ASSIGNMENT

(CHAPTER : Basic concepts of chemistry)

Q1. Prove that the compounds like water & hydrogen peroxide justify law of multiple proportion.

Q2. How much copper can be extracted from 100g of copper sulphate ?

Q3. Explain the following terms:----

(a) Formula mass (b) Empirical formula

Q4. How many moles of hydrogen gas, molecules of hydrogen gas & atoms of hydrogen are present in 7.5g of H_2 ?

Q5. Give two postulates of Dalton's atomic theory which are no more relevant.

Q6. What is the weight of one molecule of Ethanol ?

Q7. 12g of Calcium oxide reacts with 46g of waterto prepare Calcium hydroxide. Which Is the limiting reagent & how much Calcium hydroxide is formed?

Q8. An aqueous soln of glucose contains 10.8 % glucose. What is the mole fraction of glucose?

Q9. Define molality & give its units.

Q10. The density of Nitric acid solution which is 63% by mass is 1.41g/ml . What is the Molarity of solution?

Q12. A welding fuel gas contains C & H only. Burning a small sample of it in oxygen Gives 3.38g carbon dioxide & 0.690g water. 10L of this gas at STP weighs 11.6g. Calculate empirical formula,molar mass & molecular formula of the gas.

Q13. What is unified mass? Calculate its value in grams.

Q14. Calculate mass % of all the elements in Glucose.

Q15. If 1g of Mg is burnt in a closed vessel containing 0.5 g oxygen, what will be the limiting reagent & how much magnesium Oxide will be obtained?

Assignment on Chemical Bonding & Molecular Structure

Q1. Define Electronegativity.

Q2. Draw Lewis Dot Structure of Bromine atom & Oxide ion.

Q3. How is bond strength related to bond order & bond length?

Q4. What do you understand by Lattice enthalpy? Give its unit.

Q5. Differentiate b/w electronegativity & electron gain enthalpy.

Q6. What do you understand by polar & non polar covalent bonds? Explain giving an example for each.

Q7. Draw lewis dot structure of ozone & sulphur dioxide molecules. Calculate formal charge on each atom in both the molecules.

Q8. Draw resonating structures & resonance hybrid of carbonate ion.

Q9. Out of OCS & CS_2 , which has higher dipole moment & why? Explain.

Q10. Why is ClF_3 T-shaped but BF_3 is trigonal planar?

Q11. Using the concept of hybridisation , explain the shapes of

(a) Carbon di oxide

(b) ammonia &

(c) water

Q12. Using VBT , explain the formation of hydrogen molecule from hydrogen atoms.

Q13. What are the three conditions for linear combination of atomic orbitals ? Q14. Give reasons :------

(a) CCl_4 & $SiCl_4$ both are tetrahe (b) BF_3 & NH_3 are not isostructural.

(c) Dipole moment of HF is more than HI.

Q14. Draw MO diagram of oxygen molecule & nitrogen molecule. Compare their bond order & bond strength too.

Q15. What are odd electron molecules ? Why are they unstable ?Explain giving an example.

ASSIGNMENT

(Periodic classification of elements)

Q1. State modern periodic law.

Q2. Which element was named eka-aluminium by Mendeleev ?

Q3. Give IUPAC name & symbol of an element with atomic no. 112.

Q4. How would you justify the presence of 18 elements in fourth period of periodic table .

Q5. What are Transition elements ? Why are they called so ? Give general config. of Transition elements.

Q6. Arrange the following in increasing order of their radii giving reason :---
Na , Na^+ , Mg & $Mg^{}$ ion.

Q7. Differentiate b/w the terms Electron gain enthalpy & electronegativity.

Q8. Would you expect first ionization enthalpy of two isotopes of the same element to be same or different ? Explain giving an example.

Q9. (i) What do you understand by negative electron gain enthalpy?

(ii) Out of F & Cl , which one would have more negative electron gain Enthalpy & why?

Q10. (i) Define Ionization Enthalpy.
(ii) Why Be has higher I.E. than B & O has lower I.E. than N & F?

Q11. Explain the trend of reactivity of Metals & Non-metals down the group in group 1 & 17 resp. giving examples.

Q12. The I.E. & e gain enthalpy of a few elements are :----------

Element	First I.E. (KJ / mol)	Second I.E (KJ/mol)	E gain enthalpy (KJ/mol)
I	530	7300	- 60
II	419	3051	- 48
III	1681	3374	- 328
IV	1008	1846	- 295
V	2372	5251	+ 48

Which of these elements is likely to be :----

(a) the least reactive element .
(b) the most reactive non metal.
(c) Metal which can form predominately stable covalent halide MX.

ASSIGNMENT

REDOX REACTIONS

Q1. What are redox reactions ? Explain giving an example.

Q2. Consider the reaction for displacement of Cu from Copper sulphate by Zn metal. Identify the substance getting oxidised & reduced. What are the oxidising & reducing agents in this case?

Q3. What do you understand by a redox couple ? give example.

Q4. What is salt bridge ? how it can be made ? Give its uses.

Q5. Calculate the oxidation state of Mn in manganate & permanganate ion.

Q6. Balance the following redox reactions :----------

a. dichromate ion reacts with ferrous ion to give chromium(III) ion & ferric ion in acidic medium.

b. Manganate ion reacts with bromide ion to give manganese dioxide & bromate ion basic medium.

c. dichromate ion reacts with sulphur dioxide to give chromium(III) ion & sulphate ion in acidic medium.

d. Phosphorous reacts with Hydroxide ion to give phosphine & HPO_2^-.

Q7. What are disproportionation reactions ? Explain giving an example.

Q8. Justify that the decomposition of potassium chlorate is a redox reaction.

Q9. Give reasons :-

a) Nitric acid acts as a oxidant only but nitrous acid acts as both an oxidant as well as a reductant.
b) The oxidation state of S in Thiosulphate ion is in fraction.
c) AgF2 is unstable however if formed the compound acts as a very strong oxidant.

Q10. A cell is prepared by dipping copper rod in 1M copper sulphate solution and Nickel rid in 1M nickel sulphate solution.

The std. reduction potentials of Cu and Ni are 0.34V and 0.25V respectively.

a) Which electrode will work as Anode and as cathode?
b) Represent the cell.
c) Calculate the emf of the cell.

States of matter

Q1. In terms of Charles' law , why -273°C is the lowest possible temperature? 1

Q2. State Charle's law and give its mathematical expression. 1

Q3. What is the significance of Vander waal's factor 'a' ? 1

Q4. A gas that follows Boyle's law, Charles' law and Avogadro's law is called an ideal gas. Under what conditions a real gas would behave ideally and why ? 2

Q5. Using the equation of state PV = nRT, show that at a given temperature, density of a gas is proportional to the gas pressure P. 2

Q6. Critical temperature for CO_2 and CH_4 are 31.1°C and -81.9°C respectively. Which of these can be liquified easily and why ? 2

Q7. Define a) Boiling point and b) Surface tension. 2

Q8. What will be the pressure of the gas mixture when 0.5 L of H_2 at 0.8 bar and 2.0 L of dioxygen at 0.7 bar are introduced in a vessel at 27 °C? 3

Q9. 34.05 mL of phosphorus vapour weighs 0.0625 g at 546°C and 1.0 bar pressure. What is the molar mass of phosphorus? 3

Q10. Pay load is defined as the difference between the mass of the displaced air and the mass of the balloon. Calculate the pay load when a balloon of radius 10 m, mass 100 kg is filled with helium at 1.66 bar at 27°C .
(Density of air = 1.2 kg m^{-3} and R = 0.083 bar dm^3 / K / mol). 3