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| **UT/CHQP/1223/B 02-NOV-2023** | | | | | |
| **UNIT TEST (2023-24)** | | | | | |
| **Subject: CHEMISTRY**  **Grade: XII** | | Max. Marks:50Time: 2.5Hrs | | | |
| **Name:** | | | **Section:** | **Roll No:** | |
| ***GENERAL INSTRUCTIONS***   * ***There are 24 questions in this question paper with internal choice.*** * ***Section A consists of 10 multiple choice questions with carrying one mark each.*** * ***Section B consists of 6 short answer questions carrying 2 marks each.*** * ***Section C consists of 6 short answer questions carrying 3 marks each.*** * ***Section D consists of 2 long answer questions carrying 5 marks each.*** * ***All questions are compulsory.*** * ***Use of calculators is not allowed*** | | | | | |
|  | **SECTION A** | | | | |
| 1 | Considering the basic strength of amines in aqueous solution which one has the smallest pkb value?  (a) (CH3 )2 NH  (b) C6 H5 NH2  (c) CH3 NH2  (d) (CH3 )3 N | | | | 1 |
| 2 |  | | | | 1 |
| 3 | The product of oxidation of I- with MnO4 - in alkaline medium is:  (a) IO3 –  (b) I2  (c)IO-  (d)IO4 – | | | | 1 |
| 4 | Determine the value of E°cell for the following reaction : Cu2+ + Sn+2 → Cu + Sn+4, equilibrium constant is 106 .  (a) 0.1773  (b) 0.01773  (c) 0.2153  (d) 1.773 | | | | 1 |
| 5 |  | | | | 1 |
| 6 | The value of Λº m for NH4 Cl, NaOH and NaCl are 129.8, 248.1 and 126.4 Ohm–1 cm2 mol–1 respectively. Calculate Λº m for NH4 OH solution.  (a) 215.5  (b) 251.5  (c) 244.7  (d) 351.5 | | | | 1 |
| 7 | Transition elements form alloys easily because they have  (a) same atomic number  (b) same electronic configuration  (c) nearly same atomic size  (d) none of the above | | | | 1 |
| 8 | The nature of curve of E° cell against log KC is:  (a) a straight line  (b) parabola  (c) a hyperbola  (d) an elliptical curve | | | | 1 |
|  | Question number 9-10 are Assertion-Reason based questions: Note : In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.  A) Both assertion and reason are true, and reason is the correct explanation of the assertion.  B) Both assertion and reason are true but reason is not the correct explanation of assertion.  C) Assertion is true but reason is not true.  D) Assertion is not true but reason is true. | | | |  |
| 9 | Assertion : Cu2+ iodide is not known.  Reason : Cu2+ oxidises iodide to iodine. | | | | 1 |
| 10 | Assertion : Lower the activation energy, faster is the reaction.  Reason : Catalyst does not affect activation energy of the reaction. | | | | 1 |
|  | **SECTION B** | | | |  |
| 11 | 1. Decomposition reaction of ammonia on Pt surface has rate constant = 2.5 × 10-1 mol L-1 sec-1. What is order of the reaction? 2. For a reaction A + B → Product, the rate law is given by r = k[A]½ [B]2 . What is the order of the reaction? | | | | 2 |
| 12 | Give a chemical test to distinguish between the following pairs:   1. Aniline and benzyl amine 2. secondary and tertiary amine | | | | 2 |
| 13 | Arrange the following compounds in increasing order of their property as indicated:   1. CH3CH2CH(Br)COOH, CH3CH(Br)CH2COOH, (CH3)2CHCOOH, CH3CH2CH2COOH (acid strength) 2. Benzoic acid, 4-Nitrobenzoic acid, 3,4-Dinitrobenzoic acid, 4-Methoxybenzoic acid (acid strength) | | | | 2 |
| 14 | 1. Define Kohlraush’s law. 2. The Λº m for CH3COONa, HCl, NaCl are 91.0, 425.9 and 126.4 S cm2 mol-1 respectively at 298 K. Calculate Λº m for CH3 COOH. | | | | 2 |
| 15 | Complete the equations : | | | | 2 |
| 16 | Name the type of cell used in the Apollo space program. Give the advantages of this cell over thermal power plants. | | | | 2 |
|  | **SECTION C** | | | |  |
| 17 | The half-life for radioactive decay of 14C is 5730 years. An archaeological artifact containing wood had only 80% of the 14C found in a living tree. Estimate the age of the sample. | | | | 3 |
| 18 | Account for the following observations:   1. Methylamine solution in water reacts with ferric chloride solution to give a precipitate of ferric hydroxide. 2. Aniline readily forms 2,4,6-tribromoaniline on reaction with bromine water 3. Diazonium salts of aromatic amines are more stable than those of aliphatic amines. | | | | 3 |
| 19 | 1. Write the structure of the 2-formylpentanoic acid 2. A carboxylic acid does not form a hydrazone although it contains >C=O group. Why? 3. What happens when Propanoic acid is treated with chlorine in the presence of a small amount of red phosphorus? | | | | 3 |
| 20 | When an oxide of manganese (A) is fused with KOH in the presence of an oxidizing agent and dissolved in water, it gives a dark green solution of compound (B). Compound (B) disproportionates in neutral or acidic solution to give purple compound (C). An alkaline solution of compound (C) oxidises potassium iodide solution to a compound (D) and compound (A) is also formed. Identify compounds A to D and also explain the reactions involved. | | | | 3 |
| 21 | Give the structures of A, B and C in the following reactions: | | | | 3 |
| 22 | 1. What is the structure of chromate and dichromate ion? 2. “The chromates and dichromates are interconvertible by the change in pH of medium.” Why? Give chemical equations in favour of your answer. | | | | 3 |
|  | **SECTION D** | | | |  |
| 23 | 1. Differentiate between order and molecularity. 2. Rate constant K for first order reaction has been found to be 2.54 × 10–3 s –1 . Calculate its three-fourth life. 3. For a chemical reaction variation in rate with concentration is shown below:      1. What is the order of the reaction? 2. What are the units of rate constant K for the reaction?   (OR)   1. Observe the graph in diagram and answer the following questions:     If slope is equal to -2.0x10-6 , what will be the value of rate constant if time is taken in seconds?   1. For a first order reaction, show that time required for 99% completion is twice the time required for the completion of 90% of reaction. 2. What are pseudo – first order reactions? Give an example. | | | | 5 |
| 24 | 1. Write the chemistry of recharging the lead storage battery, highlighting all the materials that are involved during recharging. 2. Resistance of a conductivity cell filled with 0.1 mol L–1 KCl solution is 100 Ω. If the resistance of the same cell when filled with 0.02 mol L–1 KCl solution is 520 Ω, calculate the conductivity and molar conductivity of 0.02 mol L–1 KCl solution. The conductivity of 0.1 mol L–1 KCl solution is 1.29 S/m.   (OR)   1. Explain how rusting of iron is envisaged as setting up of an electrochemical cell. 2. The molar conductivity of 0.025 mol L–1 methanoic acid is 46.1 S cm2 mol–1. Calculate its degree of dissociation and dissociation constant.   Given λ0 (H+) = 349.6 S cm2 mol–1 and λ0 (HCOO–) = 54.6 S cm2 mol–1 | | | | 5 |

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