 Bk [247]	californium 98 Cf [251]	einsteinium 99 Es [252]	fermium 100 Fm [257]	mendelevium 101 Md [258]	nobelium 102 No [259]	lawrencium 103 Lr [260]	roentgenium 104 Rg [261]	meitnerium 105 Mt [262]	dubnium 106 Db [262]	seaborgium 107 Sg [263]	bohrium 108 Bh [264]	hassium 109 Hs [265]	meitnerium 110 Mt [266]	unnilium 111 Uun [267]	ununium 112 Uuu [268]	ununium 113 Uub [269]	ununium 114 Uuq [270]		

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1

What is the **second-most** electronegative element?

2

For each pair of atoms, describe the type of bond that is expected to form between them.

LiBr

CH

NH

3

For each element below, attach as many H atoms as necessary to give a stable, neutral molecule.

C

N

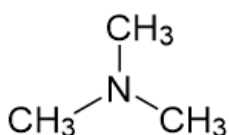
O

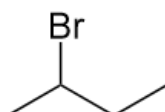
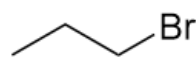
Br

Which of the following represents a pair of constitutional isomers?

4

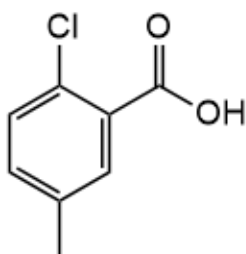
I. H_2O and H_3O^+

II.  and $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$

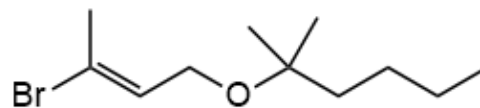
III.  and 

How many carbon atoms and hydrogen atoms are in the following structure?

5

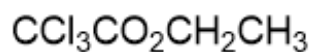


6



7

Draw the Lewis structure of the following

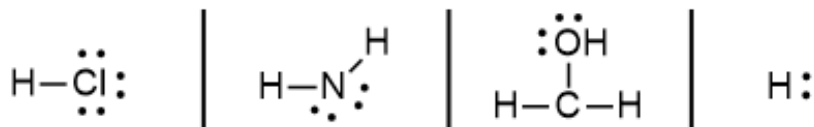


Drawing Lewis Structures (Klein 1.3)

- 1) draw skeleton - connectivity
- 2) count total # of valence electrons
(valence e^- = group no.)
- 3) subtract charge (if any)
- 4) fill in missing electrons (fill octets)
- 5) determine formal charges (if any)

8

Add any missing formal charges in the following Lewis structures:



Formal Charges (Klein 1.4)

- determine "electron count"
= all nonbonded + 1/2 bonded/shared
- compare "electron count" with valence
missing an electron \rightarrow + charge
extra electron \rightarrow - charge

1

Which element is the **second-most** electronegative element in the Periodic Table?

- A) Oxygen
- B) Fluorine
- C) Hydrogen
- D) Chlorine
- E) Sodium

Periodic Table of Elements

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lithium 3 6.941	beryllium 4 9.0122											boron 5 10.811	carbon 6 12.011	nitrogen 7 14.007	oxygen 8 15.999	fluorine 9 18.998	neon 10 20.180	
sodium 11 22.990	magnesium 12 24.305											aluminum 13 26.982	silicon 14 28.086	phosphorus 15 30.974	sulfur 16 32.065	chlorine 17 35.453	argon 18 39.948	
potassium 19 39.098	calcium 20 40.078	scandium 21 44.956	titanium 22 47.887	vanadium 23 50.942	chromium 24 51.996	manganese 25 54.938	iron 26 55.845	cobalt 27 58.933	nickel 28 58.693	copper 29 63.546	zinc 30 65.39	gallium 31 69.723	germanium 32 72.61	arsenic 33 74.922	selenium 34 78.96	bromine 35 79.904	krypton 36 83.80	
rubidium 37 85.468	strontium 38 87.62	yttrium 39 88.906	zirconium 40 91.224	niobium 41 92.906	niobium 42 95.94	molybdenum 43 95.94	technetium 44 [98]	ruthenium 45 101.07	rhodium 46 106.42	palladium 47 107.87	cadmium 48 112.41	indium 49 114.82	tin 50 118.71	antimony 51 121.76	tellurium 52 127.60	iodine 53 126.90	xenon 54 131.29	
cesium 55 132.91	barium 56 137.33	* 57-70	lutetium 71 174.97	hafnium 72 178.49	tantalum 73 180.95	tungsten 74 183.84	rhenium 75 186.21	osmium 76 190.23	iridium 77 192.22	platinum 78 196.08	gold 79 196.97	mercury 80 200.59	thallium 81 204.38	lead 82 207.2	bismuth 83 208.98	polonium 84 [209]	astatine 85 [210]	radon 86 [222]
francium 87 [223]	radium 88 [226]	* * 89-102	lawrencium 103 [260]	rutherfordium 104 [261]	dubnium 105 [262]	seaborgium 106 [263]	bohrium 107 [264]	hassium 108 [265]	meitnerium 109 [266]	unnilium 110 [267]	ununium 111 [267]	ununium 112 [267]	unquadium 114 [289]					

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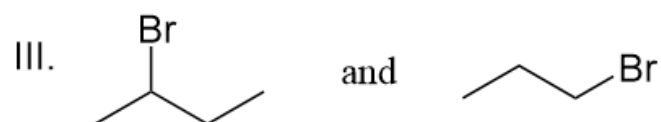
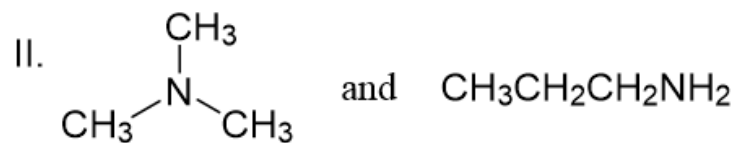
2

For each pair of atoms, describe the type of bond that is expected to form between them.

	LiBr	CH	NH
A)	polar covalent	polar covalent	polar covalent
B)	ionic	polar covalent	ionic
C)	ionic	nonpolar covalent	nonpolar covalent
D)	ionic	nonpolar covalent	polar covalent
E)	polar covalent	polar covalent	nonpolar covalent

4

Which of the following represents a pair of constitutional isomers?



A) I only

B) II only

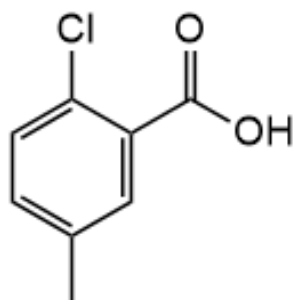
C) III only

D) II and III only

E) I, II and III

5

How many carbon atoms are in the following structure?



A) 6

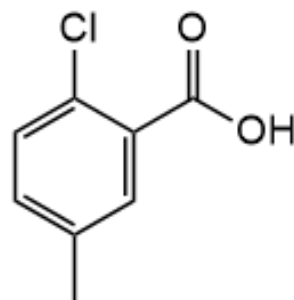
B) 7

C) 8

D) 9

E) 11

How many hydrogen atoms are in the following structure?



A) 4

B) 5

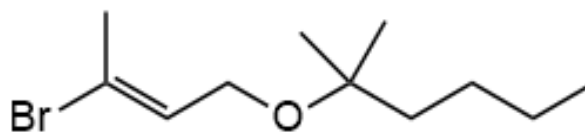
C) 6

D) 7

E) 8

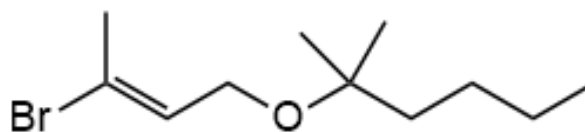
6

How many carbon atoms are in the following structure?



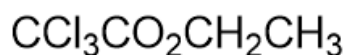
- A) 10 B) 11 C) 12 D) 13 E) 14

How many hydrogen atoms are in the following structure?

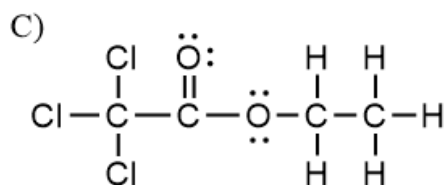
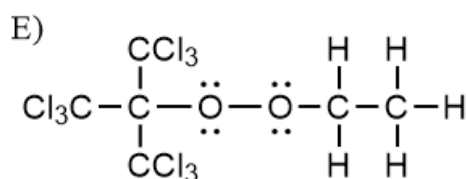
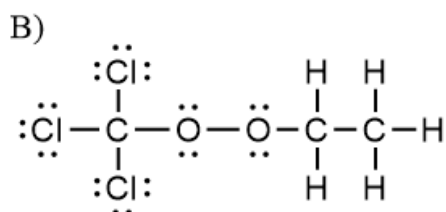
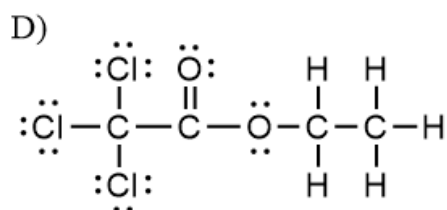
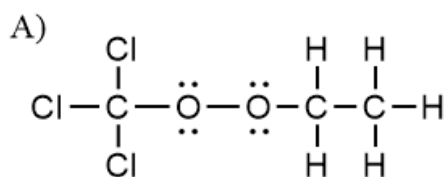


- A) 13 B) 11 C) 17 D) 20 E) 21

7

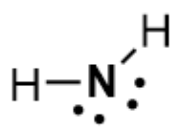
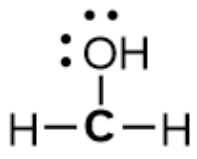



Which of the following represents the correct Lewis structure of the given condensed formula?



8

What is the formal charge on each of the following highlighted atoms?

			
A)	+1	-1	0
B)	-1	-1	0
C)	0	-1	-1
D)	-1	+1	-1
E)	-1	+1	0