Chemistry Common Exam Review Questions

1. Which atomic symbol represents an isotope of sulfur with 17 neutrons?

a. $^{17}_{16}X$
b. $^{33}_{16}X$
c. $^{17}_{32}X$
d. $^{49}_{32}X$

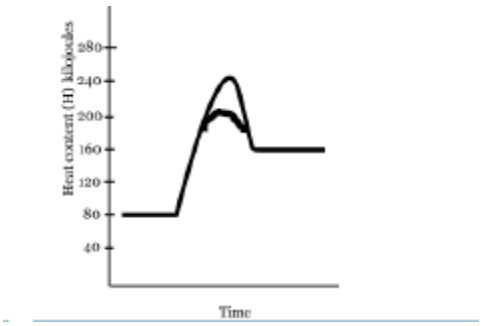
2. Which statement compares the amount of energy needed to break the bonds in $CaCl_2$ (E1) and $C_{12}H_{22}O_{11}$ (E2)?
a. E1 > E2, as $CaCl_2$ is a covalent compound.
b. E1 < E2, as $CaCl_2$ is a covalent compound.
c. E1 > E2, as $CaCl_2$ is an ionic compound.
d. E1 < E2, as $CaCl_2$ is an ionic compound.

3. Which statement describes the compound formed between sodium and oxygen?
a. It is NaO_2, which is ionic.
b. It is NaO_2, which is covalent.
c. It is Na_2O, which is ionic.
d. It is Na_2O, which is covalent

4. 1000 J of heat is added to 2 g of the following substances. Which one will experience the biggest change in temperature?
a. aluminum
b. copper
c. iron
d. lead

5. What causes an inflated balloon to shrink when it is cooled?
a. because cooling the balloon causes gas to escape from the ball
b. because cooling the balloon causes the gas molecules to collide more frequently
c. because cooling the balloon causes gas molecules to become smaller
d. because cooling the balloon causes the average kinetic energy of the gas molecules to decrease

6. Given the energy diagram below, which statement describes the forward reaction



a. It is an exothermic reaction with an energy change of 160 kJ.
b. It is an exothermic reaction with an energy change of 80 kJ.
c. It is an endothermic reaction with an energy change of 160 kJ.
d. It is an endothermic reaction with an energy change of 80 kJ.

7. A student mixes two chemicals in a test tube. The test tube turns hot and bubbles appear. What indicators of chemical reaction is the student observing?
a. Change in color and formation of precipitate.
b. Change in color and formation of gas.
c. Change in temperature and formation of precipitate.
d. Change in temperature and formation of gas.

8. Which is the electronic configuration of calcium?
a. $1s^2 2s^2 2p^6 3s^2 3p^8$
b. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$
c. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^2$
d. $1s^2 2s^2 2p^8 3s^2 3p^6$

9. An electron in an atom of hydrogen goes from energy level 6 to energy level 2. What is the wavelength of the electromagnetic radiation emitted?
a. 410 nm
b. 434 nm
c. 486 nm
d. 656 nm

10. The half-life of a radioactive isotope is 20 minutes. What is the total amount of 1.00 g of sample of this isotope remaining after 1 hour?
a. 0.500 g
b. 0.333 g
c. 0.250 g
d. 0.125 g

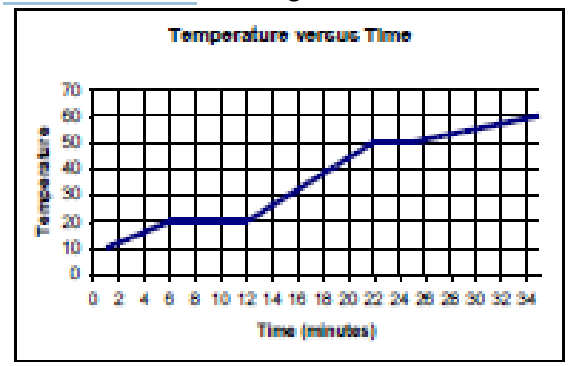
11. At STP, fluorine is a gas and iodine is a solid. Why?
a. Fluorine has lower average kinetic energy than iodine.
b. Fluorine has higher average kinetic energy than iodine.
c. Fluorine has weaker intermolecular forces of attraction than iodine.
d. Fluorine has stronger intermolecular forces of attraction than iodine.

12. What is the IUPAC name for the compound represented by the formula $Mg(OH)_2$?
a. Magnesium hydroxide.
b. Magnesium dihydroxide.
c. Magnesium (II) hydroxide.
d. Magnesium (II) dihydroxide

13. Arrange the following elements in order of increasing electronegativity, from lowest to highest: F, K, Si, and S.
a. F < K < S < Si
b. K < Si < S < F
c. Si < F < K < S
d. S < Si < F < K

14. What causes the process of perspiration to be cooling for human skin?
a. It involves condensation and is exothermic.
b. It involves evaporation and is exothermic.
c. It involves condensation and is endothermic.
d. It involves evaporation and is endothermic

15. Given the heating curve below, what is occurring between minutes 6 to 12?

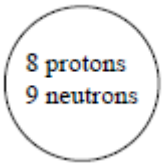


a. There is an increase in kinetic energy and vaporization is occurring.
b. There is an increase in kinetic energy and condensation is occurring.
c. There is an increase in potential energy and freezing is occurring.
d. There is an increase in potential energy and melting is occurring.

16. An unknown substance is tested in the laboratory. The physical test results are listed below.
- Nonconductor of electricity
- Insoluble in water
- Soluble in oil
- Low melting point

Based on these results, what is the unknown substance?
a. ionic and polar.
b. ionic and nonpolar.
c. covalent and polar.
d. covalent and nonpolar.

17. The nucleus of an atom is shown.

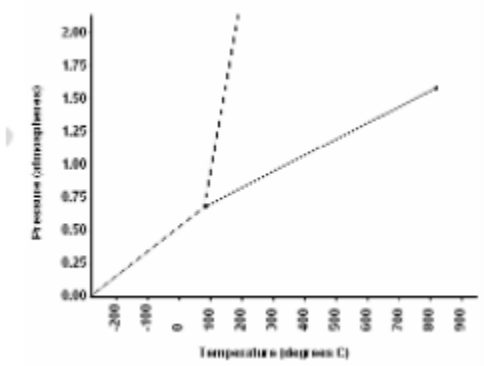


Which statement describes the element??
a. It is a nonmetal in group 2.
b. It is a nonmetal in group 16.
c. It is a metal in group 2.
d. It is a nonmetal in group 17.

18. When considering the energetics of the solution process, which process is *always* exothermic?
a. Solute particles separate from one another.
b. Solvent particles separate from one another.
c. Solute and solvent particles form attractions for one another.
d. Solution formation as a whole is always endothermic

19. Which atom has the largest radius? Justify your answer.
a. Bromine
b. Chlorine
c. Selenium
d. Sulfur

20. According to the phase diagram below, what is the boiling point of this substance at a pressure of 1.25 atmospheres?



a. 100^{o}C
b. 150^{o}C
c. 300^{o}C
d. 500^{o}C

21. Consider this combustion reaction equation:

$C_4H_{10} + O_2 \rightarrow CO_2 + H_2O$
When the equation is balanced, what will be the coefficient of O2?
a. 1
b. 7
c. 10
d. 13

22. Given the balanced chemical equation the reaction,

$P_4 + 5O_2 \rightarrow P_4O_{10}$
What mass of oxygen is needed to completely react with 7.75 g P4 ?
a. 2.00 grams
b. 5.00grams
c. 10.00 grams
d. 40.00 grams

23. A compound consisting of 56.38% phosphorus and 43.62% oxygen has a molecular mass of 220 g/mole. What is the molecular formula of this compound?
a. PO
b. PO_2
c. P_2O_3
d. P_4O_6

24. When a set amount of marble chips (CaCO3) is added to a small amount of dilute hydrochloric acid, a reaction occurs. What should be done to decrease the rate of reaction the next time the experiment is performed?
a. Use more acid.
b. Stir.
c. Use larger marble chips.
d. Add heat.

25. A scientist observes a chemical reaction as it takes place. How can the scientist so in order to tell if the reaction has achieved equilibrium?
a. Measure concentrations of products and reactants over time.
b. Monitor the temperature of the reaction over time.
c. Measure the pH of the solution over time.
d. Wait for the formation of a precipitate.

26. For the reaction

$2SO_2(g) + O_2(g) \rightleftarrows 2SO_3(g) + \text{heat}$

Which action will increase the concentration of SO_3?
a. removing SO_2
b. increasing the temperature
c. increasing the pressure
d. adding a catalyst

27. Based on hydroxide ion concentration, which unknown substance would be an acid?
a. Substance A, $[OH^-] = 1.0 \times 10^{-2}M$
b. Substance B, $[OH^-] = 1.0 \times 10^{-4}M$
c. Substance C, $[OH^-] = 1.0 \times 10^{-6}M$
d. Substance D, $[OH^-] = 1.0 \times 10^{-8}M$

28. Given the data table below, which substance is an acid?

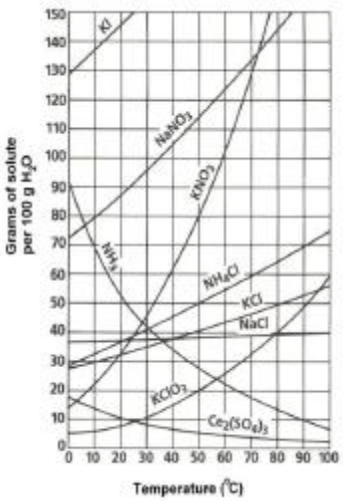
	Substance			
	W	X	Y	Z
Tastes bitter	?	Yes	Yes	No
Tastes sour	No	No	?	Yes
Feels slippery	No	Yes	Yes	?
Turns litmus blue	Yes	Yes	Yes	?
Turns litmus red	?	No	No	Yes

a. Substance W
b. Substance X
c. Substance Y
d. Substance Z

29. What volume of 0.200M HCl will neutralize 10.0mL of 0.400M KOH?
a. 40.0mL
b. 20.0mL
c. 8.00mL
d. 5.00mL

30. Heat is added to a solution to
a. increase the solubility of a solid solute.
b. increase the solubility of a gas solute.
c. increase the miscibility of the solution
d. increase the degree of saturation of the solution.

31. How many grams of KCl are required to make a saturated solution in 50.0 g of water at 80°C?



a. 25.0 g
b. 50.0 g
c. 100. g
d. 150. g