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QUESTION

1. State and explain K_p & K_c
2. Find out a relationship between K_p , K_c and K_x
3. Write down in detail the effect of inert gas in a chemical equilibrium
4. At a certain temperature the equilibrium constant K_c is, for the reaction
- $$(1-x) \text{SO}_2 + (1-x) \text{NO}_2 \rightleftharpoons (1+x) \text{SO}_3 + (1+x) \text{NO}$$
- If we take one mole of each of the four gases in a one litre container, what would be the equilibrium concentration of NO and NO_2 ?
5. The dissociation of solid NH_4HS in a closed container produces a pressure of 1.12 atm at 105°C . Calculate K_p for the equilibrium
- $$\text{NH}_4\text{HS} (s) \rightleftharpoons \text{NH}_3 (g) + \text{H}_2\text{S} (g)$$
6. Write down the hybridized structure of the following compound
- XeF_4 , NH_3 , C_2H_2 , PCl_5 , H_2O
7. a) State and explain M.O. Theory
- b) How will you explain O_2 as a paramagnetic substance
- c) State and explain London force
8. a) Define solubility and solubility product
- b) State and explain common ion effect with example
- c) The solubility of CaF_2 in water at 18°C is 2.04×10^{-4} mol/litre. Calculate (a) K_{sp} and (b) Solubility in 0.01M NaF solution.
- $$\text{CaF}_2 \rightleftharpoons \text{Ca}^{2+} + 2\text{F}^-$$
- $$s \qquad \qquad \qquad s \qquad 2s$$
- $$K_{sp} = s \times (2s)^2 = 4s^3 = 4 \times (2.04 \times 10^{-4})^3$$

- State and explain Bohr's theory? Deduce the mathematical formulae for the radius and energy of an electron moving around the nucleus. (5)
- (1) What is quantum no
explain Zeeman effect and space quantization (2)
- (2) According to Bohr's theory the electronic energy of (H) atom in the n^{th} Bohr atom is given by $E_n = - \frac{21.76 \times 10^{-19}}{n^2} \text{ J}$. Calculate the longest wave length of light that will be needed to remove an electron from the third Bohr orbit of the He^+ ion (3)
- (1) $h = 6.626 \times 10^{-34} \text{ J sec}$ $c = 3 \times 10^8 \text{ m/sec}$
- 10 cc of H_2O_2 solution when reacted with KI solution produced 0.5 gram of Iodine. Calculate percentage purity of H_2O_2 [$I = 127$] (2)
- (1) 1.0 g of an alloy of Al and Mg when treated with excess of dil HCl forms $MgCl_2$, $AlCl_3$ and Hydrogen. The evolved hydrogen collected over H_2 at $0^\circ C$ has a volume of 1.20 litre at 0.92 atm pressure. Calculate the composition of the alloy [$Al = 27$] [$Mg = 24$] (3)
- (1) A sample of gaseous hydrocarbon occupying 1.12 litre at N.T.P. when completely burnt in air produced 2.2 gram of CO_2 and 1.8 gram of H_2O . Calculate the weight of the compound taken and the volume of O_2 at N.T.P. required for its burning. Find the molecular formula of the hydrocarbon. (4)