BLUE-PRINT II

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	1 (1)	-	3 (1)	-	4 (2)
2.	Solutions	1 (1)	4(2)	-	-	5(3)
3.	Electrochemistry	-	-	-	5 (1)	5(1)
4.	Chemical Kinetics	-	2 (1)	3 (1)	-	5(2)
5.	Surface Chemistry	1(1)	-	3 (1)	-	4(2)
6.	General principles and processes of Isolation of Elements	1 (1)	2 (1)	-	-	3(2)
7.	p -Block Elements	2(2)	-	6 (2)	-	8 (4)
8.	d- and f-Block Elements	-	-	-	5 (1)	5(1)
9.	Coordination Compounds	-	-	3 (1)	-	3(1)
10.	Haloalkanes and Haloarenes	1 (1)	-	3 (1)	-	4(2)
11.	Alcohols, Phenols and Ethers	-	4 (2)	-	-	4 (2)
12.	Aldehydes, Ketones and Carboxylic Acids	1 (1)	-	-	5 (1)	6 (2)
13.	Organic Compounds Containing Nitrogen	-	4 (2)	-	-	4 (2)
14.	Biomolecules	-	4 (2)	-	-	4 (2)
15.	Polymers	-	-	3 (1)	-	3 (1)
16.	Chemistry in Everyday Life	-	-	3 (1)	-	3 (1)
	Total	**8(8)**	**20(10)**	**27(9)**	**15(3)**	**70(30)**

CHEMISTRY SAMPLE PAPER - II
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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 one mark each.
3. Question nos. 9 to 18 are short answer questions and carry two marks each.
4. Question nos. 19 to 27 are also short answer questions and carry three marks each.
5. Question nos. 28 to 30 are long answer questions and carry five marks each.
6. Use log tables if necessary. Calculators are not allowed.

1. Give IUPAC name of the following organic compound

$CH_3CH = C - CH - CH_3$

$\quad\quad\quad\quad\;\; |\quad\;\; |$

$\quad\quad\quad\; CH_3 \;\; Br$ 1

2. What are the physical states of dispersed phase and dispersion medium of froth? 1

3. Write the balanced equation for complete hydrolysis of XeF_6 1

4. Write the structure of :
4 - methyl pent - 3 - en - 2 - one 1

5. A compound contains two types of atoms - X and Y. It crytallises in a cubic lattice with atom X at the corners of the unit cell and atoms Y at the body centres. What is the simplest possible formula of this compound? 1

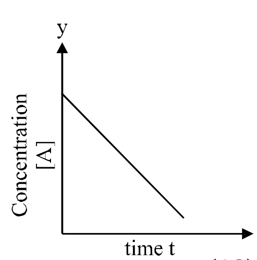
6. What is the Van't Hoff factor for a compound which undergoes tetramerization in an organic solvent? 1

7. An ore sample of galena (PbS) is contaminated with zinc blende (ZnS). Name one chemical which can be used to concentrate galena selectively by froth floatation method. 1

8. Predict the shape of CIF_3 on the basis of VSEPR theory. 1

9. Ethylene glycol (molar mass = 62 g mol^{-1}) is a common automobile antifreeze. Calculate the freezing point of a solution containing 12.4g of this substance in 100 g of water. Would it be advisable to keep this substance in the car radiator during summer?
Given : K_f for water = 1.86K kg/mol
K_b for water = 0.512K kg/mol 2

10. Consider the reaction $A \xrightarrow{k} P$. The change in concentration of A with time is shown in the following plot:



(i) Predict the order of the reaction.
(ii) Derive the expression for the time required for the completion of the reaction.

11. Free energies of formation $(\Delta_f G)$ of MgO(s) and CO(g) at 1273 K and 2273K are given below

$\Delta_f G$ (MgO(s)) = - 941 kJ/mol at 1273K

$\Delta_f G$ (MgO(s)) = - 314 kJ/mol at 2273K

$\Delta_f G$ (CO(g)) = - 439 kJ/mol at 1273K

$\Delta_f G$ (CO(g)) = - 628 kJ/mol at 2273K

On the basis of above data, predict the temperature at which carbon can be used as a reducing agent for MgO(s). 2

12. Name the two components of starch. How do they differ from each other structurally? 2

13. (a) What changes occur in the nature of egg proteins on boiling?
(b) Name the type of bonding which stabilizes α-helix structure in proteins. 2

14. Describe the mechanism of the formation of diethyl ether from ethanol in the presence of concentrated sulphuric acid. 2

15. Complete and name the following reactions:

(a) $RNH_2 + CHCl_3 + 3KOH \rightarrow$

(b) $RCONH_2 + Br_2 + 4NaOH \rightarrow$ 2

16. Give chemical tests to distinguish between compounds in each of the following pairs:
(i) Phenol and Benzyl alcohol
(ii) Butane-2 -ol and 2 Methyl propan - 2- ol 2

17. Predict, giving reasons, the order of basicity of the following compounds in (i) gaseous phase and (ii) in aqueous solutions $(CH_3)_3N$, $(CH_3)_2NH$, CH_3NH_2, NH_3 2

OR

Account for the following:
(a) Aniline does not undergo Friedel Crafts alkylation
(b) Although - NH_2 group is an ortho and para-directing group, nitration of aniline gives alongwith ortho & para-derivatives meta-derivative also.

18. Give reasons for the following :
(a) At higher altitudes, people suffer from a disease called anoxia. In this disease, they become weak and cannot think clearly.
(b) When mercuric iodide is added to an aqueous solution of KI, the freezing point is raised. 2

19. An element X with an atomic mass of 60g/mol has density of 6.23g cm^{-3}. If the edge length of its cubic unit cell is 400 pm, identify the type of cubic unit cell. Calculate the radius of an atom of this element. 3

20. Write names of monomer/s of the following polymers and classify them as addition or condensation polymers.
(a) Teflon
(b) Bakelite
(c) Natural Rubber 3

21. (a) Give the IUPAC name of :
$[Cr\,Cl_2\,(H_2O)_4]\,Cl$
(b) Give the number of unpaired electrons in the following complex ions:
$[Fe\,F_6]^{4-}$ and $[Fe\,(CN)_6]^{4-}$
(c) Name the isomerism exhibited by the following pair of coordination compounds:
$[Co(NH_3)_5\,Br]\,SO_4$ and $[Co(NH_3)_5\,SO_4]Br$
Give one chemical test to distinguish between these two compounds. 3

22. Explain the following observations:
(a) Ferric hydroxide sol gets coagulated on addition of sodium chloride solution
(b) Cottrell's smoke precipitator is fitted at the mouth of the chimney used in factories.
(c) Physical adsorption is multilayered, while chemisorption is monolayered. 3

23. Account for the following:
(a) Chlorine water has both oxidizing and bleaching properties.
(b) H_3PO_2 and H_3PO_3 act as as good reducing agents while H_3PO_4 does not.
(c) On addition of ozone gas to KI solution, violet vapours are obtained. 3

24. The decomposition of N_2O_5(g) is a first order reaction with a rate constant of 5×10^{-4} sec^{-1} at 45^o C. i.e. $2N_2O_5$ (g) $\rightarrow 4NO_2$ (g) + O_2 (g). If initial concentration of N_2O_5 is 0.25M, calculate its concentration after 2 min. Also calculate half life for decomposition of N_2O_5 (g).

(b) For an elementary reaction
$2A + B \rightarrow 3C$
the rate of appearance of C at time 't' is 1.3×10^{-4} mol l^{-1} s^{-1}.
Calculate at this time
(i) rate of the reaction.
(ii) Rate of disappearance of A. 3

25. (a) Which of the following two compounds would react faster by S_N2 path way : 1 - bromobutane or 2 - bromobutane and why.?
(b) Allyl chloride is more reactive than n - propyl chloride towards nucleophilic substitution reaction. Explain why?
(c) Haloalkanes react with KCN to give alkyl cyanide as main product while with AgCN they form isocyanide as main product. Give reason. 3

26. Give reasons for the following:
(a) CN^- ion is known but CP^- ion is not known.
(b) NO_2 demerises to form N_2O_4
(c) ICl is more reactive than I_2 3

OR

An element 'A' exists as a yellow solid in standard state. It forms a volatile hydride 'B' which is a foul smelling gas and is extensively used in qualitative analysis of salts. When treated with oxygen, 'B' forms an oxide 'C' which is a colourless, pungent smelling gas. This gas when passed through acidified $KMnO_4$ solution, decolourises it. 'C' gets oxidized to another oxide 'D' in the presence of a heterogeneous catalyst. Identify A,B,C,D, and also give the chemical equation of reaction of 'C' with acidified $KMnO_4$ solution and for conversion of 'C' to 'D'.

27. Account for the following:
(a) Aspirin drug helps in the prevention of heart attack.
(b) Diabetic patients are advised to take artificial sweetners instead of natural sweetners.
(c) Detergents are non-biodegradable while soaps are biodegradable. 3

28. (a) An organic compound 'A' with molecular formula $C_5H_8O_2$ is reduced to n-pentane on treatment with Zn-Hg/HCI. 'A' forms a dioxime with hydroxylamine and gives a positive lodoform test and Tollen's test. Identify the compound A and deduce its structure.
(b) Write the chemical equations for the following conversions:
(not more than 2 steps)
(i) Ethyl benzene to benzene
(ii) Acetaldehyde to butane - 1, 3 - diol
(iii) Acetone to propene 5

OR

(a) An organic compound 'A' with molecular formula C_8H_8O gives positive DNP and iodoform tests. It does not reduce Tollen's or fehling's reagent and does not decolourise bromine water also. On oxidation with chromic acid (H_2CrO_4), it gives a carboxylic acid (B) with molecular formula $C_7H_6O_2$. Deduce the structures of A and B.

(b) Complete the following reactions by identifying A, B and C

(i) $A + H_2(g) \xrightarrow{Pd/BaSO_4} (CH_3)_2\ CH-CHO$

(ii)
$$\begin{array}{c} \quad\; CH_3 \\ \quad\;\, | \\ CH_3 - C - C - CH_3 + NaOI \rightarrow B + C \\ \quad\;\; | \quad \| \\ \quad\; CH_3 \;\; O \end{array}$$

29. (a) Calculate the equilibrium constant for the reaction

$$Cd^{2+}(aq) + Zn(s) \rightarrow Zn^{2+}(aq) + Cd(s)$$
$$\text{If} \quad E^0 Cd^{2+}/Cd = -0.403\,V$$
$$E^0 Zn^{2+}/Zn = -0.763\,V$$

(b) When a current of 0.75A is passed through a $CuSO_4$ solution for 25 min, 0.369 g of copper is deposited at the cathode. Calculate the atomic mass of copper.

(c) Tarnished silver contains Ag_2S. Can this tarnish be removed by placing tarnished silver ware in an aluminium pan containing an inert electrolytic solution such as NaCl. The standard electrode potential for half reaction :

$Ag_2S_{(s)} + 2e \rightarrow 2Ag(s) + S^{2-}$ is $-0.71V$

and for $Al^{3+} + 3e \rightarrow Al(s)$ is $-1.66V$ 5

OR

(a) Calculate the standard free energy change for the following reaction at 25^0C

$$Au(s) + Ca^{2+}(aq, 1M) \rightarrow Au^{3+}(aq, 1M) + Ca(s)$$
$$E^0 Au^{3+}|Au = +1.50V$$
$$E^0 Ca^{2+}|Ca = -2.87V$$

Predict whether the reaction will be spontaneous or not at 25^0C. Which of the above two half cells will act as an oxidizing agent and which one will be a reducing agent?

(b) The conductivity of 0.001M acetic acid is 4×10^{-5}S / cm. Calculate the dissociation constant of acetic acid, if Λ_m^o for acetic acid is 390. 5S cm^2/mol.

30. (a) A blackish brown coloured solid 'A' when fused with alkali metal hydroxides in presence of air, produces a dark green coloured compound 'B', which on electrolytic oxidation in alkaline medium gives a dark purple coloured compound C. Identify A, B and C and write the reactions involved.

(b) What happens when an acidic solution of the green compound (B) is allowed to stand for some time? Give the equation involved. What is this type of reaction called? (3 + 2 = 5)

OR

Give reasons for the following:

(a) Transition metals have high enthalpies of atomization.

(b) Among the lanthanoids, Ce(III) is easily oxidised to Ce(IV).

(c) $Fe^{3+}|Fe^{2+}$ redox couple has less positive electrode potential than $Mn^{3+}|Mn^{2+}$ couple.

(d) Copper (I) has d^{10} configuration, while copper (II) has d^9 configuration, still copper (II) is more stable in aqueous solution than copper (I).

(e) The second and third transition series elements have almost similar atomic radii. 5