SUPPLEMENTARY QUESTION PAPERS—2010

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) *n*-type semiconductor
   (b) *p*-type semiconductor   1
   (c) Insulator
   (d) Rectifier.

2. Which of the following is not a colligative property ?
   (a) Elevation in boiling point
   (b) Osmotic pressure   1
   (c) Depression in freezing point
   (d) Elevation in freezing point.

3. In a dry cell, the depolarizer is :
   (a) MnO_2
   (b) Zn   1
   (c) C
   (d) NH_4Cl.

4. Rate constant of a reaction depends upon :
   (a) Temperature
   (b) Time of reaction   1
   (c) Initial Conc. of the reaction
   (d) Extent of reaction.

5. Bredig's arc method cannot be used to prepare colloidal solution of :
   (a) Pt
   (b) Fe   1
   (c) Ag
   (d) Au.

6. Heating pyrites to remove sulphur is called :
   (a) Smelting
   (b) Calcination   1
   (c) Liquidation
   (d) Roasting.

7. Draw the geometry of $XeOF_2$.   1

8. Write a short note on Mutarotation.   1

9. What is the chemical name of Vitamin A ?   1

7

10. Write a short note on Fittig reaction.   1

11. (a) Define Superconductivity.
    (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 $K_f = 5.12$ 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 inded-pendent of the initial conc. of the reactants.   2

15. (a) Drefine Electrochemical series.
    (b) Write down the mathematical expression for Freundlich adsorption isotherm.   1, 1

16. (a) Write a short note of Poling.
    (b) How will you convert Benzoic acid to Benzamide ?   1, 1

17. (a) What are Tranquillisers ?

    (b) $C_6H_5N_2^+Cl^- \xrightarrow{CuCN} A \xrightarrow{H_2O/H^+} B.$ 1, 1

18. (a) How is P.V.C. manufactured ? What are its uses ?
    (b) What are Elastomers ? How will you prepare Buna–S ?   1, 2

Or

    (a) Write two differences between Thermosetting and Thermoplastics.
    (b) How is Terylene prepared ? Give its uses.   1, 2

19. (a) Write I.U.P.A.C. name of $K_4[Fe(CN)_6]$.
    (b) Explain the gemoetry and magnetic character of $[FeF_6]^{3-}$ on the basis of V.B.T.   1, 2

20. (a) State and explain Saytzeff's rule with the help of a suitable example.
    (b) Write a short note on Hundsdieke reaction.   2, 1

21. (a) What happens when Ethyl alcohol is heated with conc. H_2SO_4 at 443 K ?
    (b) Why Phenol is more acidic than Alcohols ?
    (c) How will you convert Ethanol to Methanol ?   1, 1, 1

22. (a) Define Unit cell.
    (b) What is Wolff kishner reduction ?
    (c) Which vitamin is responsible for blood clotting ?   1, 1, 1

23. (a) Why Carboxylic acids are more acidic in comparison to Phenol ?
    (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.

(b) What is the difference between Lanthanoids and Actinoids ? (Four points).

(c) Define Coagulation.

$1, 1, 1, 1$

28. (a) What happens when $K_2Cr_2O_7$ is heated ?

(b) Draw the strucutre of $Cr_2O_7^{2-}$ ion.

(c) Draw the geometry of XeO_4.

(d) Define a transition element.

$1, 2, 1$

$1, 1, 1, 1$

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.

1. The coordination number in hcp arrangement is :

　(a) 10　　　　　　　　　　　　　(b) 5

　(c) 8　　　　　　　　　　　　　(d) 12.　　　　1

2. The molarity of pure water is :

　(a) 55.6 M　　　　　　　　　　(b) 50 M

　(c) 100 M　　　　　　　　　　(d) 18 M.　　　1

3. The units of cell constant are :

　(a) $ohm^{-1}\ cm^{-1}$　　　　　　　(b) cm

　(c) cm^{-1}　　　　　　　　　(d) $ohm^{-1}\ cm$.　　1

4. The units of specific rate constant for zero order reaction are :

　(a) s^{-1}　　　　　　　　　　(b) $mole\ L^{-1}s^{-1}$

　(c) $mole^2\ L^2s^{-1}$　　　　　　(d) None of the above.　1

5. Chromatography is based on the principle of :

　(a) Chemical adsorption　　　　(b) Physical adsorption

　(c) Hydrogen bonding　　　　　(d) None of the above.　1

6. A cuprous ore among the following is :

　(a) Malachite　　　　　　　　(b) Cuprite

　(c) Azurite　　　　　　　　　(d) Galena.　　1

7. Explain, why H_3PO_3 is deprotic ?　　　　　　　　1

8. Define fuel cell.　　　　　　　　　　　　　　　1

9. Name the Vitamin whose deficiency causes Rickets.　　1

10. Give the structural formula of D.D.T.　　　　　　1

11. (a) What is doping ?　　　　　　　　　　　　$1, 1$

(b) What are Analgesics ? Give one example.

12. What is van't Hoff factor ? What is its value for association and dissociation of solute ?　　2

13. The cell in which the following reactions occurs :

$$2Fe^{+3}_{(aq)} + 2I^{\ominus}_{(aq)} \longrightarrow 2Fe^{+2}_{(aq)} + I_2(s)$$

has $E^{\circ}_{cell} = .236V$ 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 ?
    (b) Define Gold number.   1, 1
16. (a) Define Calcination.
    (b) How will you convert Acetic acid to Acetaldehyde ?   1, 1
17. What is the difference between vitamin and hormones ?   2
18. (a) How will you prepare Nylon–6 ?

    (b) Write a short note on Vulcanisation of Rubber. $1\frac{1}{2}, 1\frac{1}{2}$

Or

    (a) How will you prepare Bakelite ?

    (b) Write a short note on Thermosetting polymers. $1\frac{1}{2}, 1\frac{1}{2}$

19. (a) Define Chelate.
    (b) With the help of V.B.T., explain the geometry and magnetic behaviour of $[Fe(CN)_6]^{4-}$ 1, 2

20. (a) What is an ambident Nucleophile ? Give one example.
    (b) Wirte short notes on the following :
       (i) Wurtz reaction
       (ii) Antacids.   1, 2
21. (a) Write a short note on Fries rearrangement.
    (b) Why Phenol is acidic in nature ? Explain.   1, 2
22. (a) Define Piezoelectricity.
    (b) Write a short note on Aldol condensation.
    (c) What is Power alcohol ?   1, 1, 1
23. (a) Compare the acidic character of $HCOOH$, CH_3COOH and C_2H_5COOH. Assign reasons for the same.
    (b) How will you convert Phenol to Benzene ?   2, 1
24. Write short notes on the following :
    (a) Henry's law
    (b) Kohlrausch's law
    (c) Gabriel phthalimide synthesis.   1, 1, 1
25. (a) Why Ethylamine is more basic than Ammonia ?
    (b) Write a short note on coupling reaction.
    (c) How will you convert Nitrobenzene to *m*-Nitrophenol ?   1, 1, 1
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.
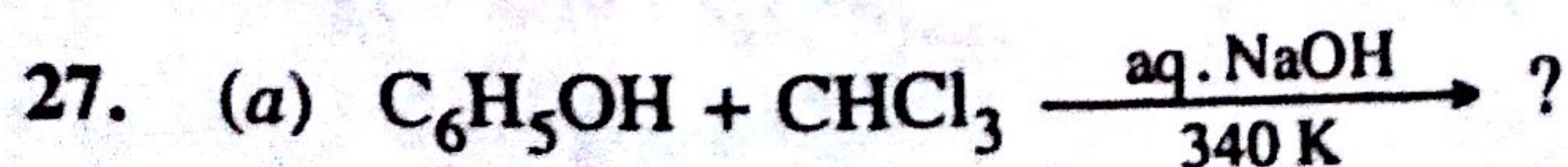   (d) What is Laughing gas ? How is it prepared ?

Or

    (a) Why Interhalogens are more reactive than Halogens ?

    (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.   1, 1, 1, 1

27. (a) $C_6H_5OH + CHCl_3 \xrightarrow[340\ K]{aq.\ NaOH}$?

(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

Maximum Marks : 60

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

Special Instructions : Same as in Series—A.

1. Coordination number of a metal which crystallises in C.C.P. lattice is :
   (a) 4
   (b) 8
   (c) 12
   (d) 6.

2. The vapour pressure of a solvent containing a non-volatile solute is :
   (a) Decreased
   (b) Increased
   (c) Does not change
   (d) None of the above.   1

3. The units of specific conductance are :
   (a) $ohm^{-1} cm^{-1}$
   (b) ohm cm
   (c) cm^{-1}
   (d) None of the above.   1

4. Rate constant for a reaction at 290 K has found to be 3.2×10^{-3}. At 300 K it will be :
   (a) 1.28×10^{-2}
   (b) 9.6×10^{-3}
   (c) 6.4×10^{-3}
   (d) 3.2×10^{-4}.   1

5. As_2S_3 solution is :
   (a) Positive colloid
   (b) Negative colloid
   (c) Neutral colloid
   (d) None of these.   1

6. Malachite is an ore of :
   (a) Iron
   (b) Aluminium
   (c) Copper
   (d) Mercury.   1

7. Why are Halogens coloured ?   1

8. Name the disease caused due to deficiency of Insulin.   1

9. Write a short note on Peptide bond.   1

10. Give the structural formula of B.H.C.   1

11. (a) What are n-type semiconductors ?
    (b) What are Antipyretics ? Give one example.   1, 1

12. Prove that relative lowering in vapour pressure is equal to the mole fraction of the solute.   2

13. Calculate the E.M.F. of the cell in which the following reaction takes place :

$$Ni_{(s)} + 2Ag_{(aq)}^+ (0.002M) \longrightarrow Ni_{(aq)}^{2+} (0.160M) \, 2^+Ag_{(s)}$$

give $E_{cell}^\circ = 1.05$ V.   2

14. Derive integrated rate equation for Zero order reaction.   2

15. (a) Define Electrochemical equivalent.
    (b) Define an Emulsion.   1, 1

16. (a) Define Roasting.
    (b) Explain HVZ reaction.   1, 1

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

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 $[Cr\,(en)_3]\,Cl_3$.
    (b) With the help of V.B.T., explain the geometry, shape and magnetic behaviour of $[Ni\,(CN)_4]^{2-}$ 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 structre 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 ? $2, 1, 1$