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| **UT/CHQP/1223/A 02-NOV-2023** | | | | | |
| **UNIT TEST (2023-24)** | | | | | |
| **Subject: Chemistry**  **Grade: 12** | | Max. Marks:50Time: 2 ½ Hours | | | |
| **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 | In the reaction 2A + B → A2B, if the concentration of A is doubled and that of B is halved, then the rate of the reaction will  a) increase 2 times  b) increase 4 times  c) decrease 2 times  d) remain the same | | | | 1 |
| 2 | Four successive members of the first row transition elements are listed below with their atomic numbers. Which one of them is expected to have the highest third ionisation enthalpy? (a) Scandium (Z = 21) (b) Manganese (Z = 25) (c) Chromium (Z = 24) (d) Iron (Z = 26) | | | | 1 |
| 3 | For a certain reaction, E0 is positive. This means that  a)ΔG0 is positive, K is greater than 1  b)ΔG0 is positive, K is less than 1  c) ΔG0 is negative, K is greater than 1  d)ΔG0 is negative, K is less than 1 | | | | 1 |
| 4 | The molar conductivity is maximum for the solution of concentration  a)0.004M  b)0.002M  c)0.005M  d)0.001M | | | | 1 |
| 5 | The correct IUPAC name for CH2=CHCH2NHCH3 is  a) Allyl methylamine  b) 2-amino-4-pentene  c) 4-amino pent-1-ene  d) N-methyl prop-2-en-1-amine | | | | 1 |
| 6 | The standard reduction potentials of X, Yand Z metals are 0.52, -3.03 and -1.18 respectively. The order of reducing power of the corresponding metals is: (a) Y > Z > X (b) X > Y > Z (c) Z > Y > X (d) Z > X > Y | | | | 1 |
| 7 | The method by which aniline cannot be prepared is:  a) reduction of nitrobenzene with H2/Pd in ethanol.  b) potassium salt of phthalimide treated with chlorobenzene  c) degradation of benzamide with bromine in alkaline medium solution.  d) Both (b) and (c) | | | | 1 |
| 8 | Which of the following is likely to form white salts? (a) Cu2+ (b) Sc3+ (c) Ti3+ (d) Fe3+. | | | | 1 |
|  | Read the statements given as assertion and reason and choose the correct option as per the following instructions. (A) if both assertion & reason are correct statements and reason is the correct explanation of assertion. (B) if both assertion & reason are correct statements and reason is not the correct explanation of assertion. (C) if the assertion is the correct statement & the reason is an incorrect statement. (D) if the assertion is an incorrect statement and the reason is the correct statement. | | | |  |
| 9 | **Assertion:** The order and molecularity of a reaction are always the same. **Reason:** Order is determined experimentally whereas molecularity by a balanced elementary reaction. | | | | 1 |
| 10 | **Assertion:** The number of unpaired electrons in the following gaseous ions: *𝑀𝑛*3+, *𝐶𝑟*3+, *𝑉* 3+ and *𝑇𝑖* 3+ are 4,3,2 and 1 respectively. **Reason:** *𝐶𝑟* 3+ is most stable in aqueous solution amongst these ions | | | | 1 |
|  | **SECTION B** | | | |  |
| 11 | Predict the products of the following reactions:  a)    b) | | | | 2 |
| 12 | **In a reaction between A and B, the initial rate of reaction (r0) was measured for different initial concentrations of A and B as given below:**    **What is the order of the reaction with respect to A and B?** | | | | 2 |
| 13 | **Give the half-cell reactions for the cell used for low current devices like hearing aids, watches, etc.** | | | | 2 |
| 14 | **What is the Cell Potential of the electrochemical cell in which the cell reaction is:**  **Pb2+ + Cd → Pb + Cd2+? Given that Eocell = 0.277 volts, [Cd2+] = 0.02 M, and [Pb2+] = 0.2 M** | | | | 2 |
| 15 | Identify A and B in the following reactions. | | | | 2 |
| 16 | Explain the following observations:  a) Copper atom has filled d orbitals (3d10) in its ground state, yet it is regarded as  a transition element.  b) The actinoids exhibit a larger number of oxidation states than the corresponding members  in the lanthanoid series. | | | | 2 |
|  | **SECTION C** | | | |  |
| 17 | a) Illustrate the reaction with the help of a suitable example.  i)Hell Volhard Zelinsky Reaction  ii)Gabriel phthalimide synthesis  b) Give the chemical tests to distinguish Aniline and Benzylamine. | | | | 3 |
| 18 | A plot of concentration of A versus time is given in the figure. ncert-exemplar-problems-class-12-chemistry-chemical-kinetics-38  a) Answer the following questions based on this graph. (i) What is the order of the reaction? (ii) What is the slope of the curve?  **b) For a certain reaction a large fraction of molecules have energy more than the threshold energy, yet the rate of reaction is very slow. Why?** | | | | 3 |
| 19 | Arrange the following compounds in increasing order of their property as indicated.   1. Cl—CH2—COOH, F—CH2—COOH, CH3—COOH (acidic character) 2. Benzoic acid, 4-Nitrobenzoic acid, 3,4-Dinitrobenzoic acid, 4-Methoxybenzoic acid (acid strength) 3. C2H5NH2, C6H5 NHCH3, (C2H5)2NH and C6H5NH2 (pKb values) | | | | 3 |
| 20 | 1. Aniline is a weaker base than cyclohexyl amine. 2. Primary amines have higher boiling points than tertiary amines. 3. Aniline does not undergo Friedel–Crafts reaction. | | | | 3 |
| 21 | a)  E0 value for Mn3+ /Mn2+ couple is much more positive than Cr3+/Cr2+.  b) What is the cause of lanthanoid contraction?  c) Complete the following chemical equation | | | | 3 |
| 22 | Describe the preparation of potassium permanganate. How does the acidified permanganate solution react with oxalic acid? Write the ionic equations for the reactions. | | | | 3 |
|  | **SECTION D** | | | |  |
| 23 | 1. If the half-life period of a first order reaction in A is 2 minutes, how long will it take [A] to reach 25% of its initial concentration? 2. The rates of most reactions double when their temperature is raised from 298 K to 308 K. Calculate their activation energy. [R = 8.314 JK-1 mol-1] 3. What is the order of the reaction whose rate constant has the same units as the rate of reaction?   **OR**   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? | | | | 5 |
| 24 | 1. The resistance of 0.01 M NaCl solution at 25° C is 200 Ω. The cell constant of the conductivity cell used is unity. Calculate the molar conductivity of the solution. 2. The chemistry of corrosion of iron is essentially an electrochemical phenomenon. Explain the reactions occurring during the corrosion of iron.   **OR**   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. | | | | 5 |

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