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PRUDENCE SCHOOL DWARKA 22 *12-B*
PERIODIC ASSESSMENT 1
SESSION 2023-24
SUBJECT: CHEMISTRY(043)
CLASS-XII
SET-B

2 2

Time Allowed: 1hr
Name of the Student: ___
Name & Sign of Invigilator: ___

Max. Marks: 30
Day & Date: Friday, 07.07.23

> There are **12** questions in this question paper.
>
> 1. Q. No. 1-6 consist of multiple-choice questions carrying 1 mark each.
> 2. Q. No. 7-8 are study case based questions of 6 marks each
> 3. Q. No. 9-10 consists of short answer questions carrying 2 marks each.
> 4. Q. No. 11 consists of short answer questions carrying 3 marks each.
> 5. Q. No. 12 consists of long answer questions carrying 5 marks each.

1   50 ml of an aqueous solution of glucose $C_6H_{12}O_6$ (molar mass 180 g mol⁻¹) contains 6.022×10^{22} molecules. The concentration of the solution will be   1

     (a) 0.1 M
✓   (b) 0.2 M
     (c) 1.0 M
     (d) 2.0 M

2   On electrolysis of molten sodium chloride , the product obtained at the cathode will be: 1

✗   (a) Hydrogen
     (b) Chlorine gas
     (c) Hydrogen Sulphide
     (d) Sodium

3   The value of Henry's constant K_H is_____   1

     (a) greater for gases with higher solubility.
     (b) greater for gases with lower solubility.

(c) constant for all gases.

(d) not related to the solubility of gases.

4 Which of the following is correct for spontaneity of a cell? 1

✗

(a) $\Delta G = -ve$ and $\Delta E = +ve$

(b) $\Delta G = +ve$ and $\Delta E = 0$

(c) $\Delta G = -ve$ and $\Delta E = 0$

(d) $\Delta G = +ve$ and $\Delta E = -ve$

5 In which of the following aqueous solutions relative lowering 1
of vapour pressure is maximum ?

✓

(a) 0.1 molal $Al_2(SO_4)_3$

(b) 0.1 molal $BaCl_2$

(c) 0.1 molal $AlCl_3$

(d) 0.1 molal NH_4Cl

6 The cell constant of a conductivity cell 1

✗

(a) Change with change of electrolyte

(b) Changes with change of concentration of electrolyte

(c) Changes with temperature of electrolyte

(d) Remains constant for a cell

7 Read the passage and answer the following questions: 1✗

The rate of a reaction, which may also be called its velocity
or speed, can be defined with relation to the concentration of
any of the reacting substances, or to that of any product of
the reaction. The rate law for a chemical reaction relates the
reaction rate with the concentrations or partial pressures of
the reactants. For a general reaction, A a + B b → c C + d D
with no intermediate steps in its reaction mechanism,
meaning that it is an elementary reaction. The rate law is
given by r = k $[A]^x$ $[B]^y$, where [A] and [B] expresses the
concentrations of A and B in moles per litre. Exponents x
and y vary for each reaction and are determined
experimentally. The value of k varies with conditions that
affect reaction rate, such as temperature, pressure, surface
area, etc. The sum of these exponents is known as overall
reaction order. A zero order reaction has a rate that is
independent of the concentration of the reactants. A first
order reaction depends on the concentration of only one
reactant.

(i) What is rate of reaction ?

✓

2

(ii) Calculate the overall order of a reaction which has the following rate expression :
Rate = k $[A]^{3/2}[B]^0$

(iii) What is the order of a reaction in which rate constant has the same units as the rate of reaction?

(iv) What is the effect of catalyst on rate of reaction?

(v) Assertion (A) followed by a statement of Reason (R) is given. Choose thecorrect answer out of the following choices.

(a)A and R both are correct statements and R is the correct explanation forA.

(b)A and R both are correct statements and R is not correct explanation forA.

(c) A is correct statement but R is wrong statement.

(d)A is wrong statement but R is correct statement

(a) Assertion : Order of a reaction can be fractional but molecularity can never be.
Reason : Order of a reaction does not depend upon the stoichiometric coefficients of the balanced chemical equation.

(b) Assertion :Reactions of higher order are rare.
Reason : The chances of simultaneous molecular collisions are extremely small.

8   Case study-based questions
Many chemical and biological processes depend on osmosis which is, the selective passage of solvent molecules through a porous membrane from a dilute solution solution to a more concentrated solution. If two solutions are of equal solute concentration, and hence, have the same osmotic pressure, they are said to be isotonic.If two solutions are of unequal osmotic pressures, the more concentrated solution is said to be hypertonic and the more diluted solution is called hypotonic.

(a) Why an unripe mango placed in a concentrated salt solution to prepare pickles shrivels?

(b) Which one of the following has higher osmotic pressure 1M NaCl or 1M glucose? Give reason.

© Give one example of semi permeable membrane.

(d)Determine the osmotic pressure of a solution prepared by

1+2+
1+2

3

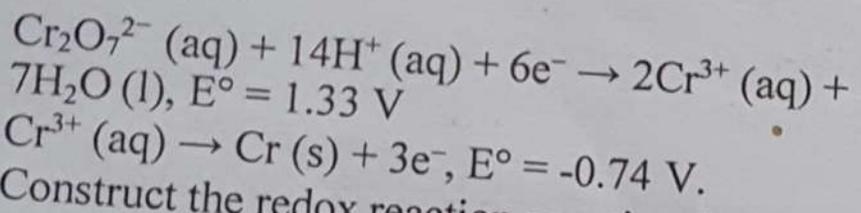dissolving 18 g of glucose (M M = 180 g/mol) in 2 litre of water at 298K . (R = 0.083 L bar mol⁻¹ K⁻¹)

9 (a) What is the effect of dilution on specific conductivity of electrolytes?

1+1

(b) How much electricity is required to reduce 1 mole of FeO to Fe_2O_3 2F c

10 Calculate the EMF of the following cells at 298 K: **0·44 V₂.**

Fe (s) / Fe²⁺(0.01 M) // H⁺(0.1 M) I H₂(g)(1 bar) I Pt(s)

When $E°_{cell}$ = 0.44 V (log 4 = 0.6021 and log 5 = 0.6990)

11 2 g of urea when dissolved in 200 g of certain solvent decreases the freezing point by 0.2°C. 3.2 g of an unknown substance when dissolved in 160 g of same solvent depresses the freezing point by 0.36°C, Caculate the molar mass of unknown substance. only mecha **M_B= 70 u**

3

12 (a) Two half-reactions of an electrochemical cell are given below:

3+2

$Cr_2O_7^{2-}$ (aq) + 14H⁺ (aq) + 6e⁻ → 2Cr³⁺ (aq) + 7H₂O (l), E° = 1.33 V

Cr³⁺ (aq) → Cr (s) + 3e⁻, E° = -0.74 V.

(i) Construct the redox reaction equation from the two half-reactions.

(ii) Calculate the cell potential from the standard potentials.

(iii) Predict if the reaction is reactant or product favoured.

(b) Determine the values of equilibrium constant (Kc) and ΔG° for thefollowing reaction:

Zn(s) + Cu²⁺ (aq) →
Zn²⁺ (aq) + Cu(s),
Given: E° = 1.01 V,
1F = 96500 C mol⁻¹

OR
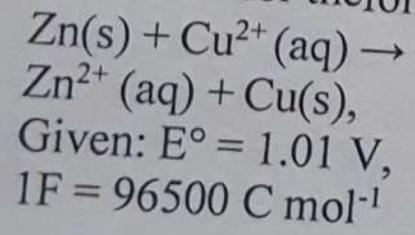
(a)The conductivity of 0.02 mol L⁻¹ solution of KCl is 2.48 ×10⁻² S cm⁻¹.Calculate its molar conductivity.

(b)What is the difference between primary battery and secondary battery?Give one example of each type. → equations could not write due to time over.

What is Galvanisation?

2+2+
1

4

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