

1.

- a. Calcium chloride
- b. Potassium hydrogen phosphate
- c. Diazonium sulphate
- d. Lead oxide
- e. Magnesium bicarbonate
- f. Nitrogen triiodide
- g. Phosphorus pentoxide
- h. Carbon tetrachloride
- i. Sodium trioxide
- j. Hydrogen chloride

2.

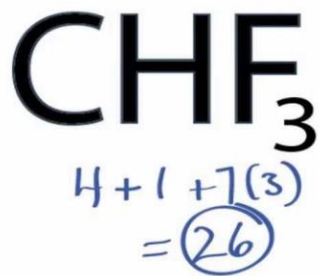
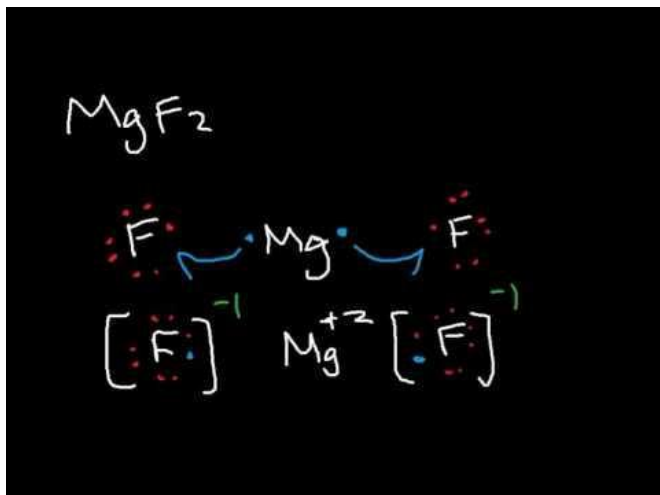
- | | | |
|-----------------------------|---------------------------------|-------------------|
| a. NH_4Cl | b. $\text{Al}_2(\text{SO}_4)_3$ | c. NH_3 |
| d. PI_3 | e. NaMnO_4 | f. CuO |
| g. H_2O_2 | h. Fe_3O_4 | i. CCL_4 |
| j. K_2CrO_4 | | |

3.

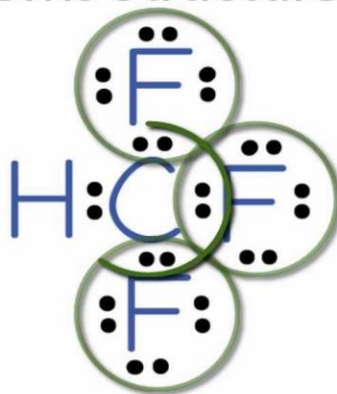
- a. $\text{ZN} + 2\text{NaOH} + 2\text{H}_2\text{O} = \text{Na}_2[\text{Zn}(\text{Oh})_4] + \text{H}_2$
- b. $\text{Al}(\text{OH})_3 + 3\text{HCL} = \text{AlCl}_3 + 3\text{H}_2\text{O}$
- c. $\text{Ba}(\text{OH } 2) + 2\text{HNO}_3 = \text{Ba}(\text{NO}_3)_2 + 2\text{H}_2\text{O}$
- d. $2\text{Na}_2\text{O}_2 + 2\text{H}_2\text{O} = 4\text{NaOH} + \text{O}_2$
- e. $2\text{NaOH} + \text{H}_2\text{SO}_4 = \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$

4.

a. MgF_2



Lewis Structure



C_2H_2



5.

Symbol (including charges where appropriate)	Number of Protons in the Nucleus	Number of Neutrons in the Nucleus	Number of Electrons	Net Charge
	17	21		-1
$^{79}_{34}\text{Y}$				
	56	81		+2

(1) $\text{Sc}=21$, $e=18$ 17

(2) $p=34$, $N=79$, $e=33$, $\text{charge}=+1$

(3) 81 , $p=56$, $N=21$, $e=54$

Th 56

Q6.

l)

Molecule is a group of 2 or more atoms that are bonded with each other whereas ions are a group of molecules that have lost or gained electrons from their outermost orbits, i.e. molecules which have a valency are called ions

II) An ionic bond is a bond that takes place between a metallic and a non-metallic atom. At the other hand, covalent bonding is formed between 2 metallic type atoms.

Ionic compounds are formed by transfer of electrons while covalent is formed by sharing of electrons

Ionic compounds are hard and crystalline while covalent are soft and more flexible.

Melting and boiling points of ionic compounds are higher than covalent compounds

Q7.

- a. $3s^1$ b. $3s^2 3p^6$ c. $2s^2 2p^6$
- b. 1. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^{10} 5s^2 5p^6 6s^0$
2. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^{10} 5s^2 5p^6 4f^{14} 5d^{10} 6s^2 6p^6 7s^0$
3. $1s^2 2s^2 2p^6 3s^2 3p^5$

Q8.

- a. Potassium , Lithium, Rubidium, Caesium
- b. Halogen
- c. Strontium
- d. Tellurium

Q9.

- a. 294 gms/mole b. 6.022×10^{23} is the number of atoms

Q10.

- a. $(3.25 \times 1000) / (138 \times 150) = 0.15 \text{ mol/l}$
- b. $3.25 / 0.15 = 21.66 \text{ g/L}$

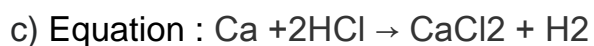
Q11.

- a) Equation : $\text{CuSO}_4 (\text{aq}) + \text{K}_2\text{CO}_3 (\text{aq}) \rightarrow \text{CuCO}_3 (\text{s}) + \text{K}_2\text{SO}_4 (\text{aq})$

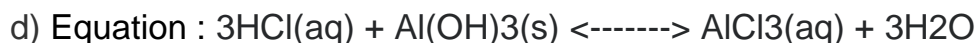
Observation : Precipitate: CuCO_3 (pale blue) and K_2SO_4 is soluble in water



Observation : Formation of bubbles due to $\text{CO}_2(\text{gas})$ is observed



Observation : H_2 is evolved while CaCl_2 will be dissolved in the water



Observation : Solid Aluminum Hydroxide is insoluble in water. This means that the

$\text{Al}(\text{OH})_3$ will only partially ionize creating a weak acid and strong base pair.

Q12.



Since 1 mol of H_3PO_4 requires 3 moles of NaOH ,
 $(.15 \times 0.255 = 0.03825 \text{ moles})$ of H_3PO_4 requires $(0.03825 \times 3 / 0.155)$

0.740 Litres of NaOH

Q13.

a) Moles of $\text{LiOH} = .007$, moles of $\text{H}_2\text{CO}_3 = .0022$

b) Limiting reagent = H_2CO_3

c) Mass of the ppt formed (Li_2CO_3) = 0.162 gms

Q14.

- a) Calcium carbonate reacts with hydrochloric acid to produce carbon dioxide gas, when this reaction occurs, carbon dioxide is produced vigorously. And hence the balloon inflates.



b) The more finely divided the solid is, the faster the reaction happens. A powdered solid will normally produce a faster reaction than if the same mass is present as a single lump, as increasing the surface area of the solid increases the chances of collision taking place.

c) Increasing the concentration of HCl and increasing the temperature of the reaction by heating up are the other two methods to increase the rate of the reaction as the number of successful collisions increase.

Q15.



- a) Equilibrium constant expression $K_c = [\text{CO}_2]$ (partial pressure of CO_2)
b) Given the partial pressure of CO_2 , 0.0025 atm

c)

Change made to the system	Effect on equilibrium concentration of CO ₂ . (Increases, decreases or no change)
Grinding the calcium carbonate into a fine powder	Increases
Increasing the pressure in the system by adding some helium gas	no effect
The addition of extra calcium oxide to the system	decreases
Heating the system	increases
Increasing the volume of the system	decreases
Removing the lid on the reaction vessel for a moment to stir the contents. During this time some of the CO ₂ escaped	decreases

Q16.

- a) Between D and E, vaporization of a liquid iron goes into phase transition from the liquid phase to the gas phase.
- b) These energy exchanges are not changes in kinetic energy. They are changes in bonding energy between the molecules. If heat is coming into a substance during a phase change, then this energy is used to break the bonds between the molecules of the substance.
- c) The melting point of iron, is at 1538 degree celsius.

- d) The boiling point of iron, is at 2862 degree celsius.
- e) The stronger an intermolecular force, the higher the boiling point of the substance will be. This is because stronger intermolecular bonds require more energy to break. As this energy is supplied in the form of heat when boiling, substances with stronger bonds will have a higher boiling point. Hence Iron has stronger intermolecular forces than water.