

## Regents Practice 25 Questions Quiz 3 (52-77 ANSWERS)

52 Which compound is soluble in water? (2)  $\text{Li}_2\text{S}$

If your first name is lithium, you will be soluble in water (aqueous) no matter what.

53 Compared to a 14 g sample of  $\text{LiCl}_{(s)}$  at STP, a 28 g sample of  $\text{LiCl}_{(s)}$  at STP has (3) the same chemical properties  
You have 2 sized piles of lithium chloride salt, they each contain the SAME compound with the same properties.

54 A solid changes directly to a gas during (2) sublimation

This is the “weird” phase change, you saw the iodine solid turn into purple gas. It’s opposite is deposition.

55 The phase of a sample of a molecular substance at STP is not determined by its (3) number of molecules  
An annoying question to be sure, the important word is NOT and numbers do not impact phases.

56 Which atom has the weakest attraction for electrons in a chemical bond? (3) a boron atom

This is about having the LOWEST electronegativity value on table S, look it up, learn your vocab.

57 Which element is a liquid at 373K & 1.0 atmosphere? (2) gallium

This is on table S, gallium melts at 303 K, iodine does not melt until 387 K.

58 Which list of elements consists of a metal, a metalloid, and a nonmetal? (2) Sn, Si, P

One atom to the left of the stairs, one to the right, and one touching the staircase (but not Al or Po!)

59 At STP, which physical property of iron always remains the same from sample to sample? (3) density

Density is a physical CONSTANT, which means it doesn’t change. Mass divided by volume = a constant

60 Which statement describes a chemical property of indium? (4) Indium reacts with bromine.

Chemical properties refer to chemical reactions and not to physical constants.

61 A compound is broken down by chemical means during (2) electrolysis

A repeated question here, vocab! This means using electricity to breakdown, as in water  $\rightarrow$  hydrogen + oxygen gases

62 Which quantities must be conserved in all chemical reactions? (2) mass, charge, energy

The Law of Conservation of Mass (matter), of Charge, and of Energy,

63 Which phrase describes the distribution of charge and the polarity of a  $\text{CHBr}_3$  molecule? (3) asymmetrical + polar

This molecule DOES NOT HAVE radial symmetry, it is a polar molecule because the polar bonds (the polarity) is not in balance, as with  $\text{CBr}_4$ .

64 What is the charge of the nucleus of an nitrogen atom? (2) 7 (terrible question) the real answer is +7, but this is the regents and sometimes the questions STINK. Always choose the BEST answer, even if it’s wrong!

65 Which ion has the most electrons? (4)  $\text{Au}^{+1}$  The gold (I) cation has 79 electrons, the others GAINED more when making anions, but this one HAS the most. Another reading question, but it is clear, if you read slowly.

66 When a chemical bond forms, energy must be (4) released (never forget this until you are 89!)

67 Every bromine atom has (4) an atomic number of 35 The trick here is to see that bromine has 7 valence electrons, can have 35 neutrons in some isotopes, and can have mass of 80 (depending upon which isotope you have). It always has 35 protons, it always will be atom # 35.

68 Which substance can not be broken down by a chemical change? (4) silicon

This is the ONLY element. The other 3 are compounds which CAN be broken down into elements.

- 69 At standard pressure, which substance becomes less soluble in water as temperature increases from 10. to 80.°C?  
(1) NH<sub>3</sub> This is on Table G, it's molecular, and the graph for this compound tends downwards with temperature.
- 70 Which type of concentration is calculated when the grams of solute is divided by the grams of the solution, and the result is multiplied by 1 000 000?  
(3) parts per million I can only be so nice about this. Multiplied by A MILLION!!! There is NO choice here!
- 71 Which type of energy is associated with the random motion of atoms and molecules in a sample of air?  
(4) thermal energy Thermal energy means temperature. Motion (kinetic energy) is hand in glove with temperature.
- 72 Which formula represents an unsaturated hydrocarbon? (3) C<sub>2</sub>H<sub>4</sub> The other 3 are alkanes. When two carbon atoms bond together, they can hold up to 6 hydrogen atoms (ethane). This has LESS than the maximum it can hold.
- 73 Which ion is most easily reduced? (2) Co<sup>2+</sup>  
This is a bit backwards, instead of which will oxidize the easiest (the highest on table J) this is the opposite.
- 74 Given the balanced equation representing a reaction:  $\text{HSO}_4(\text{AQ}) + \text{H}_2\text{O}(\text{L}) \rightarrow \text{H}_3\text{O}^+(\text{AQ}) + \text{SO}_4^{2-}(\text{AQ})$   
According to one acid-base theory, the H<sub>2</sub>O(L) molecules act as  
(1) a base because they accept H<sup>+</sup> ions  
This is way out there, here goes. When you see hydronium, the ideas are wild. Remember how ammonia is a base? It accepted a hydrogen ion so by definition it's a base. Here water accepts a hydrogen ion, it's the base. This is the regents doing its very best to keep you from a 100%. This is just hard.
- 75 At 50.°C and standard pressure, intermolecular forces of attraction are strongest in a sample of  
(1) ethanoic acid  
These 4 compounds are screaming: Look at table H!!!. Ethanoic acid (vinegar) has the lowest vapor pressure because it evaporates the worst, because it has the strongest intermolecular attractions.
- 76 At 101.3 kPa and 298 K, what is the total amount of heat released when one mole of aluminum oxide, Al<sub>2</sub>O<sub>3(S)</sub>, is formed from its elements?  
(2) 1676 kJ You so wanted to pick 3351 kJ because that is the number on Table I. Sorry. On table I it clearly shows when TWO MOLES of aluminum oxide form that is the energy released. This is when ONE MOLE forms, so HALF of 3351 kJ will be released. It's sort of cheesy, but again, they do NOT want you to get a 100%. Read, go slowly, put your finger in the box on the table, be sure and look for wrong answers too.
- 77 Element X reacts with chlorine to form an ionic compound that has the formula XCl<sub>2</sub>. To which group on the Periodic Table could element X belong?  
(3) Group 2 First of all, THERE ARE NO UNKNOWN elements. We know them all, so do you. Ionic bonds form between metals and chlorine (a nonmetal) so it has to be group 1 or 13 or 2. Pick one metal from each to see how they work this out with chlorine. Group 1 metal is sodium. NaCl is a 1:1 ratio, so that's out. In group 13 is aluminum, and that makes AlCl<sub>3</sub> which is 1:3 and also out. Group 2 has Mg, that makes MgCl<sub>2</sub> which is the correct 1:2 ratio, and the right answer. The metals in group 15 make only +3 ions and + 5 ions.