DESIGN OF THE QUESTION PAPER
CHEMISTRY CLASS - XII

Time : Three Hours **Max. Marks : 70**

The weightage of the distribution of marks over different dimensions of the question paper shall be as follows:

A. Weightage to content/subject units

Unit	Title	Marks
1.	Solid state	4
2.	Solutions	5
3.	Electrochemistry	5
4.	Chemical Kinetics	5
5.	Surface Chemistry	4
6.	General principles and process of Isolation of elements	3
7.	p-Block Elements	8
8.	d-and f-Block Elements	5
9.	Coordination Compounds	3
10.	Haloalkanes and Haloarenes	4
11.	Alcohols, Phenols and Ethers	4
12.	Aldehydes, Ketones and Carboxylic acids	6
13.	Organic Compounds containing Nitrogen	4
14.	Biomolecules	4
15.	Polymers	3
16.	Chemistry in Everyday life	3
	Total	**70**

B. Weightage to form of questions

S.No.	Form of Questions	Marks for each question	No. of questions	Total Marks
1.	Long Anwer Type (LA)	5	3	15
2.	Short Answer (SAI)	3	9	27
3.	Short Answer (SAII)	2	10	20
4.	Very Short Answer (VSA)	1	08	08
	Total	**-**	**30**	**70**

C. Scheme of Options

1. There will be no overall option.
2. Internal choices (either/or type) in five questions has been given in questions testing higher mental abilities in the following types of questions :-
   (i) One in two marks questions.
   (ii) One in three marks questions.
   (iii) All the three in five marks questions.

D. Guidelines for Units 10-13 of syllabus.

These units include questions on:

- Nomenclature : 2 marks
- Reasoning : 6 marks
- Distinguishing between compounds : 2 marks
- Name reactions : 2 marks
- Reaction Mechanism : 2 marks
- Word problems (conversions) covering Properties and reactions of functional groups : 5 marks

E. Numericals :

Weightage of 8 -10 marks in total has been assigned to numericals.

F. Weightage to difficulty level of questions

S.No.	Estimated difficulty level	Percentage
1.	Easy	15
2.	Average	70
3.	Difficult	15

A weightage of 20% has been assigned to questions which test higher order thinking skills of students.

BLUE-PRINT I
Class XII
CHEMISTRY SAMPLE PAPER

S.NO.	UNIT	VSA (1 Mark)	SA I (2 Marks)	SAII (3 Marks)	LA (5 Marks)	TOTAL
1.	Soild State	-	4 (2)	-	-	4 (2)
2.	Solutions	-	2(1)	3(1)	-	5(2)
3.	Electrochemistry	-	2(1)	3 (1)	-	5(2)
4.	Chemical Kinetics				5 (1)	5(1)
5.	Surface Chemistry	1(1)		3 (1)	-	4(2)
6.	General principles and processes of Isolation of Elements	-	-	3(1)		3(1)
7.	p -Block Elements	-	-	3 (1)	5 (1)	8 (2)
8.	d- and f-Block Elements	-	2(1)	3(1)	-	5(2)
9.	Coordination Compounds	1(1)	2 (1)	-	-	3(2)
10.	Haloalkanes and Haloarenes	-	4(2)	-	-	4(2)
11.	Alcohols, Phenols and Ethers	1 (1)	-	3 (1)	-	4 (2)
12.	Aldehydes, Ketones and Carboxylic Acids	1 (1)	-	-	5 (1)	6 (2)
13.	Organic Compounds Containing Nitrogen	1 (1)	-	3 (1)	-	4 (2)
14.	Biomolecules	1 (1)	-	3 (1)	-	4 (2)
15.	Polymers	1 (1)	2 (1)	-	-	3 (2)
16.	Chemistry in Everyday Life	1 (1)	2 (1)	-	-	3 (2)
	Total	**8(8)**	**20(10)**	**27(9)**	**15(3)**	**70(30)**

CHEMISTRY SAMPLE PAPER - I
CLASS - XII

Time : Three Hours **Max. Marks : 70**

General Instructions

1. All questions are compulsory.
2. Question nos. 1 to 8 are very short answer questions and carry 1 mark each.
3. Question nos. 9 to 18 are short answer questions and carry 2 marks each.
4. Question nos. 19 to 27 are also short answer questions and carry 3 marks each
5. Question nos. 28 to 30 are long answer questions and carry 5 marks each
6. Use log tables if necessary, use of calculators is not allowed.

(1) Why is ferric chloride preferred over potassium chloride in case of a cut leading to bleeding? 1

(2) Why does a tetrahedral complex of the type $[MA_2B_2]$ not show geometrical isomerism? 1

(3) How do you account for the miscibility of ethoxyethane with water. 1

(4) Give the IUPAC name of the organic compound 1

$$(CH_3)_2\ C = CH - \underset{\underset{O}{\|}}{C} - CH_3$$

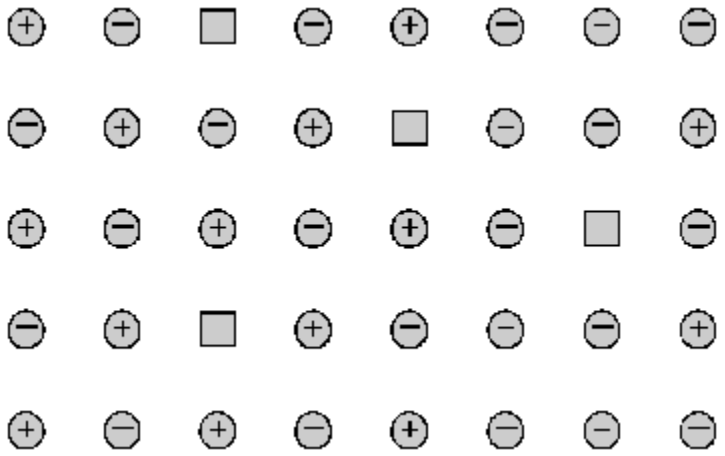
(5) Name the monomers of nylon 2 or nylon 6 ploymer. 1

(6) Give one example of an artificial sweetener used by the diabetic patients. 1

(7) Direct nitration of aniline is not carried out. Explain why? 1

(8) What type of linkage holds together the monomers of D.N.A.? 1

(9) Examine the illustration of a portion of the defective crystal given below and answer the following questions.



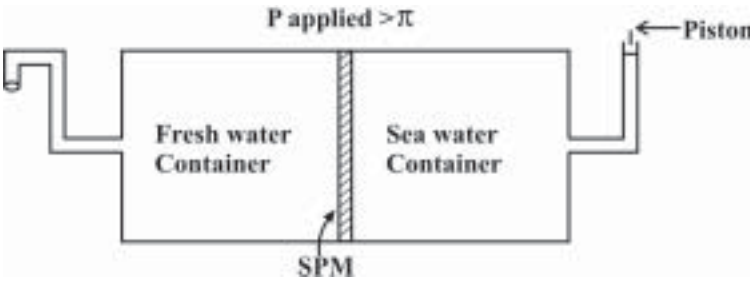
(i) What are these type of vacancy defects called?
(ii) How is the density of a crystal affected by these defects?
(iii) Name one ionic compound which can show this type of defect in the crystalline state
(iv) How is the stoichiometry of the compound affected? 2

10. Analysis shows that a metal oxide has the empirical formula $M_{0.96}O_{1.00}$. Calculate the percentage of M^{2+} and M^{3+} ions in this crystal? 2

OR

In an ionic compound the anion (N^-) form cubic close type of packing. While the cation (M^+) ions occupy one third of the tetrahedral voids. Deduce the empirical formula of the compound and the coordination number of (M^+) ions. 2

11. Given below is the sketch of a plant for carrying out a process.



(i) Name the process occurring in the above plant.
(ii) To which container does the net flow of solvent take place?
(iii) Name one SPM which can be used in this plant.
(iv) Give one practical use of the plant. 2

12. Write the chemical equations for all the steps involved in the rusting of iron. Give any one method to prevent rusting of iron. 2

13. A metal ion M^{n+} having d^4 valence electronic configuration combines with three didentate ligands to form a complex compound. Assuming $\Delta_0 > P$

(i) draw the diagram showing d orbital splitting during this complex formation.
(ii) write the electronic configuration of the valence electrons of the metal M^{n+} ion in terms of t_{2g} and e_g.
(iii) what type of hybridisation will M^{n+} ion have?
(iv) name the type of isomerism exhibited by this complex. 2

14. A mixed oxide of iron and chromium $FeOCr_2O_3$ is fused with sodium carbonate in the presence of air to form a yellow coloured compound (A). On acidification the compound (A) forms an orange coloured compound (B), which is a strong oxidising agent. Identify
(i) the compounds (A) and (B)
(ii) write balanced chemical equation for each step 2

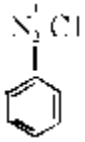
15. An optically active compound having molecular formula $C_7H_{15}Br$ reacts with aqueous KOH to give a racemic mixture of products. Write the mechanism involved for this reaction. 2

16. Write the formula of main product formed in the following chemical reactions.

(i) $(CH_3)_2$ CH-C1 $\xrightarrow[\text{dry ether}]{Na}$

(ii) $CH_3Br + AgF \xrightarrow{\Delta}$

(iii) $CH_3CH_2Br + NaI \xrightarrow{\text{dry acetone}}$

(iv)  $\xrightarrow{Cu/HCl}$ 2

17. Differentiate the following pair of polymers based on the property mentioned against each.
(i) Novolac and Bakelite (structure)
(ii) Buna-s and Terylene (intermolecular forces of attraction) 2

18. In order to wash clothes with water containing dissolved calcium hydrogencarbonate, which cleaning agent will you prefer and why: soaps or synthetic detergents? Give one advantage of soaps over synthetic detergents. 2

19. Heptance and octane form an ideal solution at 373 K, The vapour pressures of the pure liquids at this terperature are 105.2 KPa and 46.8 KPa respectively. If the solution contains 25g of heptance and 28.5g of octane, calculate
(i) vapour pressure exerted by heptane
(ii) vapour pressure exerted by solution
(iii) mole fraction of octane in the vapour phase. 3

20. The following chemical reaction is occurring in an electrochemical cell.

$Mg(s) + 2\,Ag^+ (0.0001\ M) \longrightarrow Mg^{2+} (0.10M) + 2\,Ag(s)$

The E^0 electrode values are

$Mg^{2+} / Mg = -2.36\ V$

$Ag^+ / Ag = 0.81\ V$

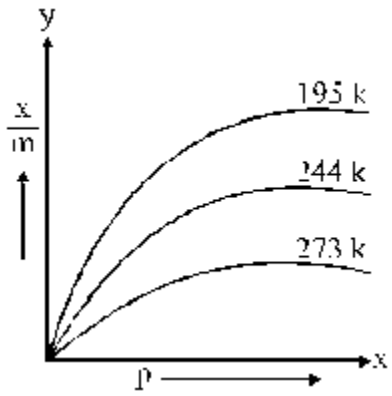
For this cell calculate / write

(a) (i) E^O value for the electrode $2Ag^+ / 2Ag$
(ii) Standard cell potential E^O_{cell}.

(b) Cell potential $(E)_{cell}$

(c) (i) Symbolic representation of the above cell.
(ii) Will the above cell reaction be spontaneous? 3

21. Consider the adsorption isotherms given below and interpret the variation in the extent of adsorption (x/m) when

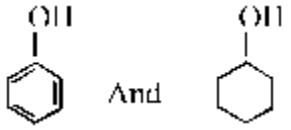


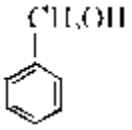
(a) (i) temperature increases at constant pressure
(ii) pressure increases at constant temperature
(b) Name the catalyst and the promoter used in Haber's process for manufacture of ammonia. 3

22. Account for the following facts
(a) the reduction of a metal oxide is easier if the metal formed is in liquid state at the temperature of reducation.
(b) the reduction of Cr_2O_3 with AI is thermodynamically feasible, yet it does not occur at room temperature.
(c) pine oil is used in froth floatation method. 3

23. Explain the following facts
(a) transition metals act as catalysts.
(b) chromium group elements have the highest melting points in their respective series.
(c) transition metals form coloured complexes. 3

24. (a) Give a chemical test to distinguish between the following pairs of compounds.

(i) 

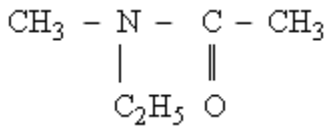
(ii) $CH_3 - \underset{\underset{OH}{|}}{CH} - CH_3$ and 

(b) Why is phenol more acidic than ethanol? 3

25. Account for the following observations
(i) among the halogens F_2 is the strongest oxidising agent?
(ii) fluorine exhibits only – 1 oxidation state whereas other halogens exhibit higher positive oxidation states also.
(iii) acidity of oxo acid of chlorine is

$$HOCl < HOClO < HOClO_2 < HOClO_3$$ 3

26. (a) Give plausible explanation for each of the following.
(i) The presence of a base is needed in the ammonolysis of alkyl halides.
(ii) Aromatic primary amines cannot be prepared by Gabriel phthaliminde syntheses.
(b) Write the IUPAC name of



3

27. An optically active compound having molecular formula $C_6H_{12}O_6$ is found in two isomeric forms (A) and (B) in nature. When (A) and (B) are dissolved in water they show the following equilibrium.

(A) $\rightleftharpoons$ Equilibrium mixture $\rightleftharpoons$ (B)

$[\alpha]_D = 111^0$ 52.2^0 19.2^0

(i) What are such isomers called?
(ii) Can they be called enantiomers? Justify your answer.
(iii) Draw the cyclic structure of isomer (A) 3

OR

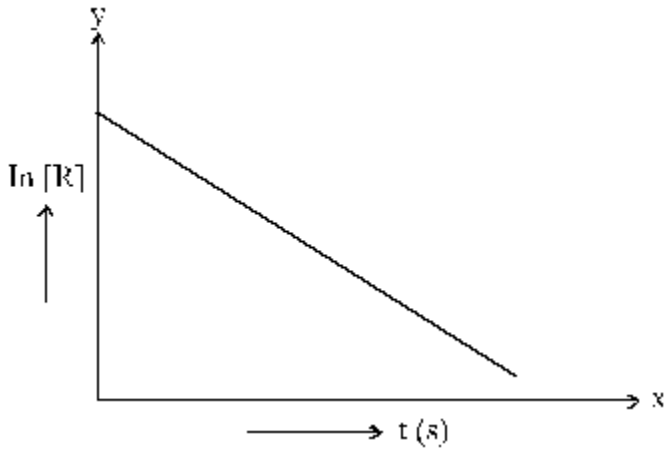
An optically active amino acid (A) can exist in three forms depending on the pH of the medium. If the molecular formula of (A) is $C_3H_7NO_2$ write

(i) structure of compound (A) in aqueous medium. What are such ions called?

(ii) In which medium will the cationic form of compound (A) exist?

(iii) In alkaline medium, towards which electrode will the compound (A) migrate in electric field? 3

28. For a certain chemical reaction variation in the concentration in [R] vs. time (s) plot is given below.



For this reaction write / draw

(i) what is the order of the reactions?

(ii) what are the units of rate constant k?

(iii) give the relationship between k and t ½ (half life period)

(iv) what does the slope of the above line indicate?

(v) draw the plot log $[R]_0$ / [R] vs time t(s) 5

OR

For a certain chemical reaction

$A + 2B \rightarrow 2C + D$

The experimentally obtained information is tabulated below.

Experiment	$[A]_0$	$[B]_0$	Initial rate of reaction
1	0.30	0.30	0.096
2	0.60	0.30	0.384
3	0.30	0.60	0.192
4	0.60	0.60	0.768

For this reaction

(i) derive the order of reaction w.r.t. both the reactants A and B.

(ii) write the rate law.

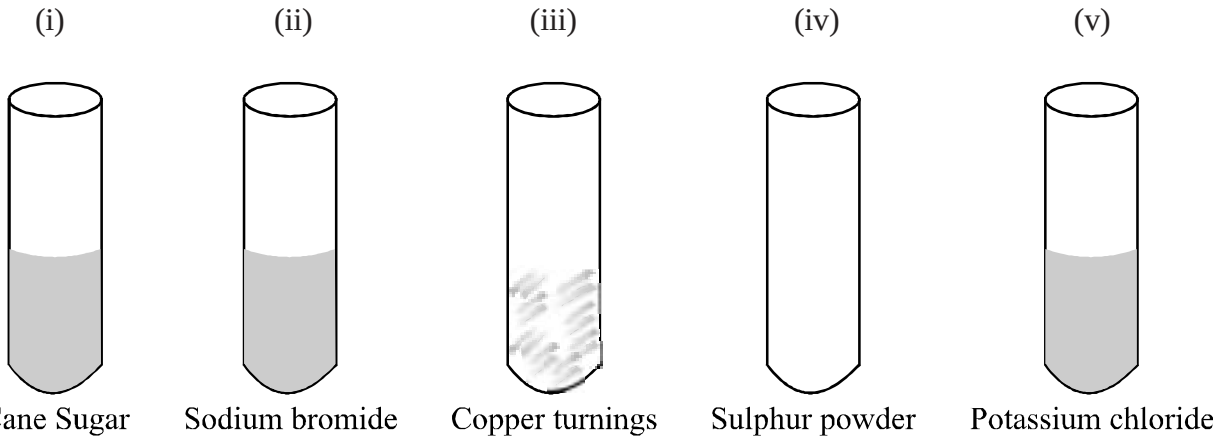
(iii) calculate the value of rate constant k

(iv) write the expression for the rate of reaction in terms of A and C. 5

29. A translucent white waxy solid (A) on heating in an inert atmosphere is converted to its allotropic form (B). Allotrope (A) on reaction with very dilute aqueous KOH liberates a highly poisonous gas (C) having rotten fish smell. With excess of chlorine forms (D) which hydrolyses to compound (E). Identify compounds (A) to (E). 5

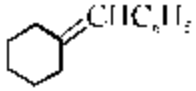
OR

Concentrated sulphuric acid is added followed by heating to each of the following test tubes labelled (i) to (v)



Identify in which of the above test tube the following change will be observed. Support your answer with the help of a chemical equation.
(a) formation of black substance
(b) evolution of brown gas
(c) evolution of colour less gas
(d) formation of brown substance which on dilution becomes blue.
(e) disappearance of yellow powder along with evolution of colourless gas. 5

30. Identify the unknown organic compounds (A) to (E) in the following series of chemical reactions.

(i)  $\xrightarrow[2.\ Zn/H_2O]{1.\ O_3}$ (A) + (B)

(ii) (A) + (B) $\xrightarrow{dil\ NaOH}$ (C) + H_2O

(iii) (C) $\xrightarrow[2.\ Zn/H_2O]{1.\ O_3}$ (A) + (D)

(iv) (D) $\xrightarrow[\Delta]{H_2 / Ni}$ (E) 5

OR

An organic compound (A) having molecular formula $C_9H_{10}O$ forms an orange red precipitate (B) with 2, 4 - DNP reagent. Compound (A) gives a yellow precipitate (C) when heated in the presence of iodine and NaOH along with a colourless compound (D). (A) does not reduce Tollen's reagent or Fehling's solution nor does it decolorise bromine water. On drastic oxidation of (A) with chromic acid, a corboxylic acid (E) of molecular formula $C_7H_6O_2$ is formed. Deduce the structures of the organic compounds (A) to (E). 5