

CLASS—XII (H.P.)

CHEMISTRY

(Theory)

SERIES—A

Time Allowed : 3 Hours

Maximum Marks : 60

Candidates are required to give their answers in their own words as far as practicable.

Special Instructions :

- (1) You must write Question Paper Series in the circle at top left side of title page of your Answer-book.
- (2) While answering your Questions, you must indicate on your Answer-book the same Question No. as appears in your Question Paper.
- (3) Do not leave blank page/pages in your Answer-book.
- (4) All questions are compulsory. Internal choices have been given in some questions.
- (5) Question Nos. 1 to 6 are multiple choice type questions (MCQ) carrying 1 mark each. Choose one correct answer among four options.
- (6) Question Nos. 7 to 10 are very short answer type carrying 1 mark each. Answer these in about one word or in one sentence.
- (7) Question Nos. 11 to 17 are short answer type carrying 2 marks each.
- (8) Question Nos. 18 to 25 are short answer type carrying 3 marks each.
- (9) Question Nos. 26 to 28 are long answer type carrying 4 marks each.
- (10) Use of Log table is allowed, whereas that of calculator is not permitted.

1. On doping Ge metal with a little of In (Indium) we get :

(a) <i>n</i> -type semiconductor	(b) <i>p</i> -type semiconductor	
(c) Insulator	(d) Rectifier.	1
2. Which of the following is not a colligative property ?

(a) Elevation in boiling point	(b) Osmotic pressure	
(c) Depression in freezing point	(d) Elevation in freezing point.	1
3. In a dry cell, the depolarizer is :

(a) MnO ₂	(b) Zn	
(c) C	(d) NH ₄ Cl.	1
4. Rate constant of a reaction depends upon :

(a) Temperature	(b) Time of reaction	
(c) Initial Conc. of the reaction	(d) Extent of reaction.	1
5. Bredig's arc method cannot be used to prepare colloidal solution of :

(a) Pt	(b) Fe	
(c) Ag	(d) Au.	1
6. Heating pyrites to remove sulphur is called :

(a) Smelting	(b) Calcination	
(c) Liquidation	(d) Roasting.	1
7. Draw the geometry of XeOF₂. 1
8. Write a short note on Mutarotation. 1
9. What is the chemical name of Vitamin A ? 1

10. Write a short note on Fittig reaction. 1
11. (a) Define Superconductivity. 1, 1
(b) What are disinfectants ? Give one example. 1, 1
12. 1.00 gm of a non-electrolyte solute when dissolved in 50 gm of Benzene lowers the freezing point of Benzene by 0.40 K. Calculate the molar mass of the non-electrolyte solute. Given $K_f = 5.12 \text{ K Kg mole}^{-1}$. 2
13. Write a short note on Electrochemical theory of rusting. 2
14. Prove that for a 1st order reaction, the time taken to complete 50% of the reaction is independent of the initial conc. of the reactants. 2
15. (a) Define Electrochemical series. 1, 1
(b) Write down the mathematical expression for Freundlich adsorption isotherm. 1, 1
16. (a) Write a short note of Poling. 1, 1
(b) How will you convert Benzoic acid to Benzamide ? 1, 1
17. (a) What are Tranquillisers ? 1, 1
(b) $\text{C}_6\text{H}_5\text{N}_2^+\text{Cl}^- \xrightarrow{\text{CuCN}} \text{A} \xrightarrow{\text{H}_2\text{O}/\text{H}^+} \text{B}$. 1, 1
18. (a) How is P.V.C. manufactured ? What are its uses ? 1, 2
(b) What are Elastomers ? How will you prepare Buna-S ? 1, 2
- Or*
- (a) Write two differences between Thermosetting and Thermoplastics. 1, 2
(b) How is Terylene prepared ? Give its uses. 1, 2
19. (a) Write I.U.P.A.C. name of $\text{K}_4[\text{Fe}(\text{CN})_6]$. 1, 2
(b) Explain the geometry and magnetic character of $[\text{FeF}_6]^{3-}$ on the basis of V.B.T. 1, 2
20. (a) State and explain Saytzeff's rule with the help of a suitable example. 2, 1
(b) Write a short note on Hundsdiecke reaction. 2, 1
21. (a) What happens when Ethyl alcohol is heated with conc. H_2SO_4 at 443 K ? 1, 1, 1
(b) Why Phenol is more acidic than Alcohols ? 1, 1, 1
(c) How will you convert Ethanol to Methanol ? 1, 1, 1
22. (a) Define Unit cell. 1, 1, 1
(b) What is Wolff kishner reduction ? 1, 1, 1
(c) Which vitamin is responsible for blood clotting ? 1, 1, 1
23. (a) Why Carboxylic acids are more acidic in comparison to Phenol ? 2, 1
(b) How will you convert Benzene to Benzophenone ? 2, 1
24. Write short notes on the following :
(a) Stephen's reduction
(b) Faraday's second law of Electrolysis
(c) Azeotropes. 1, 1, 1
25. (a) Draw the structure of Picric acid.
(b) How will you convert Nitrobenzene into Aniline ?
(c) Compare the basic character of Ammonia and Ethylamine. 1, 1, 1
26. (a) Compare the acidic character of HClO_4 , HClO_3 , HClO_2 and HClO .
(b) Why halogens are highly reactive ?
(c) PH_3 has lower boiling point than Ammonia.
(d) Bond angle in H_2O is more than in H_2Te . Why ?
- Or*
- (a) Why Ammonia is a good complexing agent ?

- (b) Write a short note on tailing of Mercury.
 (c) Noble gases are inert in nature. Why?
 (d) Draw the geometry of PCl_5 .
27. (a) Write Arrhenius equation. 1, 1, 1, 1
 (b) What is the difference between Lanthanoids and Actinoids? (Four points).
 (c) Define Coagulation.
28. (a) What happens when $\text{K}_2\text{Cr}_2\text{O}_7$ is heated? 1, 2, 1
 (b) Draw the structure of $\text{Cr}_2\text{O}_7^{2-}$ ion.
 (c) Draw the geometry of XeO_4 .
 (d) Define a transition element. 1, 1, 1, 1

SERIES—B

Time Allowed : 3 Hours

Maximum Marks : 60

Candidates are required to give their answers in their own words as far as practicable.
 General Instructions : Same as in Series—A.

- The coordination number in hcp arrangement is :
 (a) 10 (b) 5
 (c) 8 (d) 12. 1
- The molarity of pure water is :
 (a) 55.6 M (b) 50 M
 (c) 100 M (d) 18 M. 1
- The units of cell constant are :
 (a) $\text{ohm}^{-1} \text{cm}^{-1}$ (b) cm
 (c) cm^{-1} (d) $\text{ohm}^{-1} \text{cm}$. 1
- The units of specific rate constant for zero order reaction are :
 (a) s^{-1} (b) $\text{mole L}^{-1}\text{s}^{-1}$
 (c) $\text{mole}^2 \text{L}^2\text{s}^{-1}$ (d) None of the above. 1
- Chromatography is based on the principle of :
 (a) Chemical adsorption (b) Physical adsorption
 (c) Hydrogen bonding (d) None of the above. 1
- A cuprous ore among the following is :
 (a) Malachite (b) Cuprite
 (c) Azurite (d) Galena. 1
- Explain, why H_3PO_3 is deprotic? 1
- Define fuel cell. 1
- Name the Vitamin whose deficiency causes Rickets. 1
- Give the structural formula of D.D.T. 1
- (a) What is doping? 1, 1
 (b) What are Analgesics? Give one example.
- What is van't Hoff factor? What is its value for association and dissociation of solute? 2
- The cell in which the following reactions occurs :

$$2\text{Fe}^{+3}_{(\text{aq})} + 2\text{I}^{\ominus}_{(\text{aq})} \longrightarrow 2\text{Fe}^{+2}_{(\text{aq})} + \text{I}_2(\text{s})$$
 has $E^{\circ}_{\text{cell}} = .236\text{V}$ at 298 K. Calculate the standard Gibbs free energy change. 2

14. What are Pseudo chemical reactions ? Give one example. 2
15. (a) What is chemical formula of Rust ? 1, 1
(b) Define Gold number.
16. (a) Define Calcination. 1, 1
(b) How will you convert Acetic acid to Acetaldehyde ? 2
17. What is the difference between vitamin and hormones ? 2
18. (a) How will you prepare Nylon-6 ? $1\frac{1}{2}, 1\frac{1}{2}$
(b) Write a short note on Vulcanisation of Rubber.
- Or*
- (a) How will you prepare Bakelite ? $1\frac{1}{2}, 1\frac{1}{2}$
(b) Write a short note on Thermosetting polymers.
19. (a) Define Chelate. 1, 2
(b) With the help of V.B.T., explain the geometry and magnetic behaviour of $[\text{Fe}(\text{CN})_6]^{4-}$
20. (a) What is an ambident Nucleophile ? Give one example. 1, 2
(b) Write short notes on the following :
(i) Wurtz reaction
(ii) Antacids.
21. (a) Write a short note on Fries rearrangement. 1, 2
(b) Why Phenol is acidic in nature ? Explain.
22. (a) Define Piezoelectricity. 1, 1, 1
(b) Write a short note on Aldol condensation.
(c) What is Power alcohol ?
23. (a) Compare the acidic character of HCOOH , CH_3COOH and $\text{C}_2\text{H}_5\text{COOH}$. Assign reasons for the same. 2, 1
(b) How will you convert Phenol to Benzene ?
24. Write short notes on the following : 1, 1, 1
(a) Henry's law
(b) Kohlrausch's law
(c) Gabriel phthalimide synthesis.
25. (a) Why Ethylamine is more basic than Ammonia ? 1, 1, 1
(b) Write a short note on coupling reaction.
(c) How will you convert Nitrobenzene to *m*-Nitrophenol ?
26. (a) Compare the Acidic character of HF , HCl , HBr and HI .
(b) SF_6 is known whereas OF_6 is not known.
(c) H_2O is a liquid whereas H_2S is a gas.
(d) What is Laughing gas ? How is it prepared ?
- Or*
- (a) Why Interhalogens are more reactive than Halogens ? 1, 1, 1, 1
(b) Draw the structure of IF_6^\ominus
(c) Write the formula of Mustard gas.
(d) PCl_5 is ionic in nature in solid state. Give reasons.
27. (a) $\text{C}_6\text{H}_5\text{OH} + \text{CHCl}_3 \xrightarrow[340\text{ K}]{\text{aq. NaOH}} ?$

- (b) Write down the composition of Misch metal.
 (c) Write a short note on Hardy Schulze rule.
 (d) Why Cu^+ salts are colourless whereas Cu^{2+} salts are coloured ? 1, 1, 1, 1
28. (a) Write a short note on Lanthanoid contraction. Discuss its cause and consequences.
 (b) Write geometry of XeF_2 .
 (c) Why transition metals form a number of Interstitial compounds ? 2, 1, 1

SERIES—C

Time Allowed : 3 Hours

Candidates are required to give their answers in their own words as far as practicable. **Maximum Marks : 60**

Special Instructions : Same as in Series—A.

- Coordination number of a metal which crystallises in C.C.P. lattice is :
 - 4
 - 12
 - 8
 - 6.
- The vapour pressure of a solvent containing a non-volatile solute is :
 - Decreased
 - Increased
 - Does not change
 - None of the above.
- The units of specific conductance are :
 - $\text{ohm}^{-1} \text{cm}^{-1}$
 - ohm cm
 - cm^{-1}
 - None of the above.
- Rate constant for a reaction at 290 K has found to be 3.2×10^{-3} . At 300 K it will be :
 - 1.28×10^{-2}
 - 9.6×10^{-3}
 - 6.4×10^{-3}
 - 3.2×10^{-4} .
- As_2S_3 solution is :
 - Positive colloid
 - Negative colloid
 - Neutral colloid
 - None of these.
- Malachite is an ore of :
 - Iron
 - Aluminium
 - Copper
 - Mercury.
- Why are Halogens coloured ?
- Name the disease caused due to deficiency of Insulin.
- Write a short note on Peptide bond.
- Give the structural formula of B.H.C.
- What are n -type semiconductors ?
 - What are Antipyretics ? Give one example.
- Prove that relative lowering in vapour pressure is equal to the mole fraction of the solute.
- Calculate the E.M.F. of the cell in which the following reaction takes place :

$$\text{Ni}_{(s)} + 2\text{Ag}_{(aq)}^+ (0.002\text{M}) \longrightarrow \text{Ni}_{(aq)}^{2+} (0.160\text{M}) + 2\text{Ag}_{(s)}$$
 give $E_{\text{cell}}^{\circ} = 1.05 \text{ V}$.
- Derive integrated rate equation for Zero order reaction.
- Define Electrochemical equivalent.
 - Define an Emulsion.
- Define Roasting.
 - Explain HVZ reaction.

17. What are enzymes ? Give industrial applications of enzymes.

18. (a) Give the preparation of uses of Melamine.

(b) Write a short note on Thermoplastics.

2
 $1\frac{1}{2}, 1\frac{1}{2}$

Or

(a) How is Nylon-66 synthesised ? What are its uses ?

(b) Write a short note on Biodegradable polymers. Give an example of a biodegradable

aliphatic polyester.

$1\frac{1}{2}, 1\frac{1}{2}$

19. (a) Write IUPAC name of $[\text{Cr}(\text{en})_3] \text{Cl}_3$.

(b) With the help of V.B.T., explain the geometry, shape and magnetic behaviour of

$[\text{Ni}(\text{CN})_4]^{2-}$ ion.

1, 2

20. (a) Write a short note on β -elimination.

(b) Write short notes on the following :

(i) Sandmeyer's reaction

(ii) Finkelstein's reaction.

1, 2

21. (a) Write a short note on Reimer Tiemann's reaction.

(b) How will you differentiate between 1° , 2° and 3° Alcohols by Victor Meyer's method ?

1, 2

22. (a) Define F-centre.

(b) Write a short note on Cannizaro's reaction.

(c) Write a short note on Esterification.

1, 1, 1

23. (a) Compare the acidic character of Cl_3CCOOH , Cl_2CHCOOH , ClCH_2COOH and CH_3COOH .

(b) How will you prepare Aspirin ?

2, 1

24. Write short notes on the following :

(a) Raoult's law

(b) Faraday's first law of electrolysis

(c) Hofmann's bromamide degradation reaction.

1, 1, 1

25. (a) How will you differentiate between 1° , 2° and 3° amines by Hinsberg's method ?

(b) Write a short note on diazotisation reaction.

2, 1

26. (a) Give the preparation and shape of XeF_4 .

(b) PCl_5 is known, but NCl_5 is not known. Why ?

(c) Give the reason for bleaching action of Chlorine.

(d) Why is O_2 a gas whereas Sulphur is a solid ?

Or

(a) Write a short note on Inert pair effect.

(b) Draw the structure of P_4O_6 and P_4O_{10} .

(c) Draw the geometry of XeOF_4 .

(d) Why N_2 is inert at room temperature ?

1, 1, 1, 1

27. (a) Define temperature coefficient.

(b) Why transition metals form a number of alloys ?

(c) Sc^{+3} ion is colourless while Cr^{+3} ion is coloured. Explain.

(d) Why transition metals show variable oxidation states ?

1, 1, 1, 1

28. (a) How will you prepare Potassium permanganate from Pyrolusite ore ?

(b) Write a short note on Carbylamine reaction.

(c) What are Micelles ?

2, 1, 1