



Delhi Public School, Howrah

PERIODIC TEST - I (2024-2025)

CLASS - XII

SUBJECT - CHEMISTRY (Code No. 043)

Care must be taken not to write anything on the question paper. All the questions must be attempted in the correct sequence.

TIME - 3 HOURS

F.M. - 70

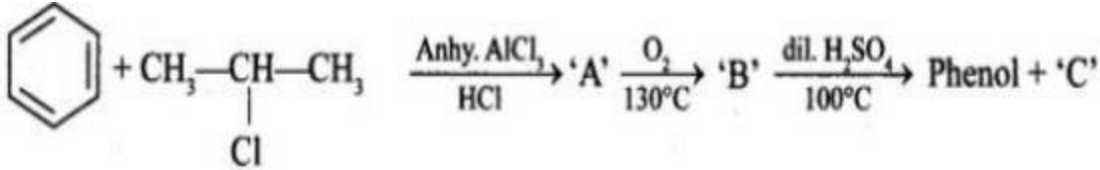
General Instructions:

Read the following instructions carefully.

- There are 33 questions in this question paper with internal choice.
- SECTION A consists of 16 multiple-choice questions carrying 1 mark each.
- SECTION B consists of 5 very short answer questions carrying 2 marks each.
- SECTION C consists of 7 short answer questions carrying 3 marks each.
- SECTION D consists of 2 case-based questions carrying 4 marks each.
- SECTION E consists of 3 long answer questions carrying 5 marks each.
- All questions are compulsory.
- Use of log tables and calculators is not allowed.

| | SECTION- A | MARKS |
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| | The following questions are multiple-choice questions with one correct answer. Each question carries 1 mark. There is no internal choice in this section. | |
| 1. | Which of the following alcohols gives 2-butene on dehydration by concentrated H_2SO_4 ? (a) 2-methylpropene-2-ol (b) 2-methylpropanol (c) Butan-2-ol (d) Butan-1-ol | 1 |
| 2. | An unknown alcohol is treated with "Lucas reagent" to determine whether the alcohol is primary, secondary or tertiary. Which alcohol reacts fastest? (a) Tertiary alcohol (b) Secondary alcohol (c) Primary alcohol (d) Both secondary and primary alcohol | 1 |
| 3. | An unripe mango placed in a concentrated salt solution to prepare pickle, shrivels because _____. (a) It gains water due to osmosis. (b) It loses water due to reverse osmosis. (c) It gains water due to reverse osmosis. (d) It loses water due to osmosis. | 1 |
| 4. | The quantity of charge required to obtain one mole of aluminium from Al_2O_3 is _____. (a) 1F (b) 6F (c) 3F (d) 2F | 1 |
| 5. | The difference between the electrode potentials of two electrodes when no current is drawn through the cell is called _____. | 1 |

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| | (a) Cell potential (b) Electromotive Force (c) Potential difference (d) Cell voltage | |
| 6. | Value of Henry's constant K_H _____. (a) Increases with increase in temperature. (b) Decreases with increase in temperature. (c) Remains constant. (d) First increases then decreases. | 1 |
| 7. | Which of the following aqueous solutions should have the highest boiling point? (a) 1.0 M NaOH (b) 1.0 M Na ₂ SO ₄ (c) 1.0 M NH ₄ NO ₃ (d) 1.0 M KNO ₃ | 1 |
| 8. | Which one of the following compounds is obtained by dehydrogenation of secondary alcohols? (a) Ketone (b) Aldehyde (c) Carboxylic acid (d) Amine | 1 |
| 9. | What is the product formed when alkyl halides are heated with dry Ag ₂ O? (a) Benzene (b) Ketone (c) Ester (d) Ether | 1 |
| 10. | 1,1-Dichloropropane on hydrolysis gives (a) Propanone (b) Propanal (c) Ethanal (d) 1,1-propanediol | 1 |
| 11. | Which of the following represents Freon? (a) Ethylene dichloride (b) Ethylidene dichloride (c) Tetrafluoro ethylene (d) Dichlorodifluoromethane | 1 |
| 12. | What will happen during the electrolysis of aqueous solution of CuSO ₄ by using platinum electrodes? (a) Copper will deposit at cathode. (b) Copper will deposit at anode. (c) Oxygen will be released at anode. (d) Copper will dissolve at anode. | 1 |
| | Given below are two statements labelled as Assertion (A) and Reason (R). Select the most appropriate answer from the options given below: (a) Both A and R are true and R is the correct explanation of A. (b) Both A and R are true but R is not the correct explanation of A. (c) A is true but R is false. (d) A is false but R is true. | |

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| 13. | Assertion (A): Ether behaves as bases in the presence of mineral acids. Reason (R): Due to the presence of lone pairs of electrons on oxygen, ether accepts protons. | 1 |
| 14. | Assertion (A): Osmosis does not take place in two isotonic solutions separated by semi-permeable membrane. Reason (R): Isotonic solutions have the same osmotic pressure. | 1 |
| 15. | Assertion (A): Fluorine is the best oxidising agent. Reason (R): Fluorine has the highest reduction potential. | 1 |
| 16. | Assertion (A): KCN reacts with methyl chloride to give methyl isocyanide. Reason (R): CN ⁻ is an ambident nucleophile. | 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. | Write Kohlrausch law of independent migration of ions. | 2 |
| 18. | Explain why Grignard reagents should be prepared under anhydrous conditions. | 2 |
| 19. | What is van't Hoff factor? Write the significance of its different values. | 2 |
| 20. | Give an example of a fuel cell and write the cathode and anode reaction for it. | 2 |
| OR | | |
| Write the significance of salt bridge in an electrochemical series. | | |
| 21. | Why do alcohols have higher boiling points than the haloalkanes of the same molecular mass? | 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. | Write the structural formula of A, B, C in the following sequence of reaction. $\text{CH}_3-\overset{\text{Cl}}{\underset{ }{\text{CH}}}-\text{CH}_3 \xrightarrow[\text{KOH}]{\text{Alc.}} \text{A} \xrightarrow[\text{Peroxide}]{\text{HBr}} \text{B} \xrightarrow[\text{Dry ether}]{\text{NaI}} \text{C}$ | 3 |
| 23. | A solution of sucrose (C ₁₂ H ₂₂ O ₁₁) in water has a boiling point of 373.128 K. Calculate the freezing point of the same solution. (Given, for water, K _f = 1.86 K kg mol ⁻¹ and K _b = 0.52 K kg mol ⁻¹) | 3 |
| 24. | Identify A, B, C.  | 3 |
| 25. | (a) What is the value of the cell constant if the conductivity of the 0.01M KCl solution at 298 K is 0.146 x 10 ⁻³ S cm ⁻¹ ? (b) On which factors does the cell constant depend? | 3 |
| 26. | (a) Why does sodium chloride solution freeze at a lower temperature than water? (b) Write the unit of 'K _f '. | 3 |
| 27. | Write a short note on (Any two): (a) Reimer Tiemann Reaction (b) Kolbe reaction (c) Friedel Craft acylation reaction of anisole. | 3 |

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| 28. | (a) Why should we keep chloroform in airtight bottles? Answer with suitable reaction. (b) Why is thionyl chloride preferred over phosphorous pentachloride for the conversion of alkyl halide from alcohol? Explain with necessary reaction. | 3 |
| SECTION: D | | |
| The following questions are case-based questions. Each question has an internal choice and carries 4 (1+1+2) marks each. Read the passage carefully and answer the questions that follow. | | |
| 29. | Alcohols and phenols are acidic in nature. Electron withdrawing groups in phenol increase its acidic strength and electron donating groups decrease. Alcohols undergo nucleophilic substitution with hydrogen halides to give alkyl halides. On oxidation primary alcohols yield aldehydes with mild oxidising agents and carboxylic acids with strong oxidising agents while secondary alcohols yield ketones. The presence of -OH groups in phenols activates the ring towards electrophilic substitution. Various important products are obtained from phenol like salicylaldehyde, salicylic acid, picric acid, etc. (a) Which degree of alcohol rarely undergoes oxidation? Why? (b) Which ion is formed when phenol is treated with a base? Draw the structure. (c) Show how salicylic acid is prepared from phenol. OR (c) Show how picric acid is prepared from phenol. | 4 |
| 30. | The boiling point elevation and the freezing point depression of solutions have a number of practical applications. Ethylene glycol (CH ₂ OHCH ₂ OH) is used in automobile radiators as an antifreeze because it lowers the freezing point of the coolant. The same substance also helps to prevent the radiator coolant from boiling away by elevating the boiling point. Ethylene glycol has a low vapour pressure. We can also use glycerol as an antifreeze. In order to elevate boiling point, the solute must be non-volatile, but no such restriction applies to freezing point depression. For example, methanol (CH ₃ OH), a fairly volatile liquid that boils only at 65°C, is sometimes used as antifreeze in automobile radiators. (a) Out of the CH ₃ OH and C ₆ H ₁₂ O ₆ which is a better reagent for depression in freezing point but not for elevation in boiling point? (b) Will the depression in freezing point be the same or different, if 0.1 moles of sugar or 0.1 moles of glucose is dissolved in 1 L of water? (c) 124 g each of the two reagents glycerol and glycol are added in 5 kg water of the radiators in the two cars. Which one is better for a car? Justify your answer. OR (c) If the cost of glycerol, glycol and methanol are the same, then what would be the sequence of the economy to use these compounds as antifreeze? | 4 |
| SECTION: E | | |
| The following questions are long answer type and carry 5 marks each. All questions have an internal choice. | | |
| 31. | Write reactions as an example of <u>(Answer any five among the following)</u> (a) Markwonikoff addition. (b) Saytzeff elimination. (c) Finkelstein reaction. (d) Sandmayer's reaction. (e) Friedel-Crafts reaction. (f) Wurtz-Fittig reaction. | 5 |

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| 32. | <p>(a) Calculate the mass of urea (NH_2CONH_2) required in making 2.5 kg of 0.25 molal aqueous solution.</p> <p>(b) What do you mean by colligative property of a solution?</p> <p>(c) Liquid 'Y' has higher vapour pressure than liquid 'X'. Which of them will have a higher boiling point?</p> <p style="text-align: center;">OR</p> <p>(a) What is the effect of temperature on the solubility of glucose in water?</p> <p>(b) Rehan collected a 10mL each of fresh water and ocean water. He observed that one sample labeled "P" froze at 0°C while the other "Q" at -1.3°C. Rehan forgot which of the two, "P" or "Q" was ocean water. Help him identify which container contains ocean water, giving rationalization for your answer.</p> <p>(c) Calculate Van't Hoff factor for an aqueous solution of $\text{K}_3[\text{Fe}(\text{CN})_6]$ if the degree of dissociation (α) is 0.852. What will be boiling point of this solution if its concentration is 1 molal? ($K_b=0.52 \text{ K kg/mol}$)</p> | 5 |
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| 33. | <p>(a) State Faraday's law.</p> <p>(b) What is S.H.E.?</p> <p>(c) What are the differences between conductance & conductivity? Write any two.</p> <p style="text-align: center;">OR</p> <div style="text-align: center;"> </div> <p>(a) In the given figure, identify the nature of electrolyte A & B. Write an explanation in support of your answer.</p> <p>(b) In which case it is not possible to obtain the value of limiting molar conductance?</p> <p>(c) In the graph, which parameters are taken as X-axis & Y-axis?</p> | 5 |
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