# ANSWERS

20. Systems in nature tend to undergo changes toward
2. lower energy and higher entropy - Energy disperses and spreads out, more chaos or higher entropy is what happens in nature all the time.

8. At STP, solid carbon can exist as graphite or diamond. These two forms of carbon have
4. the different properties and different crystal structure
The vocabulary word here is ALLOTROPES, when different forms of a pure element exist. They have different forms or structure, different properties. Examples are carbon atoms, diamonds, and graphite. Other allotropes are oxygen and ozone.

15. Compared to a 0.1 M aqueous solution of NaCl, a 0.8 M aqueous solution of NaCl has a

2. higher boiling point and a lower freezing point Colligitive properties of water, the more ions in solution, the higher the BP, the lower the FP. Besides having to overcome the attractiveness of water molecules to boil them away, the water also is attracted to the ions, so it takes more energy to boil. As for the cold side, water wants to form into hexagon lattices. The ions get in the way, making it take LOWER temperatures to freeze despite these ions in the way.

32. Which equation represents a fusion reaction?

3. $^{27}_{13}Al + {}^{4}_{2}He \longrightarrow {}^{30}_{15}P + {}^{1}_{0}n$

Here the aluminum and alpha particle fuses into a larger Phosphorous atom, and gives off a neutron at the same time. Fusion requires 2 smaller atoms or particles to combine into something larger, in this case P-30.

34. Which symbol represents a particle that hast he same total number of electrons as $S^{-2}$?
4. Ar sulfur has 16 electrons as an atom. As an anion it gains 2 electrons to gain that coveted octet of electrons. It is ISOELECTRIC to Argon the noble gas. Isoelectric means having the same electron configuration as something else (usually but not always a noble gas).

40. Which molecule contains a non-polar covalent bond?

Br—Br Bromine molecules share equally their electrons in the bond.
They have NO DIFFERENCE in their electro negativity values (Table S). Since neither has a greater or lesser desire to gain the electrons in a bond, neither gets that electron more or less. Thus, the bond is perfectly balanced, or NON-P0LAR. All the other molecules were slightly to strongly polar.

41. According to reference table G, which substance forms an unsaturated solution when 80 grams of the substance is dissolved into 100 grams water at 10ºC?
1. KI at 10°C 100 mL water can hold much more KI than this.

49. Given the balanced ionic equation $Zn_{(S)} + Cu^{+2}_{(AQ)} \text{ —–> } Zn^{+2}_{(AQ)} + Cu_{(S)}$

Which equation represents the oxidation half reaction?

2. $Zn_{(S)} \text{ —–> } Zn^{+2}_{(AQ)} + 2e^-$
Here the zinc atoms become cations, by losing 2 electrons each. Oxidation is Loss of Electrons
Remember this: LEO the lion goes GER. (and REDCAT)

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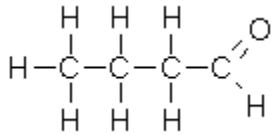
49. What is the half life of sodium-25 if 1.00 grams of a 16.00 gram sample remains unchanged after 237 seconds?
2. 59.3 sec That took 4 half lives (16 to 8 to 4 to 2 to 1 gram) 237 seconds = 4 half lives

50. Proposed models of the atom:
Model A: protons in nucleus, electrons in specific shells
Model B: protons in nucleus, electrons in regions of most probably location
Model C: protons dispersed throughout the atom, electrons in specific shells
Model D: protons dispersed throughout the atom, electrons in regions of most probably location

Which model correctly describes the locations of protons and electrons in the wave-mechanical model of the atom? B: modern model or wave mechanical have central protons (with the neutrons) with the electrons flying around in "clouds" or zones of likelihood.

43. What is the IUPAC name for the compound that has a condensed structure of $CH_3CH_2CH_2CHO$?
2. butanal (shown here)



4. Atoms of different isotopes of the same element differ in their total number of
2. neutrons They are chemically identical atoms with different masses due to a different number of NEUTRAL (non chemically reactive) neutrons.

5. Which statement correctly describes two forms of oxygen, $O_2$ and $O_3$?
4. they have different molecular structures and different properties - THESE ARE ALLOTROPES!

17. Which formula represents a hydrocarbon? 2. $CH_3CH_2CH_2CH_3$ (must be C + H ONLY!)

23. Which balanced equation represents a redox reaction?
1. $AgNO_3 + NaCl \text{ —–> } AgCl + NaNO_3$ (no, double replacement, but no change of charges)
2. $BaCl_2 + K_2CO_3 \text{ —–> } BaCO_3 + 2KCl$ (no, double replacement, but no change of charges)
3. $CuO + CO \text{ —–> } Cu + CO_2$ YES!
4. $HCl + KOH \text{ —–> } KCl + HOH$ (no, double replacement, and also acid base neutralization, but no change of charges)