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.

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BLUE-PRINT III
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	2 (2)	2 (1)	-	-	4 (3)
2.	Solutions	-	-	-	5(1)	5(1)
3.	Electrochemistry	-	2(1)	3 (1)		5(2)
4.	Chemical Kinetics	2 (2)	-	3 (1)	-	5(3)
5.	Surface Chemistry	-	4 (2)	-	-	4(2)
6.	General principles and processes of Isolation of Elements	-	-	3 (1)	-	3(1)
7.	p -Block Elements	1(1)	4 (2)	3 (1)	-	8 (3)
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	1 (1)	-	3 (1)	-	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 - III
CLASS - XII

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

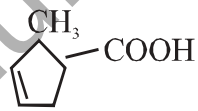
General Instructions

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. Name the type of point defect that occurs in a crystal of zinc sulphide. 1

2. The decomposition reaction of ammonia gas on platinum surface has a rate constant $k = 2.5 \times 10^{-4}$ mol L^{-1} S^{-1}. What is the order of the reaction? 1

3. Give the IUPAC name of the following compound 1



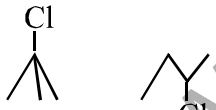
4. How many octahedral voids are there in l mole of a compound having cubic close packed structure? 1

5. What is the molecularity of the reaction? 1

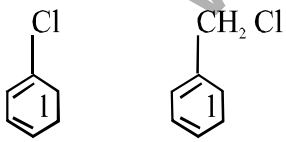
$$Cl \rightarrow \frac{1}{2}Cl_2(g)$$

6. In each of the following pairs of organic compounds, identify the compound which will undergo SN^1 reaction faster? 1

(a)



(b)

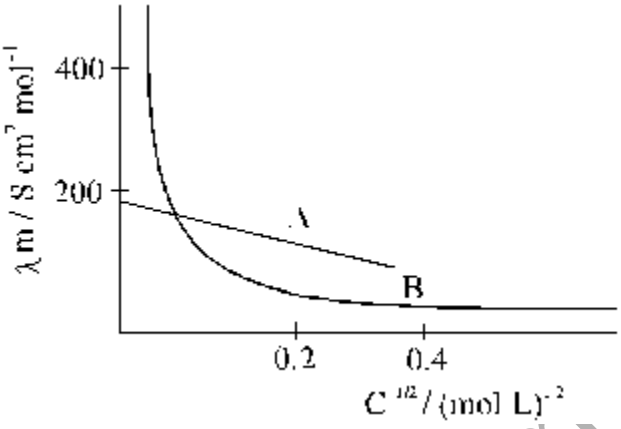


7. In the ring test for identification of nitrate ion, what is the formula of the compound responsible for the brown ring formed at the interface of two liquids? 1

8. Except for vitamin B_{12}, all other vitamins of group B, should be supplied regularly in diet. Why? 1

9. An element E crystallizes in body centred cubic structure. If the edge length of the cell is 1.469×10^{-10} m and the density is 19.3 g cm^{-3}, calculate the atomic mass of this element. Also calculate the radius of an atom of this element. 2

10. The following curve is obtained when molar conductivity λ_m (y-axis) is plotted against the square root of concentration $c^{1/2}$ (x - axis) for two electrolytes A and B.

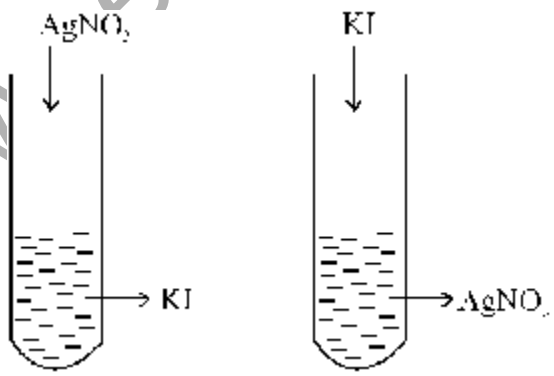


(a) What can you say about the nature of the two electrolytes A and B?
(b) How do you account for the increase in molar conductivity λm for the electrolytes A and B on dilution? 2

11 (a) Adsorption of a gas on the surface of solid is generally accompanied by a decrease in entropy. Still it is a spontaneaons process. Explain.

(b) How does an increase in temperature affect both physical as well as chemical adsorption? 2

12. A colloidal solution of AgI is prepared by two different methods shown below:-



(A) (B)

(i) What is the charge of AgI colloidal particles in the two test tubes (A) and (B)?
(ii) Give reasons for the origin of charge. 2

13. (a) What is the covalence of nitrogen in N_2O_5?
(b) Explain why both N and Bi do not form pentahalides while phosphorus does. 2

OR

When conc. H_2SO_4 was added into an unknown salt present in a test tube, a brown gas (A) was evolved. This gas intensified when copper turnings were also added into this test-tube. On cooling, the gas (A) changed into a colourless gas (B).

(a) Identify the gases A and B.

(b) Write the equations for the reactions involved.

14. Which is a stronger acid - Phenol or Cresol? Explain. 2

15. (a) How can you convert an amide into an amine having one carbon less - than the starting compound?

(b) Name the reaction.

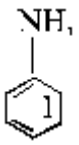
(c) Give the IUPAC name and struclure of the amine obtained by the above method if the amide is 3- chlorobut anamide. 2

16. (a) Why does chlorine water lose its yellow colour on standing?

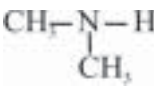
(b) What happens when Cl_2 reacts with cold dilute solution of sodium hydroxide? Write equation only. 2

17. How will you distinguish between:

(a)



and CH_3NH_2

(b)  and $(CH_3)_3N$ 2

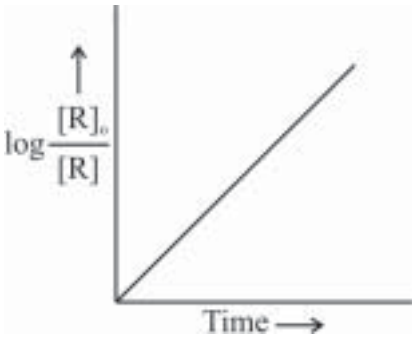
18. Give mechanism of preparation of ethoxyethanle from ethanol. 2

19. (a) A current of 1.50 amp was passed through an electrolytic cell containing $AgNO_3$ solution with inert electrodes. The weight of Ag deposited was 1.50g. How long did the current flow?

(b) Write the reactions taking place at the anode and cathode in the above cell.

(c) Give reactions taking place at the two electrodoes if these are made up of Ag. 3

20. (i)



Answer the following questions on the basis of the above curve for a first order reaction $A \rightarrow P$:-

(a) What is the relation between slope of this line and rate constant? (1)

(b) Calculate the rate constant of the above reaction if the slope is $2 \times 10^{-4}\ S^1$

(ii) Derive the relationship between half life of a first order reaction and its rate constant. 3

21. (a) Name the method used for refining of
(i) Nickel
(ii) Zirconium
(b) The extraction of Au by leaching with NaCN involves both oxidation and reduction. Justify giving equations. 3

22. Write down the equations for hydrolysis of X F_4 and XeF_6. Which of these two reactions is a Redox reaction? 3

23. Give the electonic configuration of the
(a) d- orbitals of Ti in $[Ti(H_2O)_6]^{3+}$ ion in an octahedral crystal field.
(b) Why is this complex coloured? Explain on the basis of distribution of electrons in the d- orbitals.
(c) How does the colour change on heating $[Ti(H_2O)_6]^{3+}$ ion? 3

24. (a) Which will have a higher boiling point?
1 - Chloro enthane or - 2 methyl -2- chlorobutane
Give reasons
(b) p - nitro chlorobenzene undergoes nucleophilic substitution faster than chlorobenzene. Explain giving the resonating structures as well. 3

25. Despite having an aldehyde group
(a) Glucose does not give 2,4 - DNP test. What does this indicate?
(b) Draw the Haworth structure of $\alpha - D - (+) - Glucopyranose$.
(c) What is the significance of D and (+) here? 3

26. (a) What is the role of Benzoyl peroxide in polymerisation of ethene?
(b) What are LDPE and HDPE? How are they prepared? 3

27. Classify synthetic detergents giving an example in each case.

OR

What are antihistamines? Give two examples. Explain how they act on the human body. 3

28. (a) Derive the relationship between relative lowering of vapour pressure and mole fraction of the volatile liquid.
(b) (i) Benzoic acid completely dimerises in benzene. What will be the vapour pressure of a solution containing 61g of benzoic acid per 500g benzene when the vapour pressure of pure benzene at the temperature of experiment is 66.6 torr?

(ii) What would have been the vapour pressure in the absence of dimerisation?
(iii) Derive a relationship between mole fraction and vapour pressure of a component of an ideal solution in the liquid phase and vapour phase. 5

OR

28. (a) Which aqueous solution has higher concentration -1 molar or 1 molal solution of the same solule? Give reason.
(b) 0.5g KCl was dissolved in 100g water and the solution originally at 20^0C, froze at – 0.24^0C. Calculate the percentage ionization of salt. K_f per 1000g of water = 1.86K.

29. (a) Out of Ag_2SO_4, CuF_2, MgF_2 and CuCl, which compound will be coloured and why?
(b) Explain :
(i) CrO_4^{2-} is a strong oxidizing agent while MnO_4^{2-} is not.
(ii) Z_r and H_f have identical sizes.
(iii) The lowest oxidation state of manganese is basic while the highest is acidic.
(iv) Mn (II) shows maximum paramagnetic character amongst the divalent ions of the first transition series. 5

OR

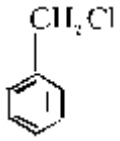
(a) In the titration of $FeSO_4$ with $KMnO_4$ in the acidic medium, why is dil H_2SO_4 used instead of dil HCl?
(b) Give reasons:
(i) Among transition metals, the highest oxidation state is exhibited in oxoanins of a metal.
(ii) Ce^{4+} is used as an oxidizing agent in volumetric analysis.
(iii) Transition metals form a number of interstitial compounds.
(iv) Zn^{2+} salts are white while Cu^{2+} salts are blue.

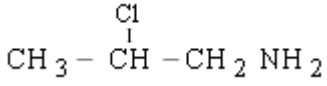
30. An unknown Aldehyde 'A' on reacting with alkali gives a β -hydroxy –aldehyde, which losses water to form an unsaturated aldehyde, 2- butenal. Another aldehyde 'B' undergoes disproportionation reaction in the presence of conc. alkali to form products C and D. C is an arylalcohol with the formula C_7H_8O.
(i) Identify A and B.
(ii) Write the sequence of reactions involved.
(iii) Name the product, when 'B' reacts with Zinc amalgum and hydrochloric acid. 5

OR

A compound 'X' (C_2H_4O) on oxidation gives 'Y' ($C_2H_4O_2$). 'X' undergoes haloform reaction. On treatment with HCN 'X' forms a product 'Z' which on hydrolysis gives 2- hydroxy propanoic acid.
(i) Write down structures of 'X' and 'Y'.
(ii) Name the product when 'X' reacts with dil NaOH.
(iii) Write down the equations for the reactions involved.

MARKING SCHEME
CHEMISTRY SAMPLE PAPER - III
CLASS - XII

Q. No.	Value Points	Marks
1.	Frenkel defect	1
2.	Zero order reaction	1
3.	2 - Methylcyclopent -3- enecarboxylic acid	1
4.	1 Mole or 6.02×10^{23}	1
5.	One	1
6.	(a) 	½
	(b) 	½
7.	$[Fe(H_2O)_5NO]^{2+}$	1
8.	Except for B_{12}, no other vitamin of group B can be stored in the body and is readily excreted in urine.	1
9.	$P = \frac{ZM}{a^3 N_O}$ g cm^{-3} $a = 1.469 \times 10^{-10}$ m	
	$= 146.9 \times 10^{-10}$ cm	
	$M = \frac{Pa^3 N_0}{Z}$ g	
	$= \frac{19.3 \times (146.9 \times 10^{-10})^3 \times 6.02 \times 10^{23}}{2}$	½
	$= 19.3 \times 3.17 \times 3.01 = 183.5$ g	½
	$r = \frac{\sqrt{3}}{4}$ $a = \frac{\sqrt{3}}{4} \times 1.469 \times 10^{-8}$ cm	½
	$r = 0.634 \times 10^{-8}$ cm	½

Q. No.	Value Points	Marks
10.	(a) A is a strong electrolyte	½
	B is a weak electrolyte	½
	(b) Molar conductivity of a strong electrolyte increases with dilution as ionic mobility increases.	½
	In a weak electrolyte molar conductivity increases steeply with dilution as degree of dissociation increases.	½
11.	(a) According to the equation $\Delta G = \Delta H - T\Delta S$ for a process to be spentoneous ΔG should be negative. Even though ΔS is negative here, ΔG is negative because reaction is highly exothermic i.e. ΔH is negative.	1
	(b) On increasing temperature desorption occurs in physical adsorption.	½
	Chemical adsorption increases first and then decreases with increase in temprature.	½
12.	Test tube (A) has negative charge.	½
	(i) Test tube (B) positive charge on the colloidal particles.	½
	(ii) In test, tube (A) $I^{\ominus}$ is adsorbed on AgI. [or AgI / I^- is formed]	½
	In test tube (B) $Ag^{\oplus}$ is adsorbed on AgI. [or AgI / Ag^+ is formed]	½
13.	(a) 4	1
	(b) unlike P, N has no vacant d-orbitals in its valence shell.	½
	Bi prefers +3 oxidation state due to inert pair effect.	½
	OR	
	(a) A is NO_2 gas	½
	B is N_2O_4 gas	½
	$MNO_3 + H_2SO_4 \rightarrow MHSO_4 + HNO_3$	
	$Cu + 4HNO_3 \rightarrow Cu(NO_3)_2 + 2H_2O + 2NO_2$	½
	$2NO \rightleftharpoons N_2O_4$	½
	Brown gas — Colourless gas	
14.	Phenol is a stronger acid, Methyl group due to +I effect concentrates the negative charge on the oxygen, thus destabilizing the intermidiate phenoxide ion in cresol.	1
15.	(a) By reacting it with NaOH and Br_2.	½
	(b) Hoffmann bromamide degradation reaction.	½
	(c) 	½
	2-Chloropropanamine	½

Q. No.	Value Points	Marks

16. (a) Chlorine water looses its yellow colour on standing due to the formation of HCl and HClO.

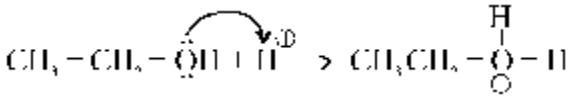
$Cl_2 + H_2O = HCl + HClO$ 1

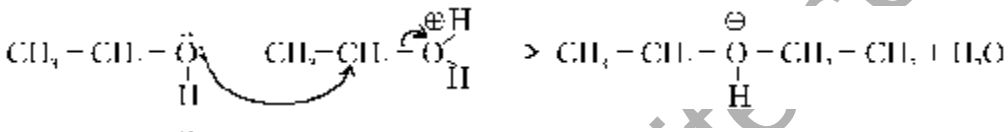
(b) $Cl_2 + 2NaoH \rightarrow NaCl + NaClO + H_2O$ 1

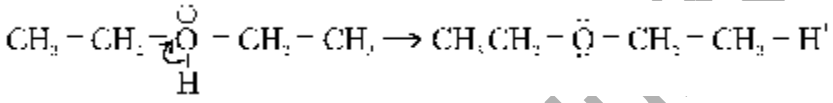
(cold & dilute)

17. (a) By reacting with $NaNO_2$ and HCl or HNO_2 at temperature 0-5^{0}C.
Aniline will form diazonium salt
CH_3NH_2 will form methanol and bubbles of N_2 gas will come out of the solution. 1

(b) By using Hinsberg's reagent. $C_6H_5SO_2Cl$ 1
$(CH_3)_3N$ will not react.
$(CH_3)_2NH$ will form a product insoluble in alkali.

18. (i)  ½

(ii)  1

(iii)  ½

19. (a) According to Faraday's first law, charge required to deposit 1.50 g

$$Ag = \frac{96500}{108} \times 1.50 = 1331.70 \text{ Coulombs}$$

$$\text{Time taken} = \frac{1331.70}{1.50} = 887.15 \text{sec}$$ 1

(b) Inert electrodes

Anode $2H_2O(l) \rightarrow O_2(g) + 4H^+(aq) + 4e^-$

Cathode $Ag^+(aq) + e^- \rightarrow Ag(s)$ 1

(c) Ag electrodes

Anode : $Ag(s) \rightarrow Ag^+(aq) + e^-$

Cathode : $Ag^+(aq) + e^- \rightarrow Ag(s)$ 1

20. (a) $\text{Slope} = \frac{k}{2.303}$ ½

(b) As slope = $2 \times 10^{-4} S^{-1}$
$\therefore$ $k = 2.303 \times 2 \times 10^{-4} S^{-1}$
$k = 4.606 \times 10^{-4} S^{-1}$ 1

Q. No.	Value Points	Marks

(c) For a first order reaction

$$t=\frac{2.303}{K}\log\frac{[R]_0}{[R]}$$ ½

$$\text{At } t_{1/2}, [R]=\frac{[R]_0}{2}$$

$$t_{1/2}=\frac{2.303}{K}\log\frac{[R]_o}{\frac{[R]_o}{2}}$$

$$=\frac{2.303}{K}\log 2$$

$$t_{½}=\frac{0.693}{K}$$ 1

21. (a) (i) Mond Process ½

(ii) Van Arkel Method ½

(b) $4\,Au_{(s)}+8CN^-_{(aq)}+2H_2O_{(aq)}+O_{2(g)}\rightarrow 4\left[Au(CN)_2\right]^-_{(aq)}+4\,OH^-_{(aq)}$ ½

$2\left[Au(CN)_2\right]^-_{(aq)}+Zn_{(s)}\rightarrow 2Au_{(s)}+\left[Zn(CN)_4\right]^{2-}_{(aq)}$ ½

In the first reaction Au charges into Au^+ i.e. its oxidation takes place. In the second case

$Au^+\rightarrow Au^\circ$

i.e. reduction takes place. 1

22. $6XeF_4+12H_2O\rightarrow 4Xe+2XeO_3+24HF+3O_2$ 1

$XeF_6+3H_2O\rightarrow XeO_3+6HF$ 1

Hydrolysis of XeF_4 is a Redox reaction. Here Xe^{4+} is changing into Xe and Xe^{6+}. 1

$Xe^{4+}\rightarrow Xe^\circ+Xe^{6+}$

23. (a) In $\left[Ti(H_2O)_6\right]^{3+}$ ion Ti is in 3^+ oxidation state. There is only 1 electron in the d-orbital and its configuration is

$t_{2g}^{\,1}\ eg^\circ$. 1

(b) due to d-d transition, configuration becomes $t_{2g}^{\,\circ}\ eg^1$. 1

(c) On heating $\left[Ti(H_2O)_6\right]^{3+}$ ion becomes colourless as there is no ligand (H_2O) left in heating. 1

In the absence of ligand, crystal field splitting does not occur.

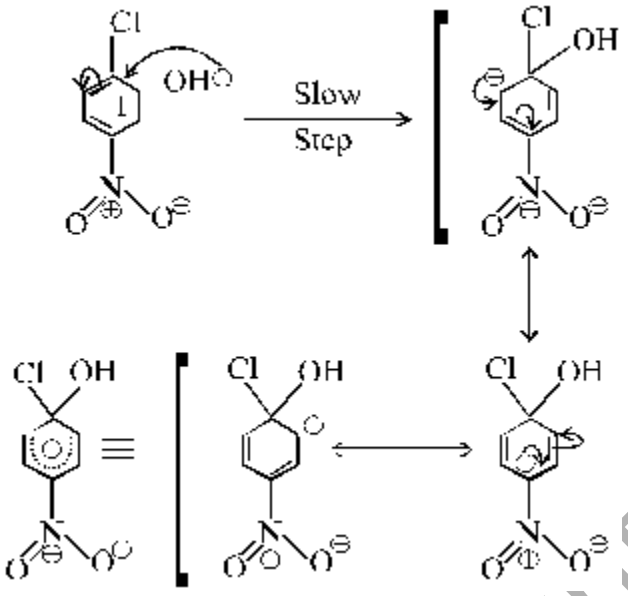
Q. No.	Value Points	Marks

24. (a) 1-chloro pentane

Surface area and hence Van der Waal's forces of attraction decreases on branching. 1

(b) In this reaction a carbanion intermediate is formed.

This is stabilized by Resonance as shown below in p-nitrochloro benzene. ½



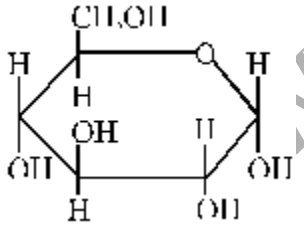
1

The -I effect of nitro group further statrilizes the intermediate.

Hence p- nitrochlorobenzene reacts faster than chloro benzene. ½

25. (a) This indicates that the aldehyde group in glucose is not free. 1

(b) 1



$\alpha - D - (+) - Glucopyran\ ose$

(c) 'D' gives the configuration i.e. the – OH gp at carbon 5 is on the <u>right hand side</u>.

(+) indicates that the isomer is dextro rotatory.

26. (a) Benzoyl peroxide is initiator.

It forms a free radical. 1

(b) <u>LDPE</u> :- <u>Low</u> <u>Density</u> <u>Polyethylene</u> ½

LDPE is obtained by the polymerisation of ethene under high pressure of 1000 to 2000 Atm at 350K to 570 <u>K</u> temperature in the presence of an initiator. ½

<u>HDPE</u> <u>High</u> <u>Density</u> <u>Polyethylene</u> ½

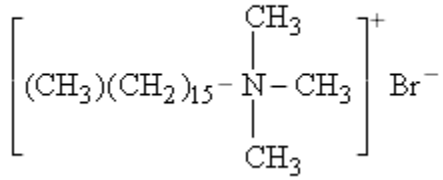
It is obtained when polymerisation is done in the presence of <u>Ziegler Natta Catalyst</u> at <u>333 K to 343 K</u> under 6 - 7 Atm pressure. ½

27. Anionic detergents : These are sodium salts of sulphonated long chain alcohols or hydrocarbons.

Q. No.	Value Points	Marks

Eg : Sodium Salt of alkyl benzene sulphonates. 1

Cationic detergents : These are quarternary ammonium salts of amines with acetates, chlorides or bromides as anions.

e g :  1

Non-ionic detergents : They do not contain any ion in them.

eg : Ester of stearic acid and polyethylene glycol 1

OR

Antihistamines are drugs that interfere with the natural action of histamines.

eg : (1) Bromopheniramine 1

(2) Terfenadine 1

They interfere with the natural action of histamine by competing with histamine binding sites of receptor where histamine exerts its effect. 1

28. (a) $\frac{\Delta P}{P^o} = i\, X_B$

$$i = \frac{1}{2}$$

$$X_B = \frac{n_B}{n_A + n_B} = \frac{61/122}{61/122 + \frac{500}{78}}$$

$$= \frac{0.5}{0.5 + 6.41} = \frac{0.5}{6.91}$$ 1

$$\frac{\Delta P}{66.6} = \frac{1}{2} \cdot \frac{50}{691}$$

$$\Delta P = \frac{50 \times 66.6}{691 \times 2} = 2.41$$ ½

$$P^o - P = 2.41$$

P = 66.6 - 2.40

= 64.20 torr ½

(b) In the absence of dimerisation

Q. No.	Value Points	Marks

$i = 1$

$$\frac{\Delta P}{P^o} = X_B$$

$$\Delta P = \frac{50}{691} \times 66.6 = 4.82$$ 1

$$P = 66.6 - 4.82 = 61.78 \text{ torr}$$

(c) From Raoult's law $P_1 = x_1 P_1^O$
$P_2 = x_2 P^O_2$

x_1 = mole fraction of liquid 1
x_2 = mole fraction of liquid 2

y_1 = Mole fraction of component -1 in vapour phase.
y_2 = Mole fraction of component - 2 in vapour phase.

$$y_1 = \frac{P_1}{P_{total}} = \frac{P_1}{P_1 + P_2}$$ ½

$$y_2 = \frac{P_2}{P_{total}} = \frac{P_2}{P_1 + P_2}$$ ½

$$y_1 = \frac{x_1 P_1^O}{x_1 P_1^o + x_2 P_2^o} = \frac{x_1 P_1^o}{x_1 P_1^o + (1 - x_1) P_2^o}$$

$$y_2 = \frac{x_2 P_2^O}{x_1 P_1^o + x_2 P_2^o}$$ 1

OR

28. (a) 1 M has higher concentration than 1m. ½
1 m solution = 1 mole in 1000 g solvent

or

1 mole in 1000 cm^3 of solvent if d = 1 g / cm^3 1

But 1 M solution = 1 mole in 1000 cm^3 of solution i.e. solvent is less here,

(b) $\Delta T_f = 0 - (-0.24) = +0.24^\circ C$ ½

$$M_2 = \frac{1000 K_f w_2}{\Delta T_f w_1}$$

$$= \frac{1000 \times 1.86 \times .5}{0.24 \times 100} g\,mol^{-1}$$ ½

$= 38.75 \text{ g mol}^{-1}$ ½

Theoretical mol mass of KCl
$= 39 + 35.5 = 74.5 \text{ g mol}^{-1}$ ½

$$i = \frac{\text{calculated mol mass}}{\text{Theoretical mol mass}} = \frac{74.5}{38.75}$$ ½

$$= 1.92$$

Q. No.	Value Points	Marks

$KCl \rightleftharpoons K^+ + Cl^-$

Initial moles 1 mole o o

After dissociation $1-\alpha$ α α

Total no. of moles after dissociation

$= 1 - \alpha + \alpha + \alpha = 1 + \alpha$

$$i = \frac{1+\alpha}{1}$$

$\alpha = i - 1 = 1.92 - 1 = 0.92$ ½

Percentage dissociation = 92% ½

29. (a) CuF_2 ½

In CuF_2, Cu^{2+} ($3d^9$) has an unpaired electron. ½

(b) (i) Oxidation state of Cr in CrO_4^{2-} is 6+. This is its maximum oxidation state and it can only gain electrons. ½

Oxidation state of Mn in MnO_4^{2-} is 6+. Mn can further loose electron to become 7+ which is its highest oxidation state. ½

(ii) This is due to lanthanoid contraction. 1

(iii) In its highest oxidation state manganese can only accpet electrons and so is acidic in behaviour. Similarly in its lowest oxidation state, it can donate electrons and hence is basic. 1

(iv) Mn (II) has maximum number of unpaired electrons i.e. $3d^5$. 1

OR

30. (a) Dil H_2SO_4 is an oxidising agent and oxidizes $FeSO_4$ to $Fe_2(SO_4)_3$.

Dil HCl is a reducing agent and liberates chlorine on reacting with $KMnO_4$ solution. 1

Thus, part of the oxygen produced from $KMnO_4$ is used up by HCl.

(b) (i) In these oxoanions the oxygen atoms are directly bonded to the transition metal.

Since oxygen is highly electronegative, the oxoanions bring out the highest oxidation state of the metal. 1

(ii) Ce^{4+} has the tendency to attain +3 oxidation state and so it is used as an oxidizing agent in volumetric analysis. 1

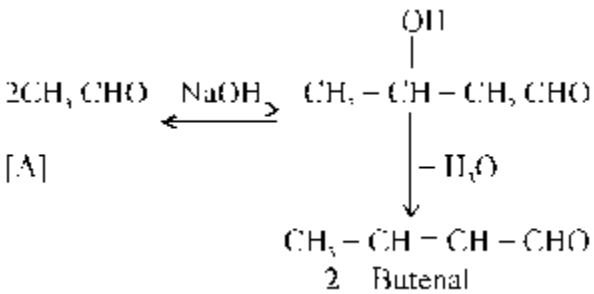
(iii) This is due to the presence of voids of appropriate sizes in their crystal lattices. 1

(iv) Zn^{2+} ion has all its orbitals completely filled where as in Cu^{2+} ion there is one half-filled 3d-orbital. It therefore has a tendency to form coloured salts where as Zn^{2+} has no such tendency. 1

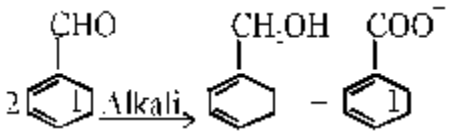
31. (i) A is CH_3CHO or ethanal ½

B is C_6H_5CHO or benzaldehyde. ½

(ii) (2)



Q. No.	Value Points	Marks



[B] [C] [D] 1

(iii) Toluene 1

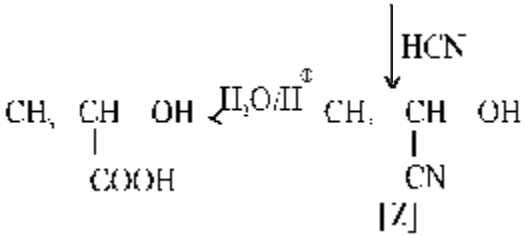
OR

(i) X is CH_3CHO Y is CH_3COOH 1

(ii) 3 - Hydroxybutanal. 1

(iii) $CHI_3 \xleftarrow{I_2/NaOH} CH_3CHO \xrightarrow{[O]} CH_3COOH$

[Haloform test] [X] [Y]



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