

Regents 1-26 Answers

- 1 In which type of chemical reaction do two or more reactants combine to form one product, only?
(1) synthesis - in this reaction, like hydrogen + oxygen make water, there is a combination of reactants.
- 2 Which statement explains why neon is a Group 18 element?
(2) Neon atoms have a stable valence electron configuration.
Noble gases do not react because they have all FULL ORBITALS, they're perfect and stable.
- 3 Which element has chemical properties that are most similar to the chemical properties of fluorine? (3) chlorine
Elements in the same group are similar, not next door, in the same period. Same group = similar properties.
- 4 What occurs as two atoms of iodine combine to become a molecule of iodine?
(2) A bond is formed as energy is released. This is CLASSIC in chemistry. To break bonds requires energy.
- 5 What is the number of pairs of electrons that are shared between the nitrogen atoms in a molecule of N₂?
(2) 3 It's a triple bond. They share 3 pairs of electrons. They share 6 electrons, but that is a different question.
- 6 Which phrase describes an atom?
(4) a positively charged nucleus surrounded by negatively charged electrons
Rutherford showed this with the Gold Foil Experiment. Nucleus has positive protons (and neutral neutrons) while negative electrons fly
- 7 An orbital is defined as a region of the most probable location of
(1) an electron Electrons live in orbitals, no where else.
- 8 The bright-line spectrum of an element in the gaseous phase is produced as
(4) electrons move from higher energy states to lower energy states.
To get excited electrons gain energy, but spectra is from the release of this energy as the unstable electron goes back to the ground state.
- 9 An atom of lithium-7 has an equal number of
(2) electrons and protons The NEGATIVES = POSITIVES in all atoms, they're neutral.
- 10 Which set of values represents standard pressure and standard temperature?
(3) 101.3 kPa and 0°C Look at Table A, go slowly.
- 11 Which statement about one atom of an element identifies the element? (1) The atom has 8 protons.
The number of protons is the ATOMIC NUMBER. The same number of electrons is in this atom (oxygen)
- 12 A substance is classified as either an element or a
(1) compound Solid, liquid or gas is a phase. Substances are PURE, they include only elements and compounds.
- 14 A solid element that is brittle, a poor conductor of electricity, & can covalent bonds is classified as a (1) nonmetal
The definition of nonmetal is brittle, & is a poor conductor of electricity. Metals are malleable, ductile, they conduct well, & make ionic bonds
- 15 Three forms of energy are (2) chemical, thermal, and electromagnetic (learn your vocabulary)

- 16 What is the total amount of heat required to melt 1.00 gram of $\text{H}_2\text{O}_{(s)}$ at $0.^\circ\text{C}$ and 1 atmosphere?
(3) 334 J This is the heat of fusion, the H_F from thermochem.
- 17 Which compound is soluble in water? (2) Na_2S
See table F, if your first name is sodium, you're aqueous without exception.
- 18 Compared to a 26-gram sample of $\text{NaCl}_{(s)}$ at STP, a 52-gram sample of $\text{NaCl}_{(s)}$ at STP has
(3) the same chemical properties Sodium chloride is sodium chloride, this is just 2 different sized piles of it.
- 19 A gas changes directly to a solid during (3) deposition
This is one of the weird phase changes, the opposite of sublimation
- 20 The phase of a sample of a molecular substance at STP is not determined by its (3) number of molecules
A weird NYS question, the backwards way to ask something. How many molecules you have can be in any phase
- 21 Which atom has the weakest attraction for electrons in a chemical bond?
(1) a boron atom Which has the LOWEST ELECTRONEGATIVITY value? Look it up on table S.
- 22 Which element is a liquid at 305 K and 1.0 atmosphere? (2) gallium
Table S shows that Gallium melts at 303 K, look it up!
- 23 Which list of elements consists of a metal, a metalloid, and a nonmetal? (2) Sn, Si, C
One on the left of the staircase, one on the right, and one touching (but not Al or Po!)
- 24 At STP, which physical property of aluminum always remains the same from sample to sample? (3) density
Density is a physical CONSTANT, something about a substance that never changes.
- 25 Which statement describes a chemical property of silicon? (4) Silicon reacts with fluorine.
We're looking for chemistry, not a physical property. Reacting with other substances (to form new ones) is a chemical property.
- 26 A compound is broken down by chemical means during (2) electrolysis
Electrolysis means using electricity to break down a substance, like water in the Hoffmann Apparatus.
- 27 Which quantities must be conserved in all chemical reactions?
(1) mass, charge, density (2) mass, charge, energy (3) charge, volume, density (4) charge, volume, energy
- 28 Which phrase describes the distribution of charge and the polarity of a CH_4 molecule? (2) symmetrical and nonpolar
the molecule is nonpolar because it has radial symmetry. The polar bonds are "in balance" with each other.
- 29 What is the charge of the nucleus of an oxygen atom? (2) 8 A terrible question from NYS. The real answer MUST BE +8!
- 30 Which ion has no electrons? (1) H Another "name" for the H^+ cation (in acid/base chem) is a proton.
- 31 To break a chemical bond, energy must be (1) absorbed When bonds BREAK, it takes energy to do this.
When bonds form, energy is released.
- 32 Every chlorine atom has (4) an atomic number of 17
The only tricky answer was mass of 35, but remember, there are ISOTOPES of chlorine with different numbers of neutrons (mass)
- 33 Which substance can not be broken down by a chemical change? (4) phosphorus This is the only element, all the others are compounds.
- 34 At standard pressure, which substance becomes less soluble in water as temperature increases from 10. to $80.^\circ\text{C}$?
(1) HCl Look at table G, it's the only molecular compound in this short list.
- 35 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 Multiplied by ONE MILLION (duh!)
- 36 Which type of energy is associated with the random motion of atoms and molecules in a sample of air?