



Test Paper Class-12 | Chapter–Solution/ Chemical kinetics/Haloalkanes and Haloarene /Alcohol phenol and ethers | Marks 70 | Time- 3 h

- 1 Henry's law states that: 1
- A. The solubility of a gas in a liquid is independent of pressure  
B. The solubility of a gas in a liquid is directly proportional to the pressure of the gas  
C. The solubility of a gas in a liquid is inversely proportional to the pressure  
D. None of these
- 2 A 0.1 M NaCl solution and 0.1 M glucose solution have the same: 1
- A. Boiling point  
B. Freezing point  
C. Osmotic pressure  
D. Vapour pressure
- 3 Which of the following colligative properties is used to determine the molar mass of a solute most accurately? 1
- A. Relative lowering of vapour pressure  
B. Elevation in boiling point  
C. Depression in freezing point  
D. Osmotic pressure
- 4 The rate of a reaction doubles when the temperature is increased by 10°C. This is due to: 1
- A. Increase in activation energy  
B. Increase in number of effective collisions  
C. Decrease in activation energy  
D. Increase in molecular size
- 5 For a reaction, rate =  $k[A]^2[B]$ , the overall order of the reaction is: 1
- A. 1  
B. 2  
C. 3  
D. 0
- 6 The half-life of a first-order reaction is 20 minutes. The time required for the reaction to be 75% complete is: 1



- A. 10 min  
B. 20 min  
C. 40 min  
D. 60 min
- 7 Which of the following halides will undergo SN1 reaction most readily? **1**
- A.  $\text{CH}_3\text{Cl}$   
B.  $\text{CH}_3\text{CH}_2\text{Cl}$   
C.  $(\text{CH}_3)_3\text{CCl}$   
D.  $\text{CH}_2=\text{CH}-\text{CH}_2\text{Cl}$
- 8 When phenol reacts with bromine water, the major product formed is: **1**
- A. o-Bromophenol  
B. p-Bromophenol  
C. 2,4,6-Tribromophenol  
D. m-Bromophenol
- 9 Which of the following compounds will show the highest boiling point? **1**
- A. Diethyl ether  
B. Propan-1-ol  
C. Bromopropane  
D. Propanal
- 10 Which reagent is used to convert an alcohol into an alkyl chloride? **1**
- A. NaOH  
B. HCl (conc.) with  $\text{ZnCl}_2$   
C. NaCl  
D.  $\text{NH}_4\text{Cl}$
- 11 Which of the following is most reactive towards nucleophilic substitution? **1**
- A. Chlorobenzene  
B. Benzyl chloride  
C. Vinyl chloride  
D. Chloroethane
- 12 When ethanol is heated with concentrated  $\text{H}_2\text{SO}_4$  at  $170^\circ\text{C}$ , the main product is: **1**
- A. Diethyl ether  
B. Ethyl hydrogen sulphate  
C. Ethene  
D. Acetaldehyde

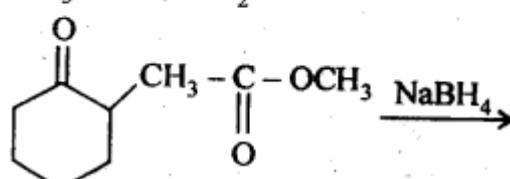


- 13 Calculate the mass of a non-volatile solute (molecular mass 40 g mol<sup>-1</sup>) that should be dissolved in 114 g of octane to reduce its pressure to 80%. 2
- 14 A 5% solution (by mass) of cane sugar in water has freezing point of 271 K. Calculate the freezing point of 5% glucose in water if freezing point of pure water is 273.15 K. 2
- 15 a) Define  
b) Azeotropic Mixture  
c) Osmotic Pressure  
d) Henry's Law 4

16	Give two reactions that show the acidic nature of phenol. Compare its acidity with that of ethanol.	3
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17	Give equations of the following reactions: (i) Oxidation of propan-1-ol with alkaline KMnO <sub>4</sub> solution. (ii) Bromine in CS <sub>2</sub> with phenol. (iii) Dilute HNO <sub>3</sub> acid with phenol (iv) Treating phenol with chloroform in presence of aqueous NaOH	4
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18	Explain the following with an example (i) Kolbe's reaction (ii) Reimer – Tiemann reaction – (iii) Williamson ether synthesis	3
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19	Write structures of the products of the following reactions: (i) $\text{CH}_3 - \text{CH} = \text{CH}_2 \xrightarrow{\text{H}_2\text{O}/\text{H}^+}$ (ii)  (iii) $\text{CH}_3 - \text{CH}_2 - \underset{\text{CH}_3}{\text{CH}} - \text{CHO} \xrightarrow{\text{NaBH}_4}$	3
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20	Write the mechanism of hydration of ethene to yield ethanol	3
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21	Explain why	3
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	(i) the dipole moment of chlorobenzene is lower than that of cyclohexyl chloride? (ii) alkyl halides, though polar, are immiscible with water? (iii) Grignard reagents should be prepared under anhydrous conditions?	
22	Write the structure of the major organic product in each of the following reactions (i) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl} + \text{NaI} \xrightarrow{\text{Acetone, heat}}$ (ii) $(\text{CH}_3)_3\text{CBr} + \text{KOH} \xrightarrow{\text{Ethanol, heat}}$ (iii) $\text{CH}_3\text{CH}(\text{Br})\text{CH}_2\text{CH}_3 + \text{NaOH} \xrightarrow{\text{Water}}$ (iv) $\text{CH}_3\text{CH}_2\text{Br} + \text{KCN} \xrightarrow{\text{aq. ethanol}}$ (v) $\text{C}_6\text{H}_5\text{ONa} + \text{C}_2\text{H}_5\text{Cl} \longrightarrow$ (vi) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH} + \text{SOCl}_2 \longrightarrow$ (vii) $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2 + \text{HBr} \xrightarrow{\text{Peroxide}}$ (viii) $\text{CH}_3\text{CH}=\text{C}(\text{CH}_3)_2 + \text{HBr} \longrightarrow$	8
23	Primary alkyl halide $\text{C}_4\text{H}_9\text{Br}$ (a) reacted with alcoholic KOH to give compound (b). Compound (b) is reacted, with HBr to give (c) which is an isomer of (a). When (a) is reacted with sodium metal it gives compound (d), $\text{C}_8\text{H}_{18}$ which is different from the compound formed when n-butyl bromide is reacted with sodium. Give the structural formula of (a) and write the equations for all the reactions.	3
24	The rate of a reaction quadruples when the temperature changes from 293 K to 313 K. Calculate the energy of activation of the reaction assuming that it does not change with temperature.	3
25	A first order reaction takes 40 min for 30% decomposition. Calculate $t_{1/2}$	3
26	Define (a) Rate Law (b) Rate Constant (c) Order of reaction (d) Features of Molecularity (e) Activation Energy (f) Collision frequency (g) Pseudo first order reaction with two examples (h) Draw graphs for Zero order and 1 <sup>st</sup> order	10



### Assertion And Reasoning

Directions: These questions consist of two statements, each printed as Assertion and Reason. While answering these questions, you are required to choose any one of the following four responses.

- (a) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
- (b) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
- (c) If the Assertion is correct but Reason is incorrect.
- (d) If both the Assertion and Reason are incorrect.

- 1** **Assertion (A):** The vapour pressure of a solvent decreases on adding a non-volatile solute. **1**  
**Reason (R):** The solute particles occupy some surface area of the solvent, reducing the escaping tendency of solvent molecules.
- 2** **Assertion (A):** The rate of a reaction increases with increase in temperature. **1**  
**Reason (R):** Increase in temperature decreases the activation energy of the reaction.
- 3** **Assertion (A):** Chlorobenzene is less reactive towards nucleophilic substitution than alkyl chlorides. **1**  
**Reason (R):** In chlorobenzene, the C–Cl bond has partial double bond character due to resonance.
- 4** **Assertions (A):** Phenol is more acidic than ethanol. **1**  
**Reason (R):** The phenoxide ion formed after losing a proton is stabilized by resonance.