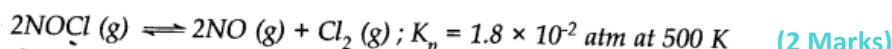




## SARVANSIR- CHEMISTRY FOR ALL

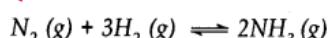
### Chapter Test | Chemistry XI | Equilibrium | Time: 2 H | Marks- 40

**Q.1.** Find the value of  $K_c$  for each of the following equilibria from the value of  $K_p$



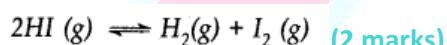
**Q.2.** For the following equilibrium,  $K = 6.3 \times 10^{14}$  at 1000 K.  $\text{NO}(g) + \text{O}_3 \rightarrow \text{NO}_2(g) + \text{O}_2(g)$  Both the forward and reverse reactions in the equilibrium are elementary bimolecular reactions. What is  $K_c$   $2\text{NO}_2(g) + 2\text{O}_2(g) \rightarrow 2\text{NO}(g) + 2\text{O}_3(g)$  (2 Marks)

**Q.3.** Reaction between nitrogen and hydrogen takes place as follows:

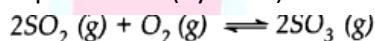


If a mixture of 0.542 mol of  $\text{N}_2$  and 0.933 mol of  $\text{H}_2$  is placed in a reaction vessel of volume 10 L and allowed to form  $\text{NH}_3$  at a temperature for which  $K_c = 2.0 \times 10^{-37}$ , determine the composition of the equilibrium mixture (3 Marks)

**Q.4.** A sample of  $\text{HI}(g)$  is placed in a flask at a pressure of 0.2 atm. At equilibrium partial pressure of  $\text{HI}(g)$  is 0.04 atm. What is  $K_p$  for the given equilibrium?



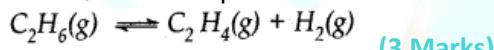
**Q.5.** If 1 mole of  $\text{SO}_2$  and 1 mole of  $\text{O}_2$  are taken in a 10 liter vessel and heated, at equilibrium point 1/5th part of  $\text{SO}_2$  (by mass) reacts with  $\text{O}_2$  according to equation.



Calculate the equilibrium constant for the reaction.

(3 Marks)

**Q.6**  $K = 0.04$  atm at 898 K for the equilibrium shown below. What is the equilibrium concentration of  $\text{C}_2\text{H}_6$  when it is placed in a flask at 4 atm pressure, and allowed to come to equilibrium?



**Q.7.** Given the following concentrations, what is  $Q_c$ ?

And, if  $K=1.0\text{K}$ , which side of the reaction is favored at that value of  $Q_c$



$$[\text{CO}(g)] = [\text{H}_2\text{O}(g)] = 1.0 \text{ M}$$

$$[\text{CO}_2(g)] = [\text{H}_2(g)] = 15 \text{ M}$$

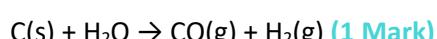
(2 Marks)

**Q.8.** Which of the following will cause an equilibrium shift in an exothermic reaction towards the products?

I. Decreasing the temperature

II. Evaporating the product (2 Marks)

**Q.9.** In what manner will increase of pressure affect the following equation





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**Q.10.** For a reversible reaction the concentration of the reactants are doubled, then the equilibrium constant **(1 Mark)**

- a) becomes one-fourth
- b) is doubled
- c) is halved
- d) remains the same

**Q.11.** The species  $\text{H}_2\text{O}$ ,  $\text{HCO}_3^-$ ,  $\text{HSO}_4^-$  and  $\text{NH}_3$  can act both as Bronsted acid and base. For each case, give the corresponding conjugate acid and base. **(4 Marks)**

**Q.12.** Define Buffer solution and types with example **(3 Marks)**

**Q.13.** The ionization constant of phenol is  $1.0 \times 10^{-10}$ . What is the concentration of phenolate ion in 0.05 M solution of phenol? What will be its degree of ionization if the solution is also 0.01 M in sodium phenolate? **(3 Marks)**

**Q.14.** (i) Point out the differences between ionic product and solubility product.

(ii) The solubility of  $\text{AgCl}$  in water at 298 K is  $1.06 \times 10^{-5}$  mole per litre. Calculate its solubility product at this temperature. **(3 Marks)**

**Q.15.** If the solubility product constant of barium fluoride is  $2.4 \times 10^{-5}$  M, what is the solubility of barium fluoride? **(3 Marks)**

**Q.16.** Assuming complete dissociation, calculate the pH of the following solutions:

(a) 0.003 M  $\text{HCl}$  (b) 0.005 M  $\text{NaOH}$  **(3 Marks)**