

CHOITHRAM SCHOOL MANIKBAGH INDORE

CLASS XI Session: 2018-19

Subject: Chemistry
Allotment Date: 14/12/18

Assignment No: 3
Submission Date: 20/12/18

S.No	QUESTION	MARKS	LEVEL
OBJECTIVE TYPE			
1.	Write the expression for the equilibrium constant, K_c for the following reactions: $\text{Fe}^{3+}(\text{aq}) + 3\text{OH}^{-}(\text{aq}) \rightleftharpoons \text{Fe}(\text{OH})_3(\text{s})$	1	Knowledge
2.	What is the relation between K_p and K_c ?	1	
3.	The species: H_2O , HCO_3^{-} , HSO_4^{-} and NH_3 can act both as Brønsted acids and bases. For each case give the corresponding conjugate acid and base.	1	understanding
SHORT ANSWER TYPE I			
4.	Explain any two functions of salt bridge.	2	understanding
5.	The degree of ionization of a 0.1M bromoacetic acid solution is 0.132. Calculate the pH of the solution and the pK_a of bromoacetic acid.	2	Application
6.	Reaction between N_2 and O_2 takes place as follows: $2\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{N}_2\text{O}(\text{g})$ If a mixture of 0.482 mol N_2 and 0.933 mol of O_2 is placed in a 10 L reaction vessel and allowed to form N_2O at a temperature for which $K_c = 2.0 \times 10^{-37}$, then what will be the composition of equilibrium mixture.	2	Analysis
7.	Classify the following species into Lewis acids and Lewis bases and show how these act as such: (a) OH^{-} (b) F^{-} (c) H^{+} (d) BCl_3	2	analysis
SHORT ANSWER TYPE II			
8.	The ionization constant of HF, HCOOH and HCN at 298K are 6.8×10^{-4} , 1.8×10^{-4} and 4.8×10^{-9} respectively. Calculate the ionization constants of the corresponding conjugate base.	3	application
9.	Depict the galvanic cell in which the reaction $\text{Zn}(\text{s}) + 2\text{Ag}^{+}(\text{aq}) \rightarrow \text{Zn}^{2+}(\text{aq}) + 2\text{Ag}(\text{s})$ takes place, Further show: (i) which of the electrode is negatively charged, (ii) the carriers of the current in the cell, and (iii) individual reaction at each electrode.	3	synthesis
10.	What do you mean by the following 1) Common ion effect 2) solubility product 3) salt hydrolysis	3	understanding
LONG ANSWER TYPE			
11.	Ethyl acetate is formed by the reaction between ethanol and acetic acid and the equilibrium is represented as: $\text{CH}_3\text{COOH}(\text{l}) + \text{C}_2\text{H}_5\text{OH}(\text{l}) \rightleftharpoons \text{CH}_3\text{COOC}_2\text{H}_5(\text{l}) + \text{H}_2\text{O}(\text{l})$ (i) Write the concentration ratio (reaction quotient), Q_c , for this reaction (note: water is not in excess and is not a solvent in this reaction) (ii) At 293 K, if one starts with 1.00 mol of acetic acid and 0.18 mol of ethanol, there is 0.171 mol of ethyl acetate in the final equilibrium mixture. Calculate the equilibrium constant. (iii) Starting with 0.5 mol of ethanol and 1.0 mol of acetic acid and maintaining it at 293 K, 0.214 mol of ethyl acetate is found after sometime. Has equilibrium been reached?	5	Knowledge +application
12.	(a) In the reaction $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$ at equilibrium, gas is injected into the vessel without disturbing overall pressure of the system. What will be the effect on equilibrium? (b) Dihydrogen gas is obtained from natural gas by partial oxidation with steam as per following endothermic reaction: $\text{CH}_4(\text{g}) + \text{H}_2\text{O}(\text{g}) \rightleftharpoons \text{CO}(\text{g}) + 3\text{H}_2(\text{g})$ (a) Write an expression for K_p for the above reaction. (b) How will the composition of equilibrium mixture be affected by (i) increasing the pressure (ii) increasing the temperature (iii) using a catalyst?	5	Analysis