Chapter 1

What is the difference between visible light and electromagnetic radiation?

A. Electromagnetic radiation contains both an oscillating electric field and an oscillating magnetic field; visible light only contains one of the two.
B. Visible light is only one form of electromagnetic radiation; all visible light is electromagnetic radiation, but not all electromagnetic radiation is visible light.
C. Electromagnetic radiation is only found at higher energies than visible light.
D. Electromagnetic radiation is only one form of visible light; all electromagnetic radiation is visible light, but not all visible light is characterized as electromagnetic radiation.
E. Electromagnetic radiation cannot be seen, but visible light is, duh, visible.

The temperature of stars may be gauged by their colour, e.g. blue-white stars are hotter than red stars. How is this observation consistent with Planck's assumption?

A. Planck proposed that matter is allowed to emit energy across a continuous spectrum analogous to the spectrum of visible light.
B. Planck proposed that all types of matter would emit the same frequencies of visible light when at the same temperatures.
C. As temperature increases, so does the average energy of the emitted radiation. Blue-white light is at the longer wavelength (lower energy) end of the visible spectrum while red light is at the shorter wavelength (higher energy) end of the visible spectrum.
D. As temperature increases, so does the average energy of the emitted radiation. Blue-white light is at the shorter wavelength (higher energy) end of the visible spectrum while red light is at the longer wavelength (lower energy) end of the visible spectrum.
E. Never assume anything – it makes an ass out of u and me

Human skin is penetrated by X-rays but not by visible light. Which travels faster, X-rays or visible light?

A. Both visible light and X-rays travel at the same speed, about 300,000 km per second.
B. Additional energy information is needed to compare the speeds.
C. X-rays travel faster.
D. Visible light travels faster.
E. Umm… none of the above?

Suppose that yellow light can be used to eject electrons from a certain metal surface. What would happen if ultraviolet light was used instead?

A. No electrons would be ejected.
B. Electrons would be ejected, and they would have the same kinetic energy as those ejected by yellow light.
C. Electrons would be ejected, and they would have greater kinetic energy than those ejected by yellow light.
D. Electrons would be ejected, and they would have lower kinetic energy than those ejected by yellow light.
E. The surface would develop a nice even tan.

Speculate as to how Bohr's model might explain the fact that hydrogen gas emits a line spectrum rather than a continuous spectrum.

A. Hydrogen's one-electron system only has four possible energies of emission and absorption.
B. Photons of only certain allowed frequencies can be absorbed or emitted as the electron changes energy state.
C. Hydrogen's spectroscopic behavior is different than other elements since it's a one-electron system allowing only certain portions of the continuous spectrum to be visible.
D. Photons of a continuous frequency spectrum can be absorbed or emitted but only certain regions have enough intensity to be detectable.
E. I'm too cautious to speculate.

As the electron in a hydrogen atom jumps from the $n = 3$ orbit to the $n = 7$ orbit, does it absorb energy or emit energy?

A. It neither emits nor absorbs energy.
B. It both emits and absorbs energy simultaneously.
C. It emits energy.
D. It absorbs energy.
E. Hmm, a 50:50 proposition… Heads!

A baseball pitcher throws a fastball at 150 km/h. Does that moving baseball generate matter waves? If so, can we observe them?

A. No matter waves are produced.
B. No, because the mass of the baseball is too large.
C. Yes; but too small to allow any way of observing them.
D. Yes; and they can be observed.
E. Let me ask YOU; what is the sound of one hand clapping?

What is the principal reason that the uncertainty principle seems very important when discussing electrons and other subatomic particles, but seems rather unimportant in our macroscopic world?

A. The size and mass of a subatomic particle is very small relative to the macroscopic world.
B. The uncertainty principle is very important in the macroscopic world.
C. The uncertainty principle only applies to charged particles and most macroscopic world objects are neutral.
D. The uncertainty principle only applies to subatomic particles.
E. The uncertainty principle applies when we haven't a clue what the answer to a multiple choice question is, so we guess "E"

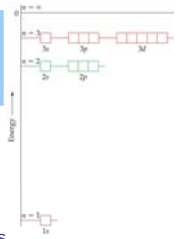
Is there a difference between stating, "The electron is located at a particular point in space" and "There is a high probability that the electron is located at a particular point in space"?

A. No. The statements mean the same thing.
B. Yes, there is a difference. The first statement says the electron's position is known exactly, which violates the uncertainty principle. The second statement expresses some uncertainty of position.
C. Yes. The first statement involves stating only 10 words, the second 16 words.

What is the difference between an *orbit* (Bohr model) and an *orbital* (quantum mechanical model)?

A. An orbital is composed of some integral number of orbits.
B. An orbit is a well-defined circular path around the nucleus while an orbital is a wave function that gives the probability of finding the electron at any point in space.
C. An orbit is a well-defined circular path around the nucleus while an orbital is the object (electron) that is moving around the nucleus.
D. There is no difference between the definitions of the terms "orbit" and "orbital." They simply were proposed by different scientists.
E. "AL".

Why is the difference between the $n = 1$ and $n = 2$ levels so much greater than the energy difference between the $n = 2$ and $n = 3$ levels?

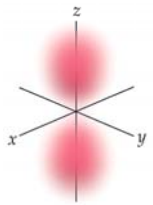


A. because $-1/(2)^2$ and $-1/(1)^2$ are of much greater difference than $-1/(3)^2$ and $-1/(2)^2$ in Bohr's equation that describes the hydrogen atom.
B. because the Rydberg constant in Bohr's equation is higher for $n = 1$ to $n = 2$ transitions.
C. because the energy difference between the 1st and 2nd energy level of hydrogen is smaller than the energy difference between the 2nd and 3rd energy level.
D. because the electron in the hydrogen atom never occupies energy levels of higher than $n = 1$.
E. I don't know, but an anagram of "Bohr's Equation" is "Abhor Question"…

How many maxima would you expect to find in the radial probability function for the 4*s* orbital of the hydrogen atom? How many nodes would you expect in the 4*s* radial probability function?

A. three maxima and three nodes
B. three maxima and four nodes
C. four maxima and three nodes
D. four maxima and four nodes
E. OK; so the 1*s* orbital has one maximum (at the nucleus) and no nodes (we don't count the one at infinity). So the 2*s* orbital must be different. Is it the same shape?… let's check my notes… yes, spherical. Does it have a node? One? That would make it different, I suppose. Where is it? Somewhere between the nucleus and infinity, I guess, but where? The suspense is killing me… maybe it doesn't matter. All right then, let's put it at an arbitrary distance "*x*" from the nucleus. If there is a node there must be at least two maxima. So far so good. Moving on to the 3*s* orbital… again, same shape, but somehow different. I'm guessing another node… so if it

What does the change in colour of the orbital represent in the picture below?



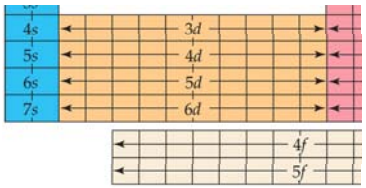
A. The variations in pink color do not represent any significant physical feature.
B. The lighter pink regions represent more positively charged areas of the *p*-orbital.
C. The probability of finding an electron in the interior of a *p*-orbital lobe is less than it is on the edges.
D. The probability of finding an electron in the interior of a *p*-orbital lobe is greater than it is on the edges.
E. Artistic license.

For a many-electron atom, can we predict unambiguously whether the 4*s* orbital is lower or higher in energy than the 3*d* orbitals?

A. Yes
B. No
C. Maybe

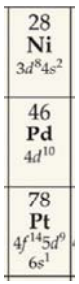
Based on the structure of the periodic table, which becomes occupied first, the 6*s* orbital or the 5*d* orbitals?

A. the 5*d* orbital
B. the 6*s* orbital
C. Neither



The elements Ni, Pd and Pt are all in the same group. By examining the electron configurations for these elements, what can you conclude about the relative energies of the *n*d and (n + 1)*s* orbitals for this group?

A. All three elements have the same relative energies for their *nd* and (n + 1)*s* orbitals.
B. Nothing can be concluded, because the three elements each have different valence electron configurations.
C. The *nd* orbitals are of lower energy than (n + 1)*s* orbitals for all three elements.
D. The *nd* orbitals are of higher energy than (n + 1)*s* orbitals for all three elements.
E. That I'd better start reading my textbook.



Arranging the elements by atomic weight leads to a slightly different order than arranging them by atomic number. How can this happen?

A. The order of atomic masses on the periodic table is in no way related to atomic numbers.
B. The atomic number depends on the number of protons in the nucleus, while the atomic weight depends on the number of both protons and neutrons in the nucleus.
C. Atomic masses are a function of group numbers on the periodic table and do not increase linearly with atomic number.
D. For certain midperiodic table elements, the effective mass of each proton in the nucleus varies.
E. And arranging them alphabetically gives a different order again. So what?

Chapter 2

Which would you expect to experience a greater effective nuclear charge, a 2*p* electron of a neon atom or a 3*s* electron of a sodium atom?

A. The 2*p* electron of a neon atom.
B. This cannot be determined without knowing the charge of the atom.
C. Both the 3*s* electron and 2*p* electron experience the same effective nuclear charge.
D. The 3*s* electron of a sodium atom.
E. Neither experience nuclear charges, as they operate using renewable energy sources.

As we proceed across a row of the periodic table, atomic weight increases but atomic radius decreases. Are these trends a contradiction?

A. Yes
B. No
C. Only in English. In Russian, it makes perfect sense.

Light can be used to ionize atoms and ions. What concept from Chapter 1 can be related to the ionization of atoms?

A. the uncertainty principle
B. the Pauli exclusion principle
C. Hund's rule
D. the photoelectric effect
E. Schrödinger's cat

Which would you expect to be greater, I_1 for a boron atom or I_2 for a carbon atom?

A. I_1 for the boron atom is equal to I_2 for the carbon atom.
B. I_2 for the carbon atom is greater.
C. I_1 for the boron atom is greater.
D. No.

Would Cr^{3+} and V^{2+} have the same or different electron configurations?

A. They have the same electron configuration: [Ar] $3d^3$
B. They have the same electron configuration: [Ar] $4s^1\ 3d^2$
C. They have the same electron configuration: [Ar] $4s^2\ 3d^1$
D. They have different electron configurations.
E. Yes.

What is the relationship between the first ionization energy of a $Cl^-_{(g)}$ ion and the electron affinity of $Cl_{(g)}$?

A. EA for Cl is significantly more endothermic than IE_1 for Cl.
B. IE_1 for Cl^- is significantly more exothermic than EA for Cl.
C. They are equal in magnitude and opposite in sign.
D. They are equal in magnitude and sign.
E. Strictly platonic.

Can you use the data below to provide estimates for the atomic radius and first ionization energy of an astatine atom?

Element	Electron Configuration	Melting Point (°C)	Density	Atomic Radius (Å)	I_1 (kJ/mol)
Fluorine	$[He]2s^22p^5$	−220	1.69 g/L	0.71	1681
Chlorine	$[Ne]3s^23p^5$	−102	3.21 g/L	0.99	1251
Bromine	$[Ar]3d^{10}4s^24p^5$	−7.3	3.12 g/cm^3	1.14	1140
Iodine	$[Kr]4d^{10}5s^25p^5$	114	4.94 g/cm^3	1.33	1008

A. It is not possible to use the data in Table 7.7 to determine the characteristics of astatine.
B. Yes, we can estimate that the atomic radius is approximately 1.10 Å and I_1 must be approximately 1000 kJ/mol.
C. Yes, we can estimate that the atomic radius is approximately 1.5 Å and I_1 must be approximately 900 kJ/mol.
D. No; I prefer not to stereotype.

Chapter 3

Which of the following possible Lewis symbols for Cl is correct?

A. - 

B. - 

C. - 

D. - 

E. - @#$%&!

Describe the electron transfers that occur in the formation of magnesium fluoride from elemental magnesium and fluorine.

A. Each magnesium atom loses one electron and each fluorine atom gains two electrons.

B. Each magnesium atom loses two electrons and each fluorine atom gains one electron.

C. Each magnesium atom gains one electron and each fluorine atom loses two electrons.

D. Each magnesium atom gains two electrons and each fluorine atom loses one electron.

E. No electronic transfers occur as neither party can establish a framework for negotiation.

Which element forms a 1+ ion that has the electron configuration [Kr] $4d^8$?

A. Rh

B. Tc

C. Ru

D. Pd

E. Fire

Because it is less stable than two separated He atoms, the He_2 molecule does not exist. What are the attractive forces in He_2? What are the repulsive forces? Which are greater, the attractive or repulsive forces?

A. There are no attractive forces in He_2; that's why it doesn't exist. Repulsive > attractive.

B. Attractive forces are between between the two entire atoms; repulsive forces are only between the electron clouds. Attractive > repulsive.

C. Attractive forces are between each electron and either nucleus; repulsive forces are those between the two nuclei and those between the two electrons. Repulsive > attractive.

D. Attractive forces are between each electron and either nucleus; repulsive forces are those between the two nuclei and those between the two electrons. Attractive > repulsive .

E. Attractive forces are between each atom's two electrons and between the two nuclei; repulsive forces are those between the nuclei and the two electrons. Repulsive > attractive.

The C-O bond length in carbon monoxide, CO, is 113 pm, whereas the C-O bond length in CO_2 is 124 pm. Without drawing a Lewis structure, what sort of bond exists between the C and O atoms in CO?

A. C–O in carbon monoxide is a single bond.

B. C–O in carbon monoxide is a double bond.

C. C–O in carbon monoxide is a triple bond.

D. C–O in carbon monoxide is a Bond… James Bond.

How does the *electronegativity* of an element differ from its *electron affinity*?

A. EN and EA are the same; they both measure the same characteristic.

B. EA measures the energy released when an isolated atom gains an electron to form a 1^- ion; EN measures the ability of an atom to hold onto its own electrons and attract electrons from other atoms.

C. EN values of neutral atoms are just the negative of EA values of neutral atoms.

D. EN measures the energy released when an isolated atom gains an electron to form a 1^- ion; EA measures the ability of an atom to hold onto its own electrons and attract electrons from other atoms.

E. Negativity = the negative element determinative or definitive of things and all ideas of things, whereby a thing is this because it is not that, and is seen to be this because it is seen not to be that, and which ≠ affinity.

The difference in the electronegativity of two elements is 0.7. How would you describe the bond between these elements?

A. nonpolar

B. polar covalent

C. ionic

D. close

The molecules chlorine monofluoride, ClF, and iodine monofluoride, IF, are examples of interhalogen compounds – compounds that contain bonds between different halogen elements. Which of these molecules will have the larger dipole moment?

A. They have the same dipole moment.

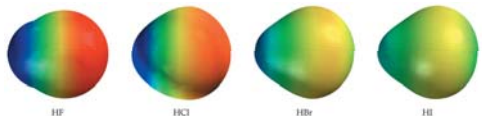
B. Neither has a dipole moment; they are both nonpolar.

C. ClF

D. IF

E. BUT

How do you interpret the fact there is no red in the HBr and HI representations below?



A. The large size of the I and the Br make the charge density less noticeable.

B. The dipole moments in both HI and HBr are in the opposite direction of HF and HCl.

C. Because HI and HBr are both strong acids, less negative charge forms on the halogens.

D. In HI and HBr the electronegativity differences are too small to lead to large charge separations in the molecules.

E. HI and HBr are rather dull molecules.

Suppose that a Lewis structure for a neutral fluorine-containing molecule results in a formal charge on the fluorine atom of +1. What conclusion would you draw?

A. The structure actually represents an ion.
B. The F in the structure must have four covalent bonds attached to it.
C. There must be another F in the structure carrying a –1 formal charge.
D. There must be a better Lewis structure since F is not expected to carry a formal charge of +1, being the most electronegative element.
E. That fluorine is a poisonous, yellow-brown gas.

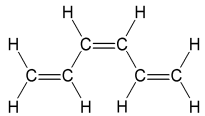
The O-O bonds in ozone are often described as "one-and-a-half" bonds. Is this description consistent with the idea of resonance?

A. Yes
B. No
C. Sort of

In the same sense that we describe the O-O bonds in O_3 as "one-and-a-half" bonds, how would you describe the N-O bonds in NO_3^-?

A. one-and-a-fifth bonds
B. one-and-a-quarter bonds
C. one-and-a-third bonds
D. one-and-a-half bonds
E. NO bonds

Each Lewis structure of benzene has 3 C=C double bonds. Another hydrocarbon with 3 C=C bonds is hexatriene, C_6H_8 (see below). Would you expect hexatriene to have multiple resonance structures like benzene? If not, why is this molecule different from benzene with respect to resonance?



A. Yes, because double bonds can be moved to give equivalent structures.
B. No, because double bonds cannot be moved to give equivalent structures.

Consider the hydrocarbon *ethane*, C_2H_6. How could you use the enthalpy of atomization of $C_2H_{6(g)}$ along with the value of *D*(C–H) to provide an estimate for *D*(C–C)?

A. The enthalpy of atomization / 7 bonds broken = a good estimate of *D*(C–C)
B. The enthalpy of atomization – 6 × *D*(C–H) = a good estimate of *D*(C–C)
C. The enthalpy of atomization + 6 × *D*(C–H) = a good estimate of *D*(C–C)
D. The enthalpy of atomization / 7 bonds broken – 6 × *D* (C–H) = a good estimate of *D*(C–C)
E. I'd have to guess.

Which element has the greater number of electrons in antibonding orbitals?

Metal	Sc	Cr	Ni
Melting point (°C)	1541	1857	1455
Metal	Y	Mo	Pd
Melting point (°C)	1522	2617	1554
Metal	La	W	Pt
Melting point (°C)	918	3410	1772

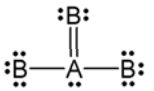
A. Y
B. Mo
C. Pd

Chapter 4

One of the common shapes for AB_4 molecules is square planar: all five atoms lie in the same plane, the atoms B lie at the corners of a square, and the atom A is at the centre. Which of the shapes below could lead to a square-planar geometry upon the removal of one or more atoms?

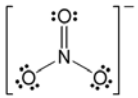
A. linear
B. trigonal planar
C. tetrahedral
D. trigonal bipyramidal
E. octahedral

Does the Lewis structure of this AB_3 molecule follow the octet rule? How many electron domains are there around the atom A?



A. No; 5 domains.
B. No; 4 domains.
C. No; 3 domains.
D. Yes; 4 domains.
E. Yes; 3 domains.

One of the resonance structures of the nitrate ion, NO_3^-, is shown. The bond angles are exactly 120°. Is this observation consistent with the effect of multiple bonds on bond angles?



A. No, the double bond should squeeze the bond angle between single bonds to less than 120°.
B. Yes, resonance equalizes repulsions between bonds, making all angles 120°.
C. Sorry; all future questions will have to be addressed to my lawyer.

What is the shape of SeF_4?

A. Tetrahedral
B. Seesaw
C. Square planar
D. T-shaped
E. Trigonal bipyramid

What is the shape of PF_6^-?

A. Hexagonal
B. Trigonal bipyramid
C. Octahedral
D. Square pyramid
E. Cubic

What is the shape of BF_4^-?

A. Tetrahedral
B. Seesaw
C. Square planar
D. T-shaped
E. Trigonal bipyramid

What is the shape of N_3^-?

A. Linear
B. Bent
C. Planar
D. Trigonal
E. Straight

The molecule O=C=S has a Lewis structure analogous to that of CO_2 and is a linear molecule. Will it have a zero dipole moment like CO_2?

A. No
B. Yes
C. It depends on whether it is O=C=S or S=C=O

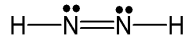
Suppose that two unhybridized 2*p* orbitals were used to make the Be-F bonds in BeF_2. Would the two bonds be equivalent to each other? If yes, what would be the expected F-Be-F bond angle?

A. No.
B. Yes, bond angle = 90°.
C. Yes, bond angle = 109.5°.
D. Yes, bond angle = 180°.
E. No, this type of bonding is expressly forbidden by Pauli, Hund, Heisenberg *and* Schrodinger.

In an sp^2 hybridized atom, what is the orientation of the unhybridized *p* orbital relative to the three sp^2 hybrid orbitals?

A. The unhybridized *p*-orbital is 180° from the plane of the sp^2 orbitals.
B. The unhybridized *p*-orbital is coplanar with the plane of the sp^2 orbitals.
C. The unhybridized *p*-orbital is 109.5° from the plane of the sp^2 orbitals.
D. The unhybridized *p*-orbital is perpendicular to the plane of the sp^2 orbitals.
E. The unhybridized *p*-orbital is reeling drunkenly about the atom.

The molecule *diazine* has the formula N_2H_2 and the Lewis structure shown below. Would you expect diazine to be a linear molecule (all four atoms on the same line)? Would you expect the molecule to be planar (all four atoms in the same plane)?



A. The molecule is both linear and planar.
B. The molecule is not linear but is planar.
C. The molecule is linear but not planar.
D. The molecule is neither linear nor planar.
E. The molecule is orange with green polka dots.

What will happen when the yellow LED gets dipped in liquid nitrogen?

A. It will get brighter.
B. It will get dimmer.
C. It will change colour.
D. Nothing.
E. It will shatter into tiny, tiny pieces.

What will happen when the battery gets dipped in liquid nitrogen?

A. The LED will get brighter.
B. The LED will get dimmer.
C. The LED will change colour.
D. Nothing.
E. The battery will superconduct, overheat, then explode.

Chapter 5

How does the energy of attraction between particles compare with the kinetic energy of the particles in a gas?

A. No comparison can be made between kinetic and attraction energy without temperature information.
B. The average kinetic energy is greater than the energy of attraction.
C. The average kinetic energy is equal to the energy of attraction.
D. The average kinetic energy is less than the energy of attraction.
E. Energetic particles are very unattractive.

In which of the following mixtures do you encounter ion-dipole forces: CH_3OH in water or $Ca(NO_3)_2$ in water?

A. Ion-dipole forces are encountered in both solutions.
B. Ion-dipole forces are encountered in neither solution.
C. Ion-dipole forces only are encountered in $Ca(NO_3)_2$ in water.
D. Ion-dipole forces only are encountered in CH_3OH in water.
E. Ion-dipole forces are the fevered imaginings of a diseased mind.

For which substance are the dipole-dipole forces greatest?

A. CH_3CH_2Cl, molecular weight 64
B. $CH_3CH_2OCH_3$, molecular weight 60
C. $CH_3CH_2CH_2CH_3$, molecular weight 58
D. CH_3CH_2CHO, molecular weight 58
E. CH_3CH_2CN, molecular weight 55

List the substances CCl_4, CBr_4 and CH_4 in order of increasing polarizability.

A. $CH_4 < CBr_4 < CCl_4$
B. $CCl_4 < CH_4 < CBr_4$
C. $CH_4 < CCl_4 < CBr_4$
D. $CBr_4 < CCl_4 < CH_4$
E. None of these substances is polarizable.

List the substances CCl_4, CBr_4 and CH_4 in order of increasing strength of dispersion forces.

A. $CH_4 < CBr_4 < CCl_4$
B. $CCl_4 < CH_4 < CBr_4$
C. $CH_4 < CCl_4 < CBr_4$
D. $CBr_4 < CCl_4 < CH_4$
E. None of these substances have dispersion forces.

Do any substances other than water expand when they freeze?

A. No. Water is unique.
B. Yes, but they are very rare.
C. Yes, metals expand when they freeze.
D. Yes, there are lots of different substances that display this behavior.
E. Yes, all substances expand when they freeze.

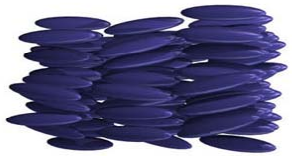
Which of Co, C_6H_6 and K_2O would you expect to form molecular solids?

A. All three substances can form molecular solids.
B. Co
C. C_6H_6
D. K_2O
E. None of them will form molecular solids.

Which of these substances might be an ionic liquid at room temperature?

A. $Na^+ Cl^-$
B. $[N(CH_3)_4]^+ Br^-$
C. C_6H_6
D. $[P(C_6H_{13})_3(C_{14}H_{29})]^+ [BF_4]^-$
E. $H^+ [PF_6]^-$

What sort of phase is shown below?



A. Liquid
B. Nematic liquid crystal
C. Smectic liquid crystal
D. Cholesteric liquid crystal
E. Solid

Chapter 6

Which of these bond types is most likely to be the seat of a chemical reaction: C=N, C-C or C-H?

A. C=N
B. C–C
C. C–H
D. Trick question! Chemical reactions don't have seats.

How many C-H and C-C bonds are formed by the middle carbon atom of propane, $CH_3CH_2CH_3$?

A. zero C–H bonds and 4 C–C bonds
B. one C–H bond and three C–C bonds
C. two C–H bonds and two C–C bonds
D. three C–H bonds and one C–C bond
E. none

What is the chemical formula of the propyl group?

A. C_3H_6
B. C_3H_7
C. C_2H_5
D. C_3H_8
E. $C_{67}H_{83}$

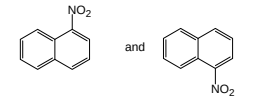
How many distinct locations are there for one double bond in a five-carbon chain?

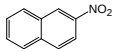
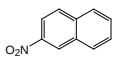
A. 5
B. 4
C. 3
D. 2
E. 1

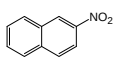
How many distinct locations are there for one double bond in a five-carbon ring?

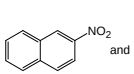
A. 4
B. 3
C. 2
D. 1
E. 0

When naphthalene is reacted with nitric and sulfuric acids, two compounds containing one nitro group are formed. Which are the structures of these two compounds?

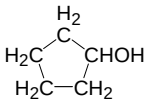
A. -  and

B. -  and 

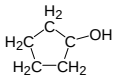
C. -  and 

D. -  and 

Write the condensed formula for the ketone that would result from partial oxidation of this alcohol:



A. - 

B. - 

C. - 

D. - 

Which object is chiral?

A. Bicycle
B. Ladder
C. Coffee mug
D. Tennis ball
E. Tetrahedron

What are the requirements on the four groups attached to a carbon atom in order that it be a chiral centre?

A. At least one group other than hydrogen must be on carbon.
B. At least two groups must be different from one another.
C. All four groups must be different from one another.
D. There must be no other C's bound to central C.
E. They all have to be different colours.

Chapter 7

A white substance melts at 800°C. It does not conduct electricity as a solid, but dissolves in water to make a conducting solution. What type of solid is it?

A. Molecular
B. Metallic
C. Covalent network
D. Ionic
E. Platonic

What is an intrinsic property of all superconductors?

A. They can exhibit zero resistance
B. They can expel magnetic field
C. They can act as a perfect diamagnet
D. All the above
E. None of the above