HIGHER SECONDARY SECOND YEAR

CHEMISTRY

MODEL QUESTION PAPER-I

TIME : 2.30 HOURS   **MARKS : 70**

Note: Draw diagrams and write equations where ever necessary.

SECTION-I

Note: **(i) Answer all the questions.**   **15 × 1 = 15**

(ii) Choose the most suitable answer from the given four alternatives.

1. Match the List -I and List -II correctly by using the code give below.

   List-I   List -II
   (A) Debroglie Relation   (1) $\Delta x \, \Delta p \geq h/4\pi$
   (B) Bohr's quantum condition   (2) $E_n = -2\pi^2 me^4 /n^2h^2$
   (C) Energy of an electron in an atom   (3) $2\pi a = n\lambda$
   (D) Uncertainty Principle   (4) $\lambda = \dfrac{h}{mv}$

   Codes: (A)   (B)   (C)   (D)
     (a)   (2)   (4)   (1)   (3)
     (b)   (4)   (3)   (2)   (1)
     (c)   (4)   (2)   (3)   (1)
     (d)   (2)   (1)   (4)   (3)

2. The lightest gas which is non-inflammable is
   (a) He   (b) H_2 (c) N_2 (d) Ar

3. Consider the following statements;
   (I) d-block elements are coloured because they absorb some energy for d-d transition.
   (II) $K_2Cr_2O_7$ is a powerful reducing agent.
   (III) Oxidation state of Ni in $Ni(CO)_4$ is Zero
   Which of the above Statement/s is/are correct?
   (a) I and III   (b) I and II   (c) I,II and III   (d) II and III

4. Ceria is used in
   (a) toys   (b) tracer bullets   (c) gas lamp material   (d) all the above

5. The time taken for 10g of initial amount of a substance to become 5g in a decay is 'X' hours and for 1g of initial amount to become 0.5g in the same decay is 'y' hours, then
   (a) x >y   (b)x <y   (c) x = y   (d) x >>y

6. Rutile is _____
   (a) TiO_2 (b) Cu_2O
   (c) MoS_2 (d) Ru

7. For the reaction $2Cl_{(g)} \rightarrow Cl_2$, the signs of ΔH and ΔS respectively are
   (a) +,-   (b) +,+   (c) -,-   (d) -,+

8. In the reversible reaction $2HI \rightleftharpoons H_2+I_2$, Kp is
   (a) greater than Kc
   (b) less than Kc
   (c) Equal to Kc
   (d) Zero

9. Consider the following potential energy diagram and Identify the correct representation.
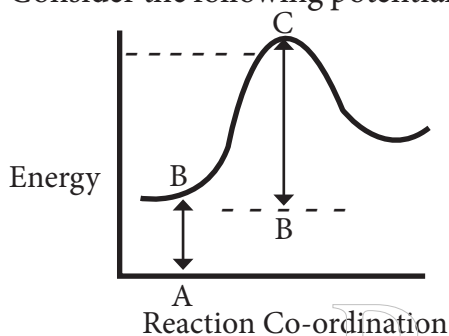
   (a) AB- Activation Energy
   (b) BC- Threshold Energy
   (c) BC - Activation Energy
   (d) AB- Threshold Energy

10. Water soluble dye is mixed with emulsion and emulsion remains colourless then the emulsion is
    (a) o/w   (b) w/o   (c) o/o   (d)   w/w

11. The Compound that reacts fastest with Lucas reagent is
    (a) Butan - 2- ol   (b) Butan - 1- ol
    (c) 2-methyl propan -1-ol   (d) 2-methyl propan -2-ol

12. According to lewis concept of acids and bases, ethers are
    (a) Neutral   (b) Acidic
    (c) Basic   (d) Amphoteric

13. When Benzaldehyde is treated with HCN followed by hydrolysis it yields.
    (a) Benzoic acid   (b) Lactic acid
    (c) Maleic acid   (d) Mandelic acid

14. Statement (I) Lower members of carboxylic acids are highly soluble in water

    Statement (II) This is due to hydrogen bonding between acids and water

    (a) Statement(I) is correct but Statement (II) is false

    (b) Statement (I) and (II) are correct and Statement (II) is the correct explanation for Statement (I)

    (c) Statement(I) is false but statement (II) is Correct

    (d) Statement (I) and (II) are correct and Statement (II) is not a correct explanation for Statement(I)

15. Which of the following answers Carbylamine Reaction.
    (a) Ethyl amine   (b) Sec- butylamine
    (c) tert-butylamine   (d) all the above

Section - II

Answer any six questions and question number 23 is Compulsory   6x2=12

16. A triprotic Oxy acid of phophorus reacts with Ag NO_3 to give a yellow precipitate. Write the suitable reaction.

17. Give the formula for the given complexes.

    (a) Tris (ethylenediammine) cobalt(III) chloride

    (b) Triamminetrinitro cobalt (III)

18. What is Q value of a nuclear reaction?

19. What is pseudofirst order reaction? Give an example.

20. State Kohlrausch's law.

21. The Standard reduction potential for the reaction $Sn^{4+} + 2e^- \rightarrow Sn^{2+}$ is +0.15v. Calculate the free energy change of the reaction.

22. Draw the cis and trans form of 2-pentene.

23. Substantiate with suitable evidence that in fructose the ketone group is adjacent to one of the terminal carbon atom.

24. Mention the characteristics of dyes.

Section - III

Answer any six questions and questions number 29 is compulsory.   6x3=18

25. The uncertainty in the position of a moving bullet of mass 10g is 10^{-5}m calculate the uncertainty in its velocity.

26. Explain the factors affecting Ionization Energy.

27. Discuss the structure of AX_3 and AX_7 interhalogen compound.

28. Show that decrease in free energy change is equal to net work done by the system.

29. Derive an expression for Kc for decomposition of PCl_5

30. Explain the cell terminologies used in Electrochemical cell.

31. When Organic compound $C_3H_8O_3$ is acetylated with acetic arhydride it gives $C_9H_{14}O_6$. How many -OH groups are there in the compound? write the structure and reaction.

32. Distinguish between diethylether and anisole.

33. Explain the mechanism of aldol condensation reaction.

Section - IV

Answer all the questions.   (5x5=25)

34. (i) Draw the Molecular Orbital diagram for Oxygen molecule and calculate its Bond order (3)

     (ii) How do electro-negativity values help to find the nature of Bond.   (2)

                                        (or)

     (i) Discuss the consequences of lanthanide contraction.   (3)

     (ii) $[Ni(CN)_4]^{2-}$ is square planar where as $[NiCl_4]^{2-}$ is tetrahedral why?   (2)

35. (i) Explain the Extraction of Gold from its ore.   (3)

     (ii) What is philosopher's wool? How is it prepared?   (2)

                                        (or)

     (i) Write notes on Schottky defect.   (3)

(ii) Define Entropy and give its unit   (2)

36.   (i) State the optimum condition to obtain maximum yield of NH_3 in Haber's process(2)

     (ii) write note on consecutive and parallel reaction with Example.   (3)

(or)

     (i) write the preparation of colloids by condensation method.   (3)

     (ii) What is the electrochemical equivalent of a substance when 150gm of it is deposited by 10 ampere of current passed for 1 sec?   (2)

37.   (i) Discuss the optical isomerism in tartaric acid.   (3)

     (ii) $\begin{matrix} CH_2 \\ \| \\ CH_2 \end{matrix} \xrightarrow{HOCl} A \xrightarrow{Ca(OH)_2} B.$ Identify A and B   (2)

(or)

     (i) How does formaldehyde react with NH_3 and $CH_3MgI/H_2O, H^+$?

     (ii) Substantiate with suitable reason that chloroacetic acid has more acid strength than acetic acid.   (2)

38.   (i) An Organic Compound (A) with molecular formula C_2H_7N dissolves in acid solution. It reacts with $NaNO_2/HCl$ to give (B) of molecular formula C_2H_6O. (B) reacts with acetic anhydride forming a pleasant smelling liquid (C) Identify A,B,C. Explain the reactions.

                                                (3)

     (ii) Convert aniline to S- diphenylthiourea   (2)

(or)

     (i) Give evidences to show glucose has a aldehyde group, 6 carbon linear chain, 5-OH groups   (3)

     (ii) How is Nylon 66 prepared.   (2)

HIGHER SECONDARY SECOND YEAR

CHEMISTRY

MODEL QUESTION PAPER-II

TIME : 2.30 HOURS   MARKS : 70

SECTION-I

Note: (i) Answer all the questions. $15 \times 1 = 15$

       (ii) Choose the most suitable answer from the given four alternatives.

1. Consider the following statements.
    (i) Alkali metals have highest ionization potential
    (ii) f- electron has the minimum screening effect
    (iii) Electron-affinity is inversely proportional to its size.
    which of the following statements is/are correct.
    (a) I and III   (b) I and II
    (c) I,II and III   (d) II and III

2. The compound with garlic odour is
    (a) P_2O_3 (b) P_2O_5
    (c) H_3PO_3 (d) H_3PO_4

3. Match the List-I and List- II correctly by using the code given below:

	List I		List II
(A)	Brass	(1)	Surgical instruments
(B)	Stellite	(2)	Skin Ointment
(C)	Lunar caustic	(3)	Condenser tube
(D)	Calamine	(4)	Hair dyes

    Codes:

	(A)	(B)	(C)	(D)
(a)	(2)	(4)	(1)	(3)
(b)	(3)	(1)	(4)	(2)
(c)	(1)	(4)	(3)	(2)
(d)	(4)	(3)	(2)	(1)

4. The Co-Ordination number of Ni(II) in $[Ni(CN)_4]^{2-}$ is
    (a) 2   (b) 4   (c) 5   (d) 6

5. The $t_{1/2}$ of a particular decay is 69.32 years. The decay constant is
    (a) 100 per year   (b) 10 per year
    (c) 0.01 per year   (d) 0.1 per year

6.   The network done by the system is given by
     (a) w-pΔv   (b) w+pΔ v
     (c) -w +pΔv   (d) -w-pΔv
7.   If ΔG for a reaction is negative, the change is
     (a) Spontaneous   (b) Non-Spontaneous
     (c) Reversible   (d) Equilibrium.

8.   The sum of the powers of the concentration terms that occur in the rate equation is called.
     (a) molecularity   (b) Order   (c) rate   (d)   rate constant

9.   Haze is an example of

     (a) Solid dispersed in gas   (b) gas dispersed in liquid

     (c) gas dispersed in gas   (d) solid dispersed in liquid

10. Three juice samples A,B,C have the p^H value as shown. Then the correct order of their $[H^+]$ ion concentration is

              JUICE   JUICE   JUICE
               (A)   (B)   (C)
              $P^H=1$ $P^H=2$ $P^H=3$

     (a) A>B>C   (b) A=B=C
     (c) A<B<C   (d) A>B=C

11. When phenol is distilled with Zinc dust it give
     (a) Benzaldehyde   (b) Benzoic acid
     (c) Toluene   (d) Benzene

12. Diethylether and methyl n-propyl ether are
     (a) functional isomers   (b) optical isomers
     (c) Metamers   (d) Tautomers

13. From which of the following, tertiary butyl alcohol is obtained by the action of methyl magnesium iodide?
     (a) HCHO   (b) CH_3 CHO   (c) CH_3 $COCH_3$ (d) CO_2

14. Ethane can be prepared from sodiumacetate by
     (a) Clemmenson reduction   (b) Hydrogenation
     (c) decarboxylation   (d) Kolbe's electrolysis

15. Statement (I): Trimethylamine is less basic than dimethylamine.
     Statement(II): Trimethylamine has steric over crowding of methyl group than dimethylanine.
   (a) Statement (I) is correct but statement (II) is false

(b) Statement (I) and (II) are correct and Statement (II) is the correct explanation of Statement (I)

(c) Statement (I) is false but Statement (II) is correct.

(d) Statement (I) and (II) are correct and Statement (II) is not correct explanation of Statement(I).

Section - II

Answer any six questions and question number 20 is compulsory. $6 \times 2 = 12$

16. He_2 molecule is not formed, why?

17.   Lead pipes are not used in supplying drinking water why?

18.   Identify the central metal ion and ligand in the given complex $[Cr\,(en)_3]cl_3$

19.   State Bragg's law.

20.   Consider the potential energy diagrams of reaction I and II predict which reaction will go faster and why?
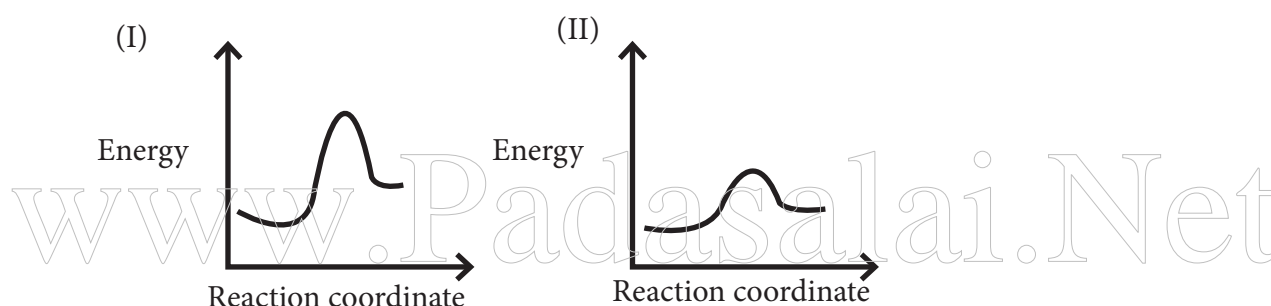
21.   Define the following terms anode and cathode in an electrochemical cell.

22.   Reason out cis isomer is less stable than trans isomer.

23.   What is isoelectric point?
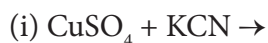
24.   What are analgesis? Give an example.

Section - III

Answer any six questions and question No 25 is compulsory. $6 \times 3 = 18$

25.   Arrange the following as directed.
      (a) Increasing order of size: $O^{2-}, F^-, Mg^{2+}, Na^+$
      (b) Increasing order of first Ionization potential: Li, Be, B
      (c) Increasing order of size: Fe^{2+}, Fe, Fe^{3+}

26.   Complete following:
      (i) $Zn + HNO_3$ (dil) $\rightarrow$

(i) $CuSO_4 + KCN \rightarrow$

27. Distinguish between Lanthanides and Actinides.

28. Explain the nature of glass.

29. Write notes on ultrafiltration.

30. Calculate the P^H of 0.1m CH_3COOH Solution. Dissociation constant of acetic acid is 1.8×10^{-5} M.

31. How does ethyleneglycol react with.

   (a) con. $H_3 PO_4$

   (b) anhydrous Zinc chloride.

32. Give the methods of preparation of anisole.

33. Explain the mechanism of claisen schmidt reaction.

Section - IV

Answer all questions   5 X 5 = 25

34. (i) Derive De-Broglie relation.   (3)

   (ii) Electron affinity of noble gases are zero why?   (2)

(or)

   (i) How are noble gases separated from air by Ramsay Raleigh method.

   (ii) Comparing $La(OH)_3$ and $Lu(OH)_3$, which is more basic and why?.   (2)

35. (i) Explain the extraction of silver from its ore.   (3)

   (ii) Account for the following "transition elements form complexes".   (2)

(or)

   (i) Write the postulates of Werner's theory   (3)

   (ii) Define Q value of a nuclear reaction.

36. (i) write the properties of ionic crystal.   (2)

(ii) Explain the characteristic of entropy.   (3)

(or)

(i) Explain the effect of temperatures on the following equilibrium reaction.   (2)

$N_2O_{4\,(g)} \rightleftharpoons 2NO_{2\,(g)}$ $\Delta H = +59.0$ KJ/mo1

(ii) Show that the time taken for 99.9% completion of first order reaction is 10 times its half life period.   (3)

37.   (i) Discuss the Quinonoid theory of indicators.   (3)

(i) Which of the following reaction will occur and why?   (2)

$Zn + 2H^+$ (dil. H_2SO_4)$\rightarrow Zn^{2+} + H_2$

$Cu + 2H^+$(dil. H_2SO_4)$\rightarrow Cu^{2+} + H_2$

(or)

(i) Distinguish between Racemic and meso form.   (3)

(ii) How will you convert

(a) Chlorobenzene to phenol

(b) Phenol to Benzene.   (3)

38.   (i) Explain the reaction of lactic acid with
(a) dil H_2SO_4 (b) PCl_5 (3)
(ii) Explain Gabriela pthalimide synthesis.   (3)
(or)
(i) Explain briefly the characteristics of rocket propellant.   (3)
(ii) Give any two functions of lipids in biological system.   (2)

HIGHER SECONDARY SECOND YEAR

CHEMISTRY

MODEL QUESTION PAPER-III

TIME : 2.30 HOURS   **MARKS : 70**

Note: **Draw diagrams and write equations where ever necessary.**

SECTION-I

Note: **(i) Answer all the questions.**   **15 × 1 = 15**

       (ii) Choose the most suitable answer from the given four alternatives.

1. H_3PO_3 is a powerful reducing agent because it has.

 (a) O-H bond   (b) P-O bond   (c) O- P bond   (d) P-H bond

2. Paramagnetism is the property of

 (a) Paired electrons   (b) Completely filled electronic subshells.

 (c) Unpaired electrons   (d) Completely Vacant electronic subshells.

3. Statement (I): The size of M^{3+} ions decreases as we move through the lanthanides.

 Statement (II): One 4f electron show perfect shielding by another in the same subshell.

 (a) Statement (1) is correct but Statement (II) is false.

 (b) Statement (I) and (II) are correct and Statement (II) is the correct explanation

 of Statement (I)

 (c) Statement (I) is false but Statement (II) is correct

 (d) Statement (I) and (II) are correct and Statement (II) is not correct explanation of Statement(I)

4. The geometry of complex ion $[Fe(CN)_6]^{4-}$ is

 (a) tetrahedral   (b) Square planar

 (c) Octahedral   (d) Triangular

5. Fill in the blank

 $$_{11}Na^{23} + \xrightarrow{\quad ? \quad} {}_{12}Mg^{23} + {}_{0}n^1$$

 (a) $\propto$ (b) d   (c) p   (d) n

6. The enthalpy of vapourization of a liquid is 30 KJmol^{-1} and entropy of vapouriztion is 75 J mol^{-1} K^{-1} its boiling point is

    (a)600K   (b) 500K   (c) 400K   (d) 300K

7. In the reversible reaction 2HI $\rightleftharpoons$ H$_2$+I$_2$, Kp is

    (a) greater than Kc   (b) less than Kc

    (c) Equal to Kc   (d) Zero

8. NH$_4$OH is a weak base because

    (a) it has low vapour pressure.

    (b) it is only partially ionized.

    (c) it is completely ionized.

    (d) it has low density.

9. Consider the following Statements.

    (I) Order of a reaction may be zero, fractional or integral values.

    (II) Order of a reaction can be determined theoretically.

    (III) Higher order reactions are not common.

    Which of the above Statement/s is/are not correct?

    (a) I and III   (b) I and II

    (c) I,II and III   (d) II and III

10. Match the List-I and List-II correctly by using the code given below.

List-I	List-II
(A) Haber's process	(1) Cupric chloride
(B) Contact Process	(2) Ferric Oxide
(C) Deacon's process	(3) Finely divided iron
(D) Bosch's process	(4) platinized asbestos

Codes;   (A)   (B)   (C)   (D)

        (a)   (3)   (4)   (2)   (1)

        (b)   (3)   (4)   (1)   (2)

        (c)   (4)   (3)   (1)   (2)

        (d)   (2)   (1)   (4)   (3)

11. A compound that undergoes bromination easily is

    (a) Benzoic acid

    (b) Benzene

    (c) phenol

    (d) toluene

12. Diethylether can be decomposed with

    (a) HI   (b) KMnO$_4$

    (c) NaOH   (d) H$_2$O

13. Benzophenone does not form additional product with sodium bisulphite because.

    (a) Steric hindrance of phenyl groups

    (b) phenyl groups reduce the activity

    (c) phenyl groups increase the activity.

    (d) Both a and b

14. The oil of winter green is

    (a) methyl acetate

    (b) methyl oxalate

    (c) methyl salicylate

    (d) methyl formate

15. Which one of the following is a tertiary amine

    (a) Ethyl amine

    (b) Dimethyl amine

    (c) tert- butyl amine

    (d) trimethyl amine

Section -II

Answer any six questions and question number 21 is compulsory   **6x2=12**

16. State Heisenberg Uncertainty Principle.

17. Calculate the electro-negativity values of fluorine on Mulliken's scale given that (Ionization potential) F= 17.4 ev/atom, (Electron affinity) F=3.62 ev/atom.

18. What is the action of heat on copper sulphate crystals?

19. Write a note on the assignment of atoms per unit cell in fcc.

20. What is common ion effect ? Give example.

21. Determine the standard emf of the cell and predict its feasibility.

    $$Ag, Ag^+ \left|\left| H^+, H_{2(g)} \right. \text{l atm, pt}$$
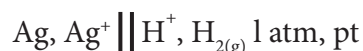
    The Standard reduction potential of Ag^+, Ag is 0.80v

22. How do you distinguish the three isomers of di-substituted Benzene using DPM(Dipole moment value)?

23. Why sucrose is a non reducing sugar?
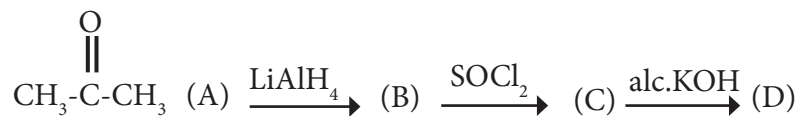
24. What are food preservatives? Give example.

Section - III

Answer any six questions and question number 31 is compulsory.   **6x3=18**

25. Mention the uses of Helium.

26. How Lanthinides are extracted from Monazite sand?

27. Explain coordination and ionization isomerism with suitable examples.

28. Derive a general relationship between Kp and Kc for a equilibrium reaction.

29. Distinguish between simple and complex reaction.

30. Explain electro osmosis.

31. Identify (B),(C) and (D)

$$CH_3\text{-}\overset{\overset{\textstyle O}{\|}}{C}\text{-}CH_3 \ (A) \xrightarrow{\text{LiAlH}_4} (B) \xrightarrow{\text{SOCl}_2} (C) \xrightarrow{\text{alc.KOH}} (D)$$

32. Give the mechanism involved in the esterification of a carboxylic acid with alcohol.

33. How can the following conversion be effected?

    (a) Nitrobenzene to anisole

    (b) Aniline to Iodobenzene.

Section -IV

Answer all the questions   **5x5=25**

34. (i) Draw the MO diagram of N_2 molecule and predict its Bond order.   (3)

    (ii) How Ionization energy is affected by atomic size and nuclear charge.   (3)

    (or)

    (i) Discuss the chemistry behind Holme's signal.   (2)

    (ii) Explain the extraction of zinc from its ore.   (3)

35. (i) Write the common and maximum Oxidation state of lanthanides.

    (ii) Mention the function of haemoglobin.

    (or)

    (i) What is Spallation reaction?   (2)

    (ii) Give the uses of radio active isotopes in medicine.   (3)

36. (i) Explain Bragg's Spectrometer method.   (3)

    (ii) State Lechatelier's principle.   (2)

(or)

(i) State various Statements of II law of thermodynamics.   (3)

(ii) The initial rate of a first Order reaction is 5.2 x 10^{-6} mol lit^{-1} S^{-1} at 298k. When the initial concentration of reactant is 2.6x10^{-3}mol. lit^{-1} calculate the first order rate constant of the reaction at same temperature.   (2)

37. (i) Derive Henderson equation.   (3)

(ii) Using IUPAC convention write the cell diagram for zinc-copper cell.   (2)

(or)

(i) Describe the conformations of cyclohexanol, comment on their stability.   (3)

(ii) Give the possible Ether isomers for molecular formula $C_4H_{10}O$.   (2)

38. (i) An organic compound (A) of molecular formula C_6H_6O gives violet colour with neutral Fecl$_3$ (A) gives maximum of two isomers (B) and (C) when an alkaline solution of (A) is refluxed with CCl$_4$ (A) also reacts $C_6H_5N_2Cl$ to give compound (D) which is a red orange dye. Identify (A),(B),(C) and (D). Explain with suitable chemical reaction.   (5)

(or)

(i) How is the Structure of glucose elucidated.   (3)

(ii) What are chromophores? Give examples.   (2)