



**SECOND YEAR HIGHER SECONDARY  
MODEL EXAMINATION, FEBRUARY – 2024**

Part – III

Time : 2 Hours

**CHEMISTRY**

Cool-off time : 15 Minutes

Maximum : 60 scores

**General Instructions to Candidates :**

- There is a 'Cool-off time' of 15 minutes in addition to the writing time.
- Use the 'Cool-off time' to get familiar with questions and to plan your answers.
- Read questions carefully before answering.
- Read the instructions carefully.
- Calculations, figures and graphs should be shown in the answer sheet itself.
- Malayalam version of the questions is also provided.
- Give equations wherever necessary.
- Electronic devices except non-programmable calculators are not allowed in the Examination Hall.

**വിദ്യാർത്ഥികൾക്കുള്ള പൊതുനിർദ്ദേശങ്ങൾ :**

- നിർദ്ദിഷ്ട സമയത്തിന് പുറമെ 15 മിനിറ്റ് 'കൂൾ ഓഫ് ടൈം' ഉണ്ടായിരിക്കും.
- 'കൂൾ ഓഫ് ടൈം' ചോദ്യങ്ങൾ പരിചയപ്പെടാനും ഉത്തരങ്ങൾ ആസൂത്രണം ചെയ്യാനും ഉപയോഗിക്കുക.
- ഉത്തരങ്ങൾ എഴുതുന്നതിന് മുമ്പ് ചോദ്യങ്ങൾ ശ്രദ്ധാപൂർവ്വം വായിക്കണം.
- നിർദ്ദേശങ്ങൾ മുഴുവനും ശ്രദ്ധാപൂർവ്വം വായിക്കണം.
- കണക്ക് കൂട്ടലുകൾ, ചിത്രങ്ങൾ, ഗ്രാഫുകൾ, എന്നിവ ഉത്തരപേപ്പറിൽ തന്നെ ഉണ്ടായിരിക്കണം.
- ചോദ്യങ്ങൾ മലയാളത്തിലും നല്കിയിട്ടുണ്ട്.
- ആവശ്യമുള്ള സ്ഥലത്ത് സമവാക്യങ്ങൾ കൊടുക്കണം.
- പ്രോഗ്രാമുകൾ ചെയ്യാനാകാത്ത കാൽക്കുലേറ്ററുകൾ ഒഴികെയുള്ള ഒരു ഇലക്ട്രോണിക് ഉപകരണവും പരീക്ഷാഹാളിൽ ഉപയോഗിക്കുവാൻ പാടില്ല.

Answer any 4 questions from 1 to 5. Each carries 1 score.

(4 × 1 = 4)

1. The molecularity of the following reaction is \_\_\_\_\_.



- (a) 2 (b) 3  
(c) 1 (d) 4
2. Give an example of a primary battery.
3. Which type of structural isomerism is exhibited by  $[\text{Co}(\text{NH}_3)_5\text{NO}_2]^+$  ion ?
4. The most suitable reagent used to convert alcohols into chloroalkanes is \_\_\_\_\_.
- (a)  $\text{HCl}$  (b)  $\text{PCl}_3$   
(c)  $\text{PCl}_5$  (d)  $\text{SOCl}_2$
5. The deficiency of which vitamin causes scurvy ?

Answer any 8 questions from 6 to 15. Each carries 2 scores.

(8 × 2 = 16)

6. (i) Define Van't Hoff factor. (1)  
(ii) Assuming complete dissociation of  $\text{KCl}$  in aqueous solution, predict the value of Van't Hoff factor. (1)
7. (i) What are galvanic cells ? (1)  
(ii) Write the cell representation of Daniel cell. (1)

8. What are Pseudo first order reactions ? Give an example.
9. (i) Write any two factors which influence the rate of a chemical reaction. (1)
- (ii) The decomposition of gaseous ammonia on a hot Pt surface is a zero order reaction at high pressure. Write the rate equation for this reaction. (1)
10. Describe the following :
- (i) Finkelstein reaction (1)
- (ii) Fittig reaction (1)
11. Write any two differences of  $S_N1$  and  $S_N2$  mechanism in the reactions of haloalkanes.
12. Chloroform is stored in dark coloured bottles completely filled. Give reason.
13. Explain the industrial preparation of ethanol from molasses.
14. Identify A and B in the following reaction :
- $$2 \text{H} - \text{CHO} \xrightarrow{\text{Con. NaOH}} \text{A} + \text{B}$$
15. (i) What is Hinsberg's reagent ? (1)
- (ii) How will you detect the presence of primary amines using Hinsberg reagent ? (1)

Answer any 8 questions from 16 to 26. Each carries 3 scores.

(8 × 3 = 24)

16. (i) Define osmotic pressure. (1)  
(ii) Explain reverse osmosis and mention one of its applications. (2)
17. (i) Define Molar conductivity. (1)  
(ii) Give the graphical representation for the variation of molar conductivity in the case of strong electrolytes. (1)  
(iii) Write the mathematical expression of the graphical representation for the variation of molar conductivity with concentration of strong electrolytes. (1)
18. (i) A first order reaction is found to have a rate constant  $K = 5.5 \times 10^{-14} \text{ s}^{-1}$ . Find the half life of the reaction. (2)  
(ii) Write the unit of rate constant of a second order reaction. (1)
19. (i) Transition metal compounds are usually coloured. Give reason. (1)  
(ii) Calculate the magnetic moment of a divalent ion in aqueous solution if its atomic number is 25. (2)
20. Explain the preparation of potassium dichromate from chromite ore.
21. (i) Write the IUPAC name of  $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$ . (1)  
(ii) Draw the geometrical isomers of  $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$ . (1)  
(iii) Which one of the geometrical isomers of  $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$  show optical activity? (1)

22. (i) Differentiate co-ordination compounds from double salts. (1)
- (ii) What are Chelating Ligands ? (1)
- (iii) Give two examples for Bidentate Ligands. (1)
23. Account for the following :
- (i) Alcohols have higher boiling points than haloalkanes. (1)
- (ii) Phenols show acidic behaviour. (1)
- (iii) Aromatic ethers give electrophilic substitution reactions at the ortho and para positions. (1)
24. (i) Aldehydes are more reactive than ketones towards nucleophilic addition reactions. Why ? (1)
- (ii) Name any one reaction that can convert aldehydes and ketones into hydrocarbons. (1)
- (iii) What is Esterification ? (1)
25. (i) Write the preparation of chlorobenzene from aniline. (2)
- (ii) What is Hoffmann bromamide degradation reaction ? (1)
26. (i) What are essential amino acids ? Give two examples. (2)
- (ii) Give one example each for globular and fibrous proteins. (1)

Answer any 4 questions from 27 to 31. Each carries 4 scores.

(4 × 4 = 16)

27. (i) What are non-ideal solutions ? (1)  
(ii) Explain negative deviation with the help of a graph. Give an example. (2)  
(iii) What do you mean by minimum boiling azeotropes ? (1)
28. (i) State Kohlrausch's law of independent migration of ions and give one of its applications. (2)  
(ii) Calculate the Molar Conductivity of 0.05 mol L<sup>-1</sup> NaOH solution whose conductivity is 0.01148 S cm<sup>-1</sup>. (2)
29. (i) Explain on the basis of V.B. theory that [Ni(CN)<sub>4</sub>]<sup>2-</sup> ion with square planar structure is diamagnetic and the [NiCl<sub>4</sub>]<sup>2-</sup> ion with tetrahedral geometry is paramagnetic. (3)  
(ii) Draw the crystal field splitting of the d-orbitals in octahedral complexes. (1)
30. (i) Explain the Lucas test for distinguishing primary, secondary and tertiary alcohols. (1½)  
(ii) Explain Reimer – Tiemann reaction. (1½)  
(iii) Write the product obtained when phenol is treated with chromic acid. (1)
31. (i) Complete the following reaction : (1)  
$$\text{CH}_3 - \text{CH}_2 - \text{COOH} \xrightarrow[\text{(ii) H}_2\text{O}]{\text{(i) Cl}_2 / \text{red P}}$$
  
(ii) Compare the acidic strength of the above product with that of CH<sub>3</sub> – CH<sub>2</sub> – COOH. (1)  
(iii) How will you prepare propan-2-ol using Grignard reagent ? (2)