CLASS-XII
CHEMISTRY

Time: 3 Hrs   **Theory: 70 Marks**
                                                   Practical: 25 Marks
                                                   INA : 5 Marks
                                                   Total: 100 Marks

STRUCTURE OF QUESTION PAPER (THEORY)

1. There will be one theory paper comprising of 21 questions. All questions are compulsory.

2. Question no. 1 will have 20 sub parts and each part will carry 1 mark. All questions are compulsory. This question will be of multiple choice, numerical, true false and comprehensive.

3. Question no. 2 to 15 will be of two marks each. There will be internal choice in four questions. All questions are compulsory.

4. Question no.16 to 19 will be of three marks each. There will be internal choice in two questions. All questions are compulsory

5. Question no.20 to 21 will be of five marks each. There will be internal choice in them.

6. Distribution of marks over different dimensions of the paper will be as follows.

LEARNING OUTCOMES	PERCENTAGE OF MARKS
KNOWLEDGE	36%
UNDERSTANDING	44%
APPLICATION	20%
Total	100%

7. Use of un-programmable calculator is allowed. The log tables can be used.

8.Total weightage of numericals will be around 20%

UNITWISE DISTRIBUTION OF MARKS

SR.NO	UNIT	TOTAL MARK
1	Solutions	07
2	Electrochemistry	08
3	Chemical kinetics	08
4	d &f-block elements	07
5	Coordination Compounds	07
6	Haloalkanes & Haloarenes	06
7	Alcohols, Phenols & Ethers	06
8	Aldehydes, Ketones & Carboxylic acids	07
9	Organic compounds containing Nitrogen	07
10	Biomolecules	07
	TOTAL QUESTIONS &TOTAL MARKS	**T.Q=21 T.M=70**

Total Question in paper =21

S No	UNIT	1 MARK	2 MARK	3 MARK	5 MARK	TOTAL MARK
1	Solutions	2T+1N (M.C.Q.)	1N (internal choice question) +1T			07
2	Electro chemistry	1T (M.C.Q.)	1N +1T	1N (internal choice question)		8
3	Chemical kinetics	1T (M.C.Q.)	1N (internal choice question) +1T	1N		8
4	d &f block Elements	-	1T		1T (internal choice question)	7
5	Coordination compounds	1T(M.C.Q.) +2 T/F	1T+1T			7
6	Haloalkanes & Haloarenes	1T (M.C.Q.)	-		1T (internal choice question)	6
7	Alcohols Phenols & Ethers	1T T/F	1T(internal choice question	1T (internal choice question)		6
8	Aldehydes Ketones & carboxylic acids	3T (M.C.Q.) +2 T/F	1T (internal choice question)			7
9	Organic compounds containing Nitrogen	-	1T+1T	1T		7
10	Biomolecules	5 (comprehension)	1T			7
		20 sub parts Total marks =20	Total Question =14 Total marks =28	Total question =4 Total Marks =12	T.Q.=2 T,M.=10	

Note: In above SCHEMATIC DISTRIBUTION OF MARKS
T=Theory, N=Numerical, M.C.Q. = Multiple choice questions,
T/F= True and False

Total Question in paper =21 questions

INSTRUCTIONS FOR PAPER SETTER
Note:
1. There will be one theory paper comprising of 21 questions. All questions are compulsory.

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3. Question no. 2 to 15 will be of two marks each. There will be internal choice in Four questions. All questions are compulsory.

4. Question no.16 to 19 will be of three marks each. There will be internal choice in two questions. All questions are compulsory.

5. Question no.20 to 21 will be of five marks each. There will be internal choice in them.

6. Questions paper should cover all the syllabus.

7. No question or topic should be repeated in the question paper.

8. Questions in the paper can be asked only from mentioned PSEB syllabus. Questions from any topic which is not mentioned in the syllabus will be considered as out of syllabus question.

9. All sets must be of equal standard and difficulty level questions.

10. At the end of each question, paper setter must write detailed distribution of marks of each sub-question.

11. Vague, many possible answer questions, confusing answer question etc type of question will not be asked in the paper.

12. Language used should be clearly understood & specific.

13. Time and length limit of paper should be kept in mind while setting the paper.

Time : 3 Hours **Class 12th** **Subject- Chemistry** **Max. Marks: 70**

Question 1 contains 20 parts of 1 mark each. Question 2 to 15 are of 2 marks each. Question 16 to 19 are of 3 marks each. Question 20 and 21 are of 5 marks each. All questions are compulsory.

Q1. **Choose the correct answer**

(i) An unripe mango placed in a concentrated salt solution to prepare pickle, shrivels because-

    a. It gains water due to osmosis.
    b. It loses water due to osmosis.
    c. It gains water due to reverse osmosis.
    d. It loses water due to reverse osmosis.

(ii) In comparison to a 0.01 M solution of glucose, the depression in freezing point of a 0.01 M $MgCl_2$ solution is?

    a. The same   b. About twice   c. About three times   d. About six times

(iii) a-Isotonic solution have

    a. same boiling point   b. same vapour Pressure

    c. Same melting point   d. Same osmotic Pressure

(iv) What is the final oxidation state of manganese after the electrochemical reactions in a Dry Cell?

    a. +4   b. +3   c. +2   d. +1

(v) If the unit of specific rate constant (k) for a certain gaseous reaction is $atm^{-2} s^{-1}$, then, the order of the reaction is-

a. Zero order   b. First order   c. Second order   d. Third order

(vi) The coordination number of platinum in $[PtCl_2(C_5H_5N)(NH_3)]$ is-

    a. 3   b. 4   c. 5   d. 6

(vii) The reaction of toluene with Cl_2 in the presence of $FeCl_3$ gives predominantly-

a. benzoyl chloride   b. benzyl chloride

c. m-chlorotoluene   d. o- and p- chlorotoluene

(viii) Which of the following is most reactive towards nucleophilic addition reactions?

a. CH_3COCH_3 b. CH_3CHO c. $CH_3COC_2H_5$ d. HCHO

(ix) Which of the following reagents cannot be used to distinguish between pentanal and 2-pentanone?

a. Tollen's reagent   b. Fehling's solution

c. Br_2 in CCl_4 d. I_2 in NaOH

(x) Which of these is most acidic?

a. CF_3COOH b. CCl_3COOH c. CBr_3COOH d. CH_3COOH

True/False

(xi) The compounds $[Co\ Cl_2\ (NH_3)_4]\ NO_2$ and $[Co\ Cl\ (NO_2)\ (NH_3)_4]\ Cl$ show coordination isomerism.

(xii) The crystal field splitting Δ_o, depends on the field produced by the ligand and charge on the metal ion.

(xiii) The boiling point of ethers are higher than those of isomeric alcohols.

(xiv) Benzaldehyde cannot undergo Cannizzaro reaction.

(xv) The red brown precipitate of Aldehydes with Fehling's solution is due to the formation of Cu_2O

Read the passage and answer the questions (xvi) to (xx)-
Carbohydrates are optically active polyhydroxy aldehydes and ketones or those compounds which on hydrolysis give such compounds are also carbohydrates. The carbohydrates which are not hydrolysed are called monosaccharides. Monosaccharides with aldehydic group are called Aldoses and those with free Ketonic group are called Ketoses. Carbohydrates are optically active. Number of optical isomers= 2^n , where n= number of asymmetric carbons. Carbohydrates are mainly synthesised by plants during photosynthesis. The monosaccharides

exist in the form of cyclic structures. In cyclization, the -OH group combines with the aldehydic or ketonic group. As a result, cyclic structures of five or six membered rings containing one oxygen are formed e.g. Glucose, Fructose, Galactose.

(xvi) What are carbohydrates?

(xvii) What are Aldoses?

(xviii) Define Monosaccharides.

(xix) Name a monosaccharide.

(xx) Glucose molecule has four asymmetric carbons. Find the total number of optical isomers in glucose.

2 Marks Questions

Q2. The boiling point of a solution containing 1.5g of dichlorobenzene in 100g of benzene was higher by 0.268 K. Calculate the molar mass ofdichlorobenzene. (K_b for benzene is 2.62 degree/molal)

ORCalculate the number of molecules of Oxallic acid ($H_2C_2O_4.2H_2O$)in 100 mL of 0.2 N oxalic acid solution.

Q3. Shazia removed the outer hard shells of two different eggs. She then placed one egg in pure water and the other egg in a saturated solution of sucrose. What change is she likely to observe in the eggs after few hours? Explain it.   (1+1)

Q4. Conductivity of a 0.00241 M acetic acid is 7.896 x 10^{-5} S cm^{-1}. Calculate its molar conductivity. If Λ^o for acetic acid is 390.5 S cm^2 mol^{-1}, what is its degree of dissociation (α)?   (1+1)

Q5. Write down the functions of a salt bridge in an electrochemical cell.

Q6. The rate constant of a reaction at 500 K and 700 K are 0.02 s^{-1} and 0.07 s^{-1} respectively. Calculate the value of E_a (Activation energy).

ORConsider the reaction: 4 NO_2 (g) + O_2 (g) → 2 N_2O_5 (g)

In an experiment, the rate of disappearance of O_2 is 0.24 mol L^{-1} s^{-1}. Calculate (i) the rate of disappearance of NO_2 and (ii) the rate of formation of N_2O_5.   (1+1)

Q7. Define: (i) Half life of a reaction (ii) Pseudo first order reaction   (1+1)

Q8. Transition metals form alloys with other transition metals. Explain why?

Q9. Write down the IUPAC names of-

(i)   Na [PtBrCl(ONO)(NH$_3$)]   (ii) [Ag(NH$_3$)$_2$] [Ag(CN)$_2$] (1+1)

Q10. (i) Define coordination number   (1)

(ii) What is the hybridisation and structure of [Ni(CN)$_4$]$^{2-}$ (1)

Q11. How will you convert phenol to salicylaldehyde?

ORExplain the mechanism of acidic dehydration of ethyl alcohol to form ethene.

Q12. Write down the following reactions-

(i) Aldol condensation   (ii) HVZ reaction   (1+1)

ORExplain why carboxylic acids exist as associated molecules?

Q13. Alkylamines are more basic than ammonia. Explain why?

Q14. Write down the following reactions-

   (i)   Carbylamine reaction   (1)
   (ii)   Reaction between benzene diazonium chloride and phenol in basic
           medium   (1)

Q15. Differentiate between fibrous and globular proteins.

3 Marks Questions

Q16. Three electrolytic cells A, B and C containing electrolytes of zinc sulphate, silver nitrate and copper sulphate respectively were connected in series. A steady current of 1.5 amp was passed through them until 1.45 g of silver were deposited at the cathode of cell B.

   (i)   How long did the current flow?   (1)
   (ii)   What weight of copper and zinc get deposited?   (2)

(Atomic masses of Zinc, Silver and Copper respectively are 65.3 g, 108 g and 63.5 g)

ORThe emf of the cell Zn (s) / Zn^{2+} (0.1 M) // Cd^{2+} (M$_1$) / Cd (s) has been found to be 0.3305 V at 298 K. Calculate the value of M$_1$. Given thatE^o Zn^{2+}/Zn = -0.76V and E^o Cd^{2+}/Cd = -0.40 V

Q17. Starting from 100 g of a radioactive substance, 2.5 g was left after 5 years. If its radioactive decay follows first order kinetics, calculate-

   (i)   Rate constant for the decay of the radioactive substance   (1)

(ii)   The amount of substance left after one year   (1)

(iii)   The time required for half of the substance to decay.   (1)

Q18. Complete the following reactions:

(i) $CH_3OH + I_2 + NaOH$ $\xrightarrow{\Delta}$ (1)

(ii) CH_3CH_2OH $\xrightarrow{Al_2O_3\ 523K}$ (1)

(iii) $C_2H_5ONa + C_2H_5Br$ $\xrightarrow{\Delta}$ (1)

OR   What is Lucas reagent? Write down Lucas test for distinction between primary, secondary and tertiary alcohol.   (1+2)

Q19. (i) Lower aliphatic amines are soluble in water. Why?   (1)

(ii)   Write down a test to distinguish between aromatic primary amines from aliphatic primary amines.   (2)

5 Marks Questions

Q20. (i) Which Element of 3d transition series has lowest enthalpy of atomisation and why?   (1+1)

(ii) Transition elements or their compounds act as catalysts. Explain why. (3)

OR (i) Define Lanthanoid contraction.   (1)

(ii) Why do Ce and Tb show +4 oxidation state?   (2)

(iii)   Write down two similarities between Lanthanoids and Actinoids.   (2)

Q 21. (i) Write down the following reactions:-

a. Sandmeyer reaction
b. Hoffmann ammonolysis reaction
c. Wurtz Fittig reaction
d. Finkelstein Reaction
e. Friedel craft's Alkylation   (5)

OR   (i) Explain the mechanism of Substitution Nucleophilic bimolecular reactions of Haloalkanes with a suitable example.   (3)

(ii) Explain giving two reasons why Haloarenes are less reactive towards Nucleophilic substitution reactions than Haloalkanes.   (2)