PM SHRI KENDRIYA VIDYALAYA SITAPUR (FIRST SHIFT)
UNIT TEST II
SUB-CHEMISTRY
CLASS-XI

Max. Marks=40 Time-90 Minutes

Instructions:
(i) All questions are compulsory.
(ii) Question 1 to question 11 are objective/ competency based. Each carry 1 mark each.

Q.1.Which of the following is not a redox reaction?

(a) Burning of candle (b) Rusting of iron

(c) Dissolving salt in water (d) Dissolving Zinc in dil. H_2SO_4

Q. 2. Oxidation number of P in PO_4^{3-}, of S in SO_4^{2-} and that of Cr in $Cr_2O_7^{2-}$ are respectively:

(a) +3, +6 and +5 (b) +5, +3 and +6

(c) +3, +6 and +6 (d) +5, +6 and +6

Q.3. Which of the following is not a redox reaction?

(a) $CaCO_3 \rightarrow CaO + CO_2$ (b) $O_2 + 2H_2 \rightarrow 2H_2O$

(c) $Na + H_2O \rightarrow NaOH + 1/2H_2$ (d) $MnCl_3 \rightarrow MnCl_2 + 1/2\ Cl_2$

Q.4. The most powerful oxidising agent among the following is:

(a) H_2SO_4 (b) H_3BO_3

(c) HPO_3 (d) H_3PO_4

Q.5. The oxidation number of Cr in K2Cr2O7 is:

(a) -6 (b) +6

(c) +2 (d) -2

Q.6. In the reaction: $2Ag + 2\ H_2SO_4 \rightarrow Ag_2SO_4 + 2H_2O + SO_2$ Sulphuric acid acts as:

(a) Oxidising agent (b) Reducing agent

(c) Catalyst (d) Acid as well as oxidant

Q. 7. The equilibrium constant for the reaction $N_2\ (g) + O_2\ (g) = 2NO\ (g)$ is $4x10^{-4}$ at 2000 K. In presence of a catalyst, equilibrium is attained ten times faster. Therefore, the equilibrium constant, in presence of the catalyst, at 2000K K is :

(a) 40×10^{-4} (b) 4×10^{-4}

(c) 4×10^{-3} (d) Difficult to compute without more data

Q. 8. The following two equilibrium exist simultaneously in a closed vessel:

$PCl_5\ (g) = PCl_3\ (g) + Cl_2\ (g)$

$COCl_2\ (g) = CO\ (g) + Cl_2\ (g)$

If some CO is added in to the vessel, then after the equilibrium is attained again, the concentration of

a) PCl_5 will increase (b) Pcl_5 will decrease

c) PCl_5 will remain unaffected d) Cl_2 will increase

Q. 9. Case Study – 1 **4 marks**

When a liquid evaporates in a closed container, molecules with relatively higher kinetic energy escape the liquid surface into the vapour phase and number of liquid molecules from the vapour phase strike the liquid surface and are retained in the liquid phase. It gives rise to a constant vapour pressure because of an equilibrium in which the number of molecules leaving the liquid equals the number returning to liquid from the vapour. We say that the system has reached equilibrium state at this stage. However, this is not static equilibrium and there is a lot of activity at the boundary between the liquid and the vapour. Thus, at equilibrium, the rate of evaporation is equal to the rate of condensation. It may be represented by

$$H_2O(l) \rightleftharpoons H_2O(vap)$$

The double half arrows indicate that the processes in both the directions are going on simultaneously. The mixture of reactants and products in the equilibrium state is called an equilibrium mixture.

i) When there is no change in the concentrations of either of the reactants or products, this stage of the system is the …

a) static equilibrium b) dynamic equilibrium c) physical equilibrium d) chemical equilibrium

ii) A … solution means no more of solute can be dissolved in it at a given temperature.
a) unsaturated
b) supersaturated
c) saturated
d) None of these.
iii) The equilibrium involving ions in aqueous solutions which is called as …
a) static equilibrium b) dynamic equilibrium c) physical equilibrium d) ionic equilibrium
iv) The concentration of the solute in a saturated solution depends upon the …
a) solvent b) pressure c) temperature d) system

Q 10. Assertion and Reason Questions. **(2 mark)**

Directions : In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given . Choose the correct option out of the choices given below .
(a) Both A and R are true and R is correct explanation of A.
(b) Both A and R are true and R is not correct explanation of A.
(c) A is true but R is false.
(d Both A and R are false.

Q(i) Assertion : A solution containing a mixture of acetic acid and sodium acetate maintains a constant vale of pH on addition of small amounts of acid or alkali
Reason : A solution containing a mixture of acetic acid and sodium acetate acts as a buffer solution around pH 4.75.

Q.(ii) Assertion : An aqueous solution of ammonium acetate can act as a buffer.
Reason : Acetic acid is a week acid and NH_4OH is a weak base.

Or

Assertion : In dissociation of PCl_5 at constant pressure and temperature addition to helium at equilibrium increases the dissociation of PCl_5.
Reason : Helium removes Cl_2 from the field of action.

Q.11. Calculate the oxidation number of the followings:
(i) $K_2\underline{Mn}O_4$ (ii)$CH_3\underline{C}OOH$ **(2 mark)**

Q.12. Define acid and bases accordingly to Arrhenius concept of acids and basis. **(2 mark)**

Q.13. Calculate P^H value of 0.2 M H_2So_4 (Log 0.4 =-O.3979) **(2 mark)**

Q.14. Calculate the hydrogen ion concentration of 0.01M soltion of NaoH at 298 k **(2 mark)**

Q.15. What is K_C for the following equilibrium when the equilibrium concentrate of each substance is:
(SO_2)= 0.60 M, $(O_2$= 0.82 M) and $(SO_3$ = 1.90 M)
$2SO_2\,(g) + O_2\,(g) = 2SO_3\,(g)$ **(3 marks)**

Q. 16. Drive relationship between Kp and Kc. ? **(3 marks)**

Q. 17. State Le-Chatelier's Principle Explain effect of concentration temperature and pressure with Example. **(4 marks)**

Q. 18. The species : H_2O, HCO_3^- ,HSO_4^- and NH_3can act both as Bronsted acid and base. For each case give the corresponding conjugate acid and base. **(4 marks)**

Q.19. Balance the reaction by ion electron method (Acidic Medium)- **(4 marks)**

a. $Cr_2O_7^{--} + Fe^{++} \longrightarrow Cr^{+++} + Fe^{+++}$
b. $MnO_4^- + C_2O_4^{--} \dashrightarrow Mn^{++} + CO_2$