

## Chemical families

1. a) - Non-metallic group  
- Ionic radius larger than atomic radius  
b) X – has smallest atomic radius hence more electronegative
2. To prevent filament from burning out. Provides an atmosphere in which burning cannot occur i.e. inert atmosphere
3. a) Halogens  
(b) X & Y  
(c) Z is the largest atom with the highest number of energy levels occupied by electrons.  
The longer an atom is the higher the forces of attraction that hold the molecules of the element together  
(d)  $3Z_{(g)} + 2Fe_{(s)} \rightarrow FeZ_{3(s)}$   
(e) The blue litmus paper turned red that bleached. This is because it dissolves in water to form an acid and bleaching solution of  $HO^{-1}$
4. (i) Down the group an extra energy level is added  
(ii) In group x elements form ions by ionizing the outer energy levels  
(iii) Across the period an extra proton is added which increased the nuclear attraction force  
(iv)  $BF_2$   
(v) – Ionic /electrovalent  
- Involves losing & gaining of electrons  
(vi) G, F, E  
- E has smallest atomic radius hence protons can attract an electron easier than in G
5. R – has the smallest atomic  $\sqrt{1/2}$  size hence its outermost electrons are more strongly held to the nucleus resulting in high  $\sqrt{1/2}$  value of ionization energy
6. - Add dilute nitric acid to lead (u) carbonate  
 $PbCO_{3(s)} + 2HNO_{3(aq)} \rightarrow Pb(NO_3)_2(aq) + CO_{2(g)} + H_2O(l)$  ✓  
- React the resulting solution with solution of sodium sulphate i.e.  
 $Na_2SO_{4(aq)} + Pb(NO_3)_2(aq) \rightarrow PbSO_{4(s)} + 2NaNO_{3(aq)}$  ✓  
- Filter to obtain lead (u) sulphate as residue. ✓  
- Dry the salt of lead (u) sulphate in between the filter papers or in sunshine. ✓
7. a) Is one of the atoms of the same element having a different mass number from the rest, but same atomic number with others of the same element  
b)  $\frac{92.2 \times 28}{100 \sqrt{1/2}} + \frac{4.7 \times 29}{100 \sqrt{1/2}} + \frac{3.1 \times 30}{100 \sqrt{1/2}} = 28.11 \sqrt{1/2}$
8. a) Alkaline earth metals ✓  
b) P has the smallest atomic radius due to electrons of P are closest to the nucleus ✓  
c)  $Q_{(s)} + 2H_{2O(l)} \rightarrow Q(OH)_{2(aq)} + H_{2(g)}$