ANANDALAYA

PERIODIC TEST – 1

Class : XII

विद्या सर्वार्थ साधिका

Subject: Chemistry M.M: 40

Date : 17/07/2019 Time: 3Hours

General Instructions:

1. All questions are compulsory.
2. Section A: Q.no. 1 to 10 are very short answer questions and carry 1 mark each.
3. Section B: Q.no. 11-14 are short answer questions and carry 2 marks each.
4. Section C: Q.no. 15 to 18 are also short answer questions and carry 3 marks each.
5. Section D: Q.no. 19 and 20 are long answer questions and carry 5 marks each.
6. Use log tables if necessary, use of calculators is not allowed.

SECTION A

1. N_2 and O_2 gases have K_H values 76.48 K bar and 34.86 K bar respectively at 293 K temperature. Which of these will have more solubility in water? (1)

2. What is the value of Van't Hoff factor (i) for $Na_2SO_4 . 10H_2O$? (1)

3. $AgNO_3$ on reaction with NaCl in aqueous solution gives white precipitate. If the two solutions are separated by a semi-permeable membrane will there be appearance of a white ppt. in the side 'X' due to osmosis? (1)

0.1 M $AgNO_3$ X	S P M	0.01 M NaCl Y

4. State one difference between a primary battery and secondary battery. (1)

5. Two metals A and B have reduction potential values of –0.25V and 0.80V respectively. Which of these will liberate hydrogen gas from dilute H_2SO_4? (1)

6. Does a large positive electrode potential indicate a strong oxidizing agent or a strong reducing agent? What about a large negative electrode potential (1)

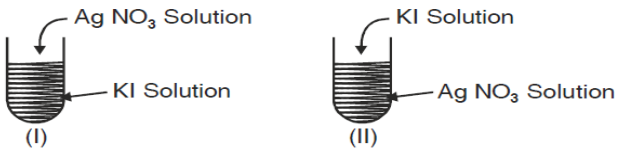
7. Express the rate of reaction in terms of Br– (*aq*) as reactant and Br_2 (*aq*) as product for the reaction : (1)

$$5\ Br^-(aq) + BrO_3^-(aq) + 6H^+(aq) \rightarrow 3\ Br_2(aq) + 3H_2O(l)$$

8. For a chemical reaction A B. The rate of the reaction is given as Rate = k [A]n.The rate of the above reaction quadruples when the concentration of A is doubled. What is the value of n? (1)

9. The rate constant of a reaction is given by the expression $k = A\ e^{-Ea/RT.}$ Which factor in this expression should register a decrease so that the reaction proceeds rapidly? (1)

10. What will be the charge on colloidal solutions in the following cases. (1)



SECTION B

11. Benzene and toluene form a nearly ideal solution. At a certain temperature, calculate the vapour pressure of solution containing equal moles of the two substances. (2)
[Given : P°Benzene = 150 mm of Hg, P°Toluene = 55 mm of Hg]

12. When 1 mole of NaCl is added to 1 litre water the boiling point increases. When 1 mole of CH_3OH is added to 1 litre water, the boiling point decreases. Suggest reason. (2)

13. A small amount of silica gel and a small amount of anhydrous calcium chloride are placed separately in two beakers containing water vapour. Name of phenomenon that takes place in both the beakers. (2)

14. Suggest a mechanism of enzyme catalyzed reaction along with the diagram. (2)

SECTION C

15. An aqueous solution containing 3.12 g of barium chloride in 250 g of water is found to be boil at 100.0832°C. Calculate the degree of dissociation of barium chloride. (3)
[Given molar mass $BaCl_2$ = 208 g mol–1, Kb for water = 0.52 K/m]

16. Give reasons for : (3)
a) For a weak electrolyte, its molar conductivity of dilute solution increases sharply as the concentration of solution is decreased.
b) Molar conductivity of a strong electrolyte like KCl decrease slightly while increasing concentration?
c) It is not easy to determine λ°m of a weak electrolyte by extrapolation of c vs λm curves?

17. Distinguish between multimolecular, macromolecular and associated colloids with the help of one example of each. (3)

18. A certain reaction is 50% complete in 20 min at 300K and the same reaction is again 50% complete in 5 min at 350K. Calculate the activation energy if it is a first order reaction. (3)
(R = 8.314J K–1 mol–1, log 4 = 0.602)

OR

The decomposition of N_2O_5 at 320K according to the following equation follows first order reaction: $N_2O_5(g) \rightarrow 2NO_2(g) + 1/2\ O_2(g)$ The initial concentration of N_2O_5 was 1.24×10^{-2} mol L^{-1} and that after 60 minutes was 0.20×10^{-2} mol L-1 . Calculate the rate constant of the reaction at 320K.

SECTION D

19. a) Current of 1.50 A was passed through cell containing $AgNO_3$ solution with inert electrodes. The weight of Ag deposited was 1.50 g. how long did the current flow. (5)
b) Write the reactions taking place at the anode and cathode in the above cell if inert electrodes are used.
c) Give reactions taking place at the two electrodes if these are made of Ag.

20. a) Derive the equation for rate constant of a first order reaction. What would be the units of the first order rate constant if the concentration is expressed in moles per litre and time in second? (5)
b) For first order chemical reaction half-life period ($t_{1/2}$) is concentration independent. Justify the statement by using integrated rate equation.

OR

a) State Kohlrausch law of independent migration of ions. Write an expression for the molar conductivity of acetic acid at infinite dilution according to Kohlrausch's law.
b) A voltaic cell is set up at 25°C with the following half cells Al^{3+} (0.001 M) and Ni^{2+} (0.50 M).Write an equation for the reaction that occurs when the cell generate an electric current and also determine the cell potential.

[Given; $E^\circ_{Ni^{2+}/Ni}$ = - 0.25 V, $E^\circ_{Al^{3+}/Al}$ = -1.66 V]