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| **PB1/CHQP/1223/A 30-NOV-2023** | | | | | |
| **PRE-BOARD EXAMINATION I - (2023-24)** | | | | | |
| **Subject: CHEMISTRY**  **Grade: XII** | | Max. Marks:70Time: 3Hrs | | | |
| **Name:** | | | **Section:** | **Roll No:** | |
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|  | **SECTION A**  **This section has multiple -choice questions with one correct answer. Each question carries 1 mark. There is no internal choice in this section.** | | | | |
| 1 | The van’ t Hoff factor (i) for a dilute aqueous solution of the strong electrolyte barium hydroxide is   1. 0 2. 1 3. 2 4. 3 | | | | 1 |
| 2 | By reacting with which of the following, primary amines can be separated from secondary and tertiary amines?  a) Chloroform alone  b) Methyl iodide  c) Chloroform and alcoholic KOH  d) Zinc dust | | | | 1 |
| 3 | The unit of rate constant for the second-order reaction is  a) s-1  b) mol L-1 s -1  c) mol-1 L s-1  d) mol-1 L -1 | | | | 1 |
| 4 | Which of the following carbohydrates is a monosaccharide?  a) Sucrose  b) Galactose  c) Maltose  d) Lactose | | | | 1 |
| 5 | A first-order reaction takes 40 min for 30% decomposition. t1/2 will be  (a) 77.7 min  (b) 52.5 min  (c) 46.2 min  (d) 22.7 min | | | | 1 |
| 6 | More than one sort of hybridization can occur in a complex with geometry.  a) tetrahedral  b) octahedral  c) trigonal bipyramidal  d) square planar | | | | 1 |
| 7 | The core atom of which of the following biologically significant coordination molecules is magnesium?  a) Vitamin B12  b) Hemoglobin  c) Chlorophyll  d) Carboxypeptidase-A | | | | 1 |
| 8 | **In which reaction acetamide is converted to methenamine**  (a) Gabriel phthalimide synthesis  (b) Carbylamine reaction  (c) Stephen’s reaction  (d) Hoffmann bromamide reaction | | | | 1 |
| 9 | In the following reaction, the product C is:     1. Acetone 2. Ethyl alcohol 3. Methane 4. Acetaldehyde | | | | 1 |
| 10 | Acetone combines with ethylene glycol in dry HCl gas to generate:  a) hemiacetals  b) cyclic ketals  c) cyclic acetals  d) acetals | | | | 1 |
| 11 | Which of the following processes does not result in the production of alcohol?  a) Acid catalyzed hydration of alkenes  b) Free radical halogenation of alkanes  c) Reduction of aldehydes  d) Hydroboration-oxidation of alkenes | | | | 1 |
| 12 | The formation of cyanohydrin from a ketone is an example of   1. electrophilic addition 2. nucleophilic addition 3. nucleophilic substitution 4. electrophilic substitution | | | | 1 |
|  | **13-16 are Assertion & Reason type questions. Choose the correct option from the following:**   1. Both A and R are true and R is the correct explanation of A 2. Both A and R are true but R is not the correct explanation of A. 3. A is true but R is false 4. A is false but R is true. | | | |  |
| 13 | Assertion: Aldehydes and ketones both react with Tollens’ reagent to form a silver mirror.  Reason: Both, aldehydes, and ketones contain a carbonyl group | | | | 1 |
| 14 | Assertion: p-nitrophenol is more acidic than phenol. Reason: Nitro group helps in the stabilization of the phenoxide ion by dispersal of negative charge due to resonance. | | | | 1 |
| 15 | Assertion: Haloarenes are less reactive than haloalkanes and haloalkenes.  Reason: Attack of nucleophiles becomes more difficult in haloarene than in haloalkane. | | | | 1 |
| 16 | Assertion: The molarity of a solution in a liquid state changes with temperature. Reason: The volume of a solution changes with a change in temperature. | | | | 1 |
|  | **SECTION B**  **This section contains 5 questions with internal choice in one question. The following questions are very short answer type and carry 2 marks each.** | | | |  |
| 17 | State Raoult's law for a solution containing volatile components. Write two characteristics of the solution that obey Raoult's law at all concentrations.  OR  State Henry's law and write its two applications | | | | 2 |
| 18 | 1. Write the IUPAC name of the following complex: [Pt(NH3)6]Cl4 2. On the basis of crystal field theory, write the electronic configuration of the d4 ion,   if Δ0 < P. | | | | 2 |
| 19 | Arrange the following in the increasing order of their property indicated:  (a) Ethanal, Propanone, Propanal, Butanone (reactivity towards nucleophilic addition)  (b) CH3CHO, CH3CH2OH, CH3CH2CH3 (Boiling Points) | | | | 2 |
| 20 | a) DNA fingerprinting is used to determine the paternity of an individual. Which property of DNA helps in the procedure?  b) What structural change will occur when a native protein is subjected to a change in pH? | | | | 2 |
| 21 | Account for the following:  (i) N-ethylbenzene sulphonyl amide is soluble in alkali.  (ii) Reduction of nitrobenzene using Fe and HCl is preferred over Sn and HCl. | | | | 2 |
|  | **SECTION C**  **This section contains 7 questions with internal choice in one question. The following questions are short answer type and carry 3 marks each.** | | | |  |
| 22 | When sucrose is hydrolyzed the optical rotation values are measured using a polarimeter and are given in the following table: | | | | 3 |
| 23 | The rate constants of a reaction at 200K and 500K are 0.02s–1 and 0.20s–1 respectively.  Calculate the value of Ea. (Given 2.303R = 19.15 JK-1mol-1) | | | | 3 |
| 24 | Write the name of the reaction, structure, and IUPAC name of the product formed when:    **OR**  Write the name of the reaction, structure and IUPAC name of the product formed when:   1. CH3CH2CN reacts with stannous chloride in the presence of hydrochloric acid followed by hydrolysis   **(b)** Anisole reacts with alkylhalide inn the presence of anhydrous aluminum chloride | | | | 3 |
| 25 | 1. Differentiate between globular and fibrous proteins. Give one example each. 2. What are essential and non-essential amino acids? Give one example of each type. | | | | 3 |
| 26 | 1. Define ambident nucleophile. Give an example. 2. Out of (CH3)3C – Br and (CH3)3 C – I, which one is more reactive towards SN1 and why? 3. Write the product formed when p-nitro chlorobenzene is heated with aqueous NaOH at 443 K followed by acidification. | | | | 3 |
| 27 | Explain:   1. Grignard reagents should be prepared under anhydrous conditions. 2. Alkyl halides, though polar, are immiscible with water? 3. p-Dichlorobenzene has higher m.p. than those of o- and m-isomers. | | | | 3 |
| 28 | 1. Write the mechanism of acid dehydration of ethanol to yield ethene. 2. Complete the following: | | | | 3 |
|  | **SECTION D**  **This section contains case – based questions. Each question has an internal choice and carries 4 (1+1+2) marks** | | | |  |
| 29 | The following questions are case-based questions. Read the passage carefully and answer the questions that follow.     1. The pKb of aniline is more than that of methylamine. Why? 2. Give a chemical test to distinguish between dimethyl amine and trimethyl amine. 3. Arrange the following: 4. In increasing order of basic strength:      1. Aniline, p-nitroaniline and p-toluidine   OR  i) Why are aliphatic amines stronger bases than aromatic amines?  ii) For an amine RNH2, write the expression for Kb to indicate its strength. | | | | 4 |
| 30 | Zero order reactions are relatively uncommon but they occur under special conditions. Some enzyme catalysed reactions and reactions which occur on metal surfaces are a few examples of zero order reactions. The decomposition of gaseous ammonia on a hot platinum surface is a zero order reaction at high pressure.     1. What is the unit for K for zero order reaction? 2. Draw the graph between concentration of reactants Vs time in a zero order reaction. | | | | 4 |
|  | **SECTION E**  **The following questions are long answer type and carry 5 marks each. All questions have an internal choice.** | | | |  |
| 31 | **OR** | | | | 5 |
| 32 | **Attempt any five from the following**:   1. Why do gases always tend to be less soluble in liquids as the temperature is raised? 2. What type of deviation from Raoult’s Law is expected when phenol and aniline are mixed with each other? Give reason. 3. Sodium chloride is used to clear snow from the roads. Explain. 4. Arrange the following in the increasing order of freezing point.   1M glucose, 1M PbCl2, 1M Al2(SO4)3   1. What are minimum boiling and maximum boiling azeotropes? 2. What happens when R.B.C. is placed in 0.1% NaCl solution? 3. What advantage does the osmotic pressure method has over elevation in boiling point method for determining molecular mass? | | | | 5 |
| 33 | 1. Write the coordination number and oxidation state of Platinum in the complex [Pt(en)2Cl2]. 2. Write the hybridization and magnetic character of [Co(C2O4)3] 3–. 3. (At. no. of Co = 27) 4. Draw a figure to show the splitting of d orbitals in an octahedral crystal field.   **OR**   1. Write the IUPAC names of the following coordination compound:      1. Draw the structures of optical isomers of:      1. Explain on the basis of valence bond theory that [Ni (CN)4] 2– ion with square planar structure is diamagnetic and the [NiCl4] 2– ion with tetrahedral geometry is paramagnetic. | | | | 5 |

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