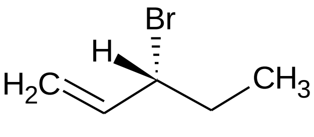
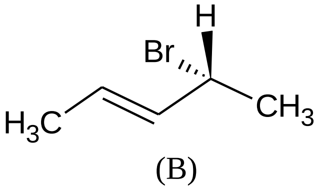
Class XII
Chemistry (Code – 043)
Sample Question Paper 2018-19

Time allowed: 3 Hours **Max. Marks: 70**

General Instructions:

(a) All questions are compulsory.
(b) Section A: Q.no. 1 to 5 are very short answer questions and carry 1 mark each.
(c) Section B: Q.no. 6 to 12 are short answer questions and carry 2 marks each.
(d) Section C: Q.no. 13 to 24 are also short answer questions and carry 3 marks each.
(e) Section D: Q.no. 25 to 27 are long answer questions and carry 5 marks each.
(f) There is no overall choice. However an internal choice has been provided in two questions of one mark, two questions of two marks, four questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.
(g) Use of log tables if necessary, use of calculators is not allowed.

	Section-A	
1.	ZnO crystal on heating acquires the formula $Zn_{1+x}O$. Give reason.	**1**
	OR	
	There is an increase in conductivity when Silicon is doped with Phosphorous. Give reason	
2.	Based on the type of dispersed phase, what type of colloids are micelles?	**1**
3.	On the basis of crystal field theory, write the electronic configuration of d^6 in terms of t_{2g} and e_g in an octahedral field when $\Delta_o < P$.	**1**
	OR	
	Low spin configuration are rarely observed in tetrahedral coordination entity formation. Explain	
4.	Identify the compound that on hydrogenation produces an optically active compound from the following compounds:  (A)  (B)	**1**
5.	Write the name of the biodegradable polymer used in orthopaedic devices.	**1**

Section-B

6. Calculate the freezing point of a solution containing 8.1 g of HBr in 100 g of water, assuming the acid to be 90 % ionized. **2**

[Given: Molar mass Br = 80 g/mol, K_f water = 1.86 K kg / mol]

OR

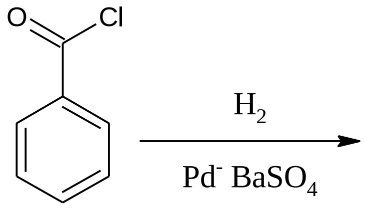
Calculate the molality of ethanol solution in which the mole fraction of water is 0.88.

7. Identify the reaction and write the IUPAC name of the product formed: **2**

(a)

$$CH_3\text{-}CH_2\text{-}COOH \xrightarrow{\text{(i) } Br_2 \text{ / Red phosphorous}}$$

(b)



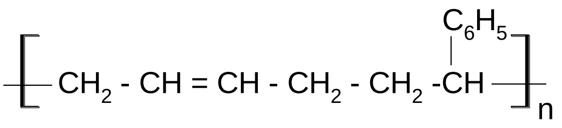
OR

Write the structures and IUPAC names of the cross aldol condensation products only of ethanal and propanal.

8. **2**

(a) Justify the role of tert-butyl peroxide in the polymerization of ethene.

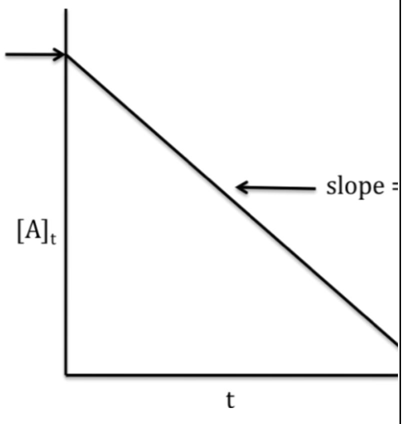
(b) Write the structures of the monomers of the following polymer:



$$\left[CH_2 - CH = CH - CH_2 - CH_2 - \underset{}{\overset{C_6H_5}{\overset{|}{CH}}} \right]_n$$

9. Write the mechanism of acid dehydration of ethanol to yield ethane **2**

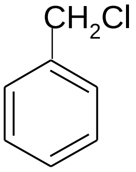
10. For a certain chemical reaction variation in concentration [A] vs. time (s) plot is given below:



(i) Predict the order of the given reaction?

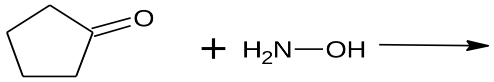
(ii) What does the slope of the line and intercept indicate?

(iii) What is the unit of rate constant k?

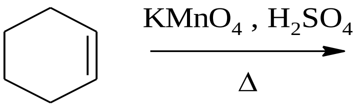
11.	Draw the molecular structures of the following: (a) Noble gas species which is isostructural with BrO_3^- (b) Dibasic oxoacid of phosphorus	**2**
12.	(i) On the basis of the standard electrode potential values stated for acid solutions, predict whether Ti^{4+} species may be used to oxidise Fe(II) to Fe(III) $Ti^{4+} + e^- \rightarrow Ti^{3+} \quad E^o = +0.01V$ $Fe^{3+} + e^- \rightarrow Fe^{2+} \quad E^o = +0.77V$ (ii) Based on the data arrange Fe^{2+}, Mn^{2+} and Cr^{2+} in the increasing order of stability of +2 oxidation state.(Give a brief reason) $E^o{}_{Cr^{3+}/Cr^{2+}} = -0.4V$ $E^o{}_{Mn^{3+}/Mn^{2+}} = +1.5V$ $E^o{}_{Fe^{3+}/Fe^{2+}} = +0.8V$	**2**
	Section-C	
13.	Niobium crystallises in body-centred cubic structure. If the atomic radius is 143.1 pm, calculate the density of Niobium. (Atomic mass = 93u).	**3**
14.	Give reasons for the following: a. When 2g of benzoic acid is dissolved in 25 g of benzene, the experimentally determined molar mass is always greater than the true value. b. Mixture of ethanol and acetone shows positive deviation from Raoult's Law. c. The preservation of fruits by adding concentrated sugar solution protects against bacterial action.	**3**
15.	An alcohol A ($C_4H_{10}O$) on oxidation with acidified potassium dichromate gives acid B ($C_4H_8O_2$). Compound A when dehydrated with conc. H_2SO_4 at 443 K gives compound C. Treatment of C with aqueous H_2SO_4 gives compound D ($C_4H_{10}O$) which is an isomer of A. Compound D is resistant to oxidation but compound A can be easily oxidised. Identify A, B, C and D. Name the type of isomerism exhibited by A and D	**3**
16.	Which one of the following compounds will undergo faster hydrolysis reaction by S_N1 mechanism? Justify your answer.  or $CH_3CH_2CH_2Cl$ OR A compound is formed by the substitution of two chlorine atoms for two hydrogen atoms in propane. Write the structures of the isomers possible. Give the IUPAC name of the isomer which can exhibit enantiomerism.	**3**

17. Complete the following reactions : **3**

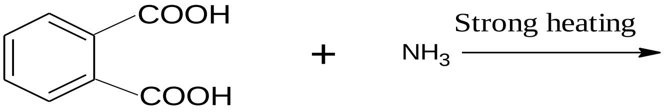
(a)



(b)



(c)



18. Give reasons for the following: **3**

(i) Use of aspartame as an artificial sweetener is limited to cold foods.
(ii) Metal hydroxides are better alternatives than sodium hydrogen carbonate for treatment of acidity.
(iii) Aspirin is used in prevention of heart attacks.

19. (a) Name the branched chain component of starch. **3**

(b) Ribose in RNA and deoxyribose in DNA differ in the structure around which carbon atom?

(c) How many peptide linkages are present in a tripeptide?

OR

Give three reactions of glucose which cannot be explained by its chain structure

20. The following data were obtained during the first order thermal decomposition of N_2O_5(g) at a constant volume: **3**

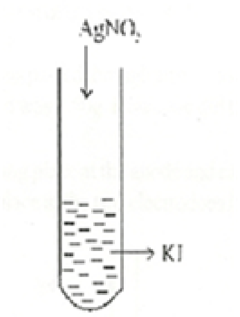
$$2N_2O_5(g) \rightarrow 2N_2O_4(g) + O_2(g)$$

S.No.	**Time (sec.)**	**Total pressure(atm)**
1.	0	0.5
2.	100	0.512

Calculate the rate constant

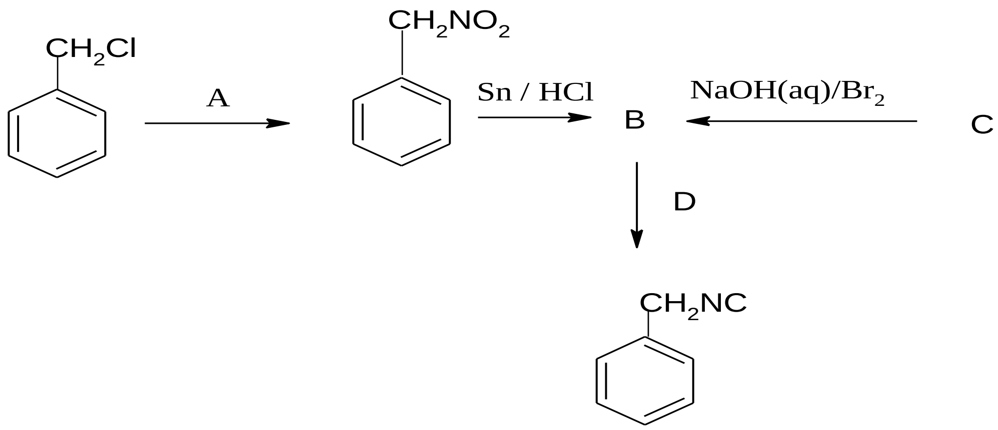
OR

Two reactions of the same order have equal pre exponential factors but their activation energies differ by 24.9 kJ mol^{-1}. Calculate the ratio between the rate constants of these reactions at 27^{o}C. (Gas constant R = 8.314 J K^{-1} mol^{-1})

21.	(a) A colloidal sol is prepared by the given method in figure. What is the charge of AgI colloidal particles in the test tube? How is the sol formed, represented?  (b) Explain how the phenomenon of adsorption finds application in Heterogeneous catalysis. (c) Which of the following electrolytes is the most effective for the coagulation of $Fe(OH)_3$ sol which is a positively charged sol ? $NaCl$, Na_2SO_4, Na_3PO_4	**3**
22.	Describe how the following steps can be carried out? (a) Recovery of Gold from leached gold metal complex.. (b) Conversion of Zirconium iodide to pure Zirconium. (c) Formation of slag in the extraction of copper. (Write the chemical equations also for the reactions involved)	**3**
	OR	
	Explain the use of the following: a) NaCN in Froth Floatation Method. b) Carbon monoxide in Mond process. c) Coke in the extraction of Zinc from Zinc Oxide	
23.	Explain the following: (a) Out of Sc^{3+}, Co^{2+} and Cr^{3+}ions, only Sc^{3+} is colourless in aqueous solutions. (Atomic no.: Co = 27; Sc = 21 and Cr = 24) (b) The $E^o_{Cu^{2+}/Cu}$ for copper metal is positive (+0.34), unlike the remaining members of the first transition series (c) $La(OH)_3$ is more basic than $Lu(OH)_3$.	**3**
24.	A metal complex having composition $Cr(NH_3)_4Cl_2Br$ has been isolated in two forms **A** and **B**. The form **A** reacts with $AgNO_3$ to give a white precipitate readily soluble in dilute aqueous ammonia whereas B gives a pale yellow precipitate soluble in concentrated ammonia. (i) Write the formulae of isomers **A** and **B**. (ii) State the hybridisation of chromium in each of them. (iii) Calculate the magnetic moment (spin only value) of the isomer A	**3**

Section-D

25. (a) Identify A-D **5**



(b) Distinguish between the following pair of compounds:

(i) Aniline and Benzylamine.

(ii) Methylamine and Dimethylamine.

(c) Complete the following:

$$CH_3CH_2CN \xrightarrow{LiAlH_4} A \xrightarrow{0^0C/\,HNO_2} B$$

OR

(a) Account for the following:

(i) Direct nitration of aniline yields significant amount of meta derivative.

(ii) Primary aromatic amines cannot be prepared by Gabriel phthalimide synthesis.

(b) Carry out the following conversions:

(i) Ethanoic acid into methanamine.

(ii) Aniline to p-Bromoaniline.

(c) Arrange the following in increasing order of basic strength:

Aniline, p-nitroaniline and p-toludine.

26. (a) A cell is prepared by dipping a zinc rod in 1M zinc sulphate solution and a silver electrode in 1M silver nitrate solution. The standard electrode potential given: **5**

$E^0_{Zn2+/Zn} = -0.76$ V, $E^0_{Ag+/Ag} = +0.80$ V

What is the effect of increase in concentration of Zn^{2+} on the E_{cell}?

(b) Write the products of electrolysis of aqueous solution of NaCl with platinum electrodes.

(c) Calculate e.m.f. of the following cell at 298 K:

$Ni(s) / Ni^{2+}$ (0.01 M) // Cu^{2+} (0.1M) / Cu (s)

[Given $E^0_{Ni2+/Ni} = -0.25$ V , $E^0_{Cu2+/Cu} = +0.34$ V)

Write the overall cell reaction.

OR

(a) Apply Kohlrausch law of independent migration of ions, write the expression to determine the limiting molar conductivity of calcium chloride.

(b) Given are the conductivity and molar conductivity of NaCl solutions at 298K at different concentrations:

Concentration M	Conductivity Scm^{-1}	Molar conductivity $S\ cm^2\ mol^{-1}$
0.100	106.74×10^{-4}	106.7
0.05	55.53×10^{-4}	111.1
0.02	23.15×10^{-4}	115.8

Compare the variation of conductivity and molar conductivity of NaCl solutions on dilution. Give reason.

(c) 0.1 M KCl solution offered a resistance of 100 ohms in a conductivity cell at 298 K. If the cell constant of the cell is 1.29 cm^{-1}, calculate the molar conductivity of KCl solution.

27. (a) Account for the following observations: **5**

(i) SF_4 is easily hydrolysed whereas SF_6 is not easily hydrolysed
(ii) Chlorine water is a powerful bleaching agent.
(iii) Bi(V) is a stronger oxidising agent than Sb(V)

(b) What happens when

(i) White phosphorus is heated with concentrated NaOH solution in an inert atmosphere of CO_2.
(ii) XeF_6 undergoes partial hydrolysis.
(Give the chemical equations involved).

OR

(a) What inspired N.Bartlett for carrying out reaction between Xe and PtF_6?
(b) Arrange the following in the order of property indicated against each set:

(i) F_2, I_2, Br_2, Cl_2 (increasing bond dissociation enthalpy)
(ii) NH_3, AsH_3, SbH_3, BiH_3, PH_3 (decreasing base strength)

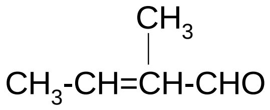
(c) Complete the following equations:

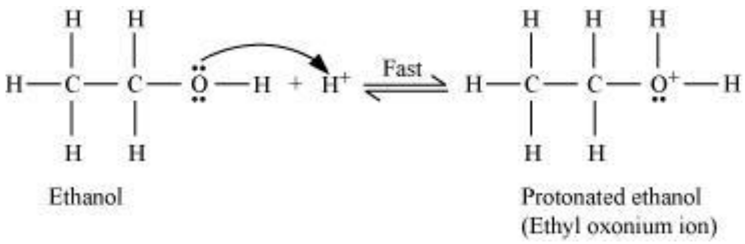
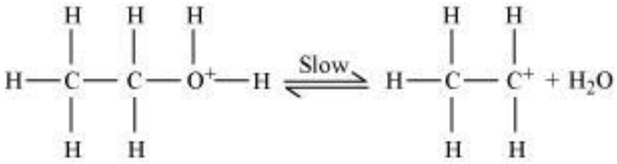
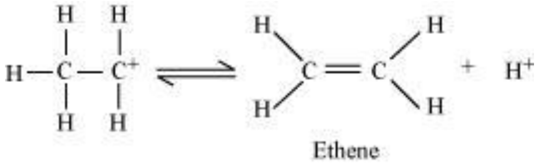
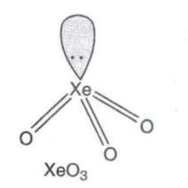
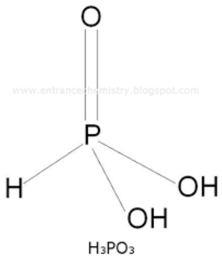
(i) $Cl_2 + NaOH(cold\ and\ dilute) \rightarrow$
(ii) $Fe^{3+} + SO_2 + H_2O \rightarrow$

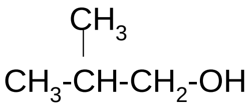
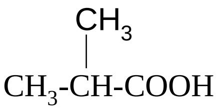
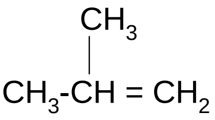
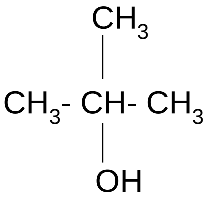
Class: XII
Chemistry
Marking Scheme 2018-19

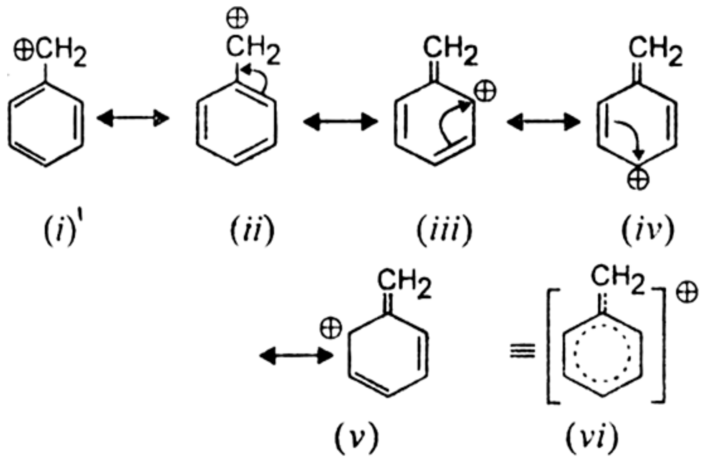
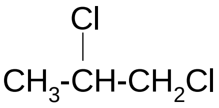
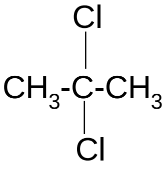
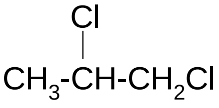
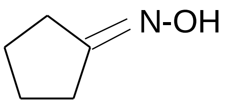
Time allowed: 3 Hours **Maximum Marks: 70**

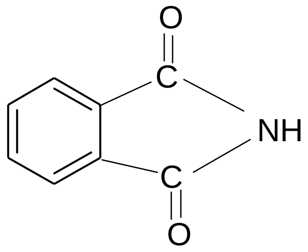
Q No	SECTION A	Marks
1.	On heating ZnO , it loses oxygen and there is excess of Zn^{2+}ions in the crystal.	1
	OR	
	When silicon is doped with phosphorous (group 15 element), the increase in conductivity is due to the delocalised negatively charged electrons.	1
2.	Associated colloids	1
3.	$t_{2g}^{3}\ e_{g}^{3}$	1
	OR	
	The orbital splitting energies, Δ_t are not sufficiently large for forcing pairing of electrons in the tetrahedral coordination entity formation.	1
4.	B	1
5.	$Poly\ \beta - hydroxybutyrate - co - \beta - hydroxy\ valerate$	1
	SECTION B	
6.	$HBr \rightarrow H^{+} + Br^{-}$ $i = 1 - \alpha + n\alpha$ $n = 2$ $i = 1 + \alpha$ $\Delta T_f = iK_f m$ $\Delta T_f = (1+\alpha)1.86\,\mathbf{x}\,\frac{\mathbf{8.1}}{\mathbf{81}}\,\mathbf{x}\,\frac{\mathbf{1000}}{\mathbf{100}}$ $\Delta T_f = \mathbf{3.53}$ $T_f^0 = 0^0 C$ $\Delta T_f = T_f^0 - T_f^{'}$ $T_f^{'} = -3.534^0 C$	½ ½ ½ ½ ½ ½
	OR	
	$Mole\ \ fraction\ \ of\ \ water\ , \chi_{H_2O} = 0.88$ $Mole\ \ fraction\ \ of\ \ ethanol\ , \chi_{C_2H_5OH} = 1 - 0.88$ $= 0.12$ $\chi_{C_2H_5OH} = \frac{n_2}{n_1 + n_2}$ ……………(1)	½

	n_2= number of moles of ethanol. n_1 = number of moles of water.Molality of ethanol means the number of moles of ethanol present in 1000 g of water. $n_1 = \frac{1000}{18} = 55.5\,moles$ Substituting the value of n_1 in equation (1) $\frac{n_2}{55.5 + n_2} = 0.12$ $n_2 = 7.57\ moles$ Molality of ethanol (C_2H_5OH) = 7.57 m **Alternatively,** Mole fraction of water = 0.88 Mole fraction of ethanol = 1-0.88 = 0.12 Therefore 0.12 moles of ethanol are present in 0.88 moles of water. Mass of water = 0.88 x 18 =15.84 g of water. Molality = number of moles of solute (ethanol) present in 1000 g of solvent (water) = 12 x 1000 / 15.84 = 7.57 m Molality of ethanol (C_2H_5OH) = 7.57 m	½ ½ ½ ½ ½
7.(a) (b)	Reaction : Hell-Volhard-Zelinsky reaction. IUPAC : 2-Bromopropanoic acid. Reaction : Rosenmund reduction reaction. IUPAC : Benzaldehyde.	½ ½ ½ ½
	OR	
	i) 2-Methylbut-2-enal  $CH_3\text{-}CH\text{=}\overset{\displaystyle CH_3}{\overset{\vert}{C}}H\text{-}CHO$ ii) Pent-2-enal $CH_3\text{-}CH_2\text{-}CH\text{=}CH\text{-}CHO$	½ ½ ½ ½
8.(a) (b)	Tert-butyl peroxide acts as a free radical generating initiator(catalyst) $CH_2 = CH\text{-}\ CH = CH_2$ $C_6H_5 – CH= CH_2$	**1** ½ ½

9.	Step 1 : Formation of protonated alcohol. 	½
	Step 2 : Formation of carbocation. 	1
	Step 3: Formation of ethane by elimination of a proton. 	½
10.	(i) Zero order reaction	½
	(ii) Slope represents –k ; Intercept represents $[R]_o$	½+½
	(iii) $mol\, L^{-1}\, s^{-1}$	½
11.(a)		**1**
(b)		**1**
12.(i)	Since Ti^{4+}/Ti^{3+} has lower reduction potential than Fe^{3+}/Fe^{2+}, it cannot be reduced in comparison with Fe^{3+}/Fe^{2+} ions.	**1**
	Hence Ti^{4+} cannot oxidise Fe^{2+} to Fe^{3+}.	½
(ii)	As the value of reduction potential increases the stability of +2 oxidation increases. Therefore correct order of stability is	**1**
	$Cr^{3+}/Cr^{2+} < Fe^{3+}/Fe^{2+} < Mn^{3+}/Mn^{2+}$	½

	SECTION C	
13.	$r=\frac{\sqrt{3}}{4}a$ $143.1=\frac{\sqrt{3}}{4}a$ a = 330.4 pm $\rho=\frac{zM}{a^3N_A}$ $\rho=\frac{2\,\mathbf{x}\,93}{(330.4\,\mathbf{x}\,10^{-10})^3\,\mathbf{x}\,6.023\,\mathbf{x}\,10^{23}}$ $\rho=8.58\ g/cm^3$	½ ½ ½ ½ ½ + ½
14.(a)	Molecules of benzoic acid dimerise in benzene, the number of particles are reduced.	**1**
(b)	The intermolecular interactions between ethanol and acetone are weaker/ the escaping tendency of ethanol and acetone molecules increases on mixing / the vapour pressure increases.	**1**
(c)	Due to osmosis, a bacterium on fruit loses water, shrivels and dies.	**1**
15.	A :  $CH_3\text{-}\overset{\displaystyle CH_3}{\overset{\vert}{CH}}\text{-}CH_2\text{-}OH$ B :  $CH_3\text{-}\overset{\displaystyle CH_3}{\overset{\vert}{CH}}\text{-}COOH$ C :  $CH_3\text{-}\overset{\displaystyle CH_3}{\overset{\vert}{CH}} = CH_2$ D :  $CH_3\text{-}\underset{\displaystyle OH}{\underset{\vert}{\overset{\displaystyle CH_3}{\overset{\vert}{CH}}}}\text{-}CH_3$ A and D are position isomers.	**1** ½ ½ ½ ½

16.	$C_6H_5CH_2Cl$ will undergo $S_N1$reaction faster. The carbocation formed by $C_6H_5CH_2Cl$ gets stabilized through resonance. Greater the stability of carbocation, greater will be its ease of formation from the respective halide. 	½ ½ 1 1
	OR	
	 $CH_3\text{-}\overset{Cl}{\overset{\vert}{CH}}\text{-}CH_2Cl$ $CH_2Cl\text{-}CH_2\text{-}CH_2Cl$ $CH_3\text{-}CH_2\text{-}CHCl_2$  $CH_3\text{-}\underset{Cl}{\underset{\vert}{\overset{Cl}{\overset{\vert}{C}}}}\text{-}CH_3$ The following isomer will exhibit enantiomerism:  $CH_3\text{-}\overset{Cl}{\overset{\vert}{CH}}\text{-}CH_2Cl$ IUPAC name: 1,2-Dichloropropane.	½ ½ ½ ½ ½ ½
17.(a)		1
(b)	HOOC - CH_2 - CH_2 - CH_2 - CH_2 – COOH	1

(c)		1
18.(i)	It is unstable at cooking temperature.	1
(ii)	Excessive hydrogencarbonate can make the stomach alkaline and trigger the production of even more acid. Metal hydroxides being insoluble do not increase the pH above neutrality.	1
(iii)	Aspirin has anti blood clotting action.	1
19.(a)	Amylopectin.	1
(b)	C- 2	1
(c)	Two peptide linkages.	1
	OR	
	(1) Glucose does not give 2,4- DNP test. (2) Glucose does not give Schiff's test. (3) The pentaacetate of glucose does not react with hydroxylamine. (4) Glucose does not form the hydrogensulphite addition product with $NaHSO_3$. (Any three points)	1 1 1
20.	$2N_2O_5(g) \rightarrow 2N_2O_4(g) + O_2(g)$ At t = 0 0.5 atm 0 atm 0 atm At time t $0.5-2x$ atm $2x$ atm x atm $p_t = p_{N_2O_5} + p_{N_2O_4} + p_{O_2}$ $= \ = (0.5-2x)+2x+x \ = \ = 0.5+x$	½
	$x = p_t - 0.5$ $p_{N_2O_5} = 0.5-2x$ $= 0.5-2(p_t-0.5)$ = 1.5 – 2p_t	½
	At t = 100 s ; p_t = 0.512 atm $p_{N_2O_5} = 1.5-2\times0.512 = 0.476\,atm$ $k = \frac{2.303}{t}\log\frac{p_i}{p_A}$	½
	$k = \frac{2.303}{100s}\log\frac{0.5\,atm}{0.476\,atm}$	½
	$k = \frac{2.303}{100s}\times0.0216 = 4.98\times10^{-4}s^{-1}$	1
	OR	1
	The Arrhenius equation: $k = Ae^{-Ea/RT}$ Taking log on both sides: $\log k = \log A - \frac{E_a}{2.303RT}$	

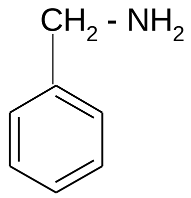
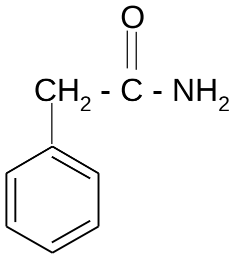
	For reaction (i) $\log k_1 = \log A - \frac{E_a(1)}{2.303RT}$ For reaction (ii) $\log k_2 = \log A - \frac{E_a(2)}{2.303RT}$	1
	Subtracting (i) from (ii) $\log \frac{k_1}{k_2} = \frac{E_a(1) - E_a(2)}{2.303RT}$ $= \log \frac{k_1}{k_2} = \frac{24.9 \times 1000}{2.303 \times 8.3 \times 300} = 4.342$ $\frac{k_1}{k_2} = anti \log(4.342) = 2.198 \times 10^4$	1
21. (a)	Negative charge is developed on the sol. Sol is represented as AgI / I^-	½ ½
(b)	Adsorption of reactants on the solid surface of the catalysts increases the rate of reaction.	1
(c)	Na_3PO_4 Hardy-Schulze rule	½ ½
22. (a)	Leached gold complex is treated with Zinc and gold is recovered by displacement method $2Au[(CN)_2]^-(aq) + Zn(s) \rightarrow 2Au(s) + [Zn(CN)_4]^{2-}(aq)$	½ ½
(b)	Zirconium iodide is decomposed on a tungsten filament; electrically heated to 1800 K. Pure Zr metal is deposited on the filament. $ZrI_4 \rightarrow Zr + I_2$	½ ½
(c)	Silica is added to the ore and heated. It helps to slag off iron oxide as iron silicate $FeO + SiO_2 \rightarrow FeSiO_3(slag)$	½ ½
	OR	
(a)	NaCN is used as depressants to separate two sulphide ores (ZnS and PbS) in Froth Floatation Method.	(1)
(b)	Carbon monoxide forms a volatile complex of nickel, nickel tetracarbonyl.	(1)
(c)	Coke is used as a reducing agent to reduce zinc oxide to zinc.	(1)
23. (a)	Co^{2+} : $[Ar]3d^7$ Sc^{3+} : $[Ar]3d^0$ Cr^{3+} : $[Ar]3d^3$ Co^{2+} and Cr^{3+} have unpaired electrons. Thus, they are coloured in aqueous solution. Sc^{3+} has no unpaired electron. Thus it is colourless.	1
(b)	Metal copper has high enthalpy of atomisation and enthalpy of ionisation. Therefore the high energy required to convert Cu(s) to Cu^{2+}(aq) is not balanced by its hydration enthalpy.	1

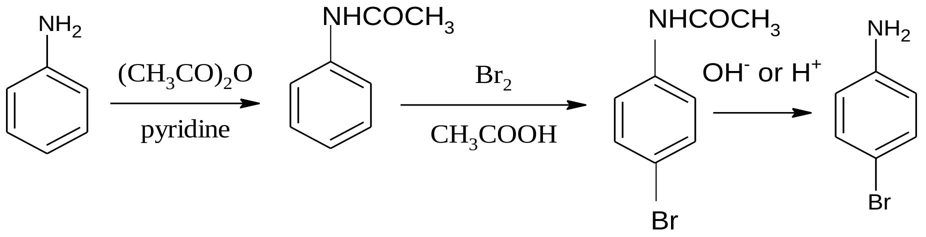
<table>
<tr><td>(c)</td><td>Due to lanthanoid contraction the size of lanthanoid ion decreases regularly with increase in atomic size. Thus covalent character between lanthanoid ion and OH^- increases from La^{3+} to Lu^{3+}. Thus the basic character of hydroxides decreases from $La(OH)_3$ to $Lu(OH)_3$</td><td>1</td></tr>
<tr><td>24.
(a)

(b)
(c)</td><td>Isomer A: $[Cr(NH_3)_4 BrCl]Cl$
Isomer B: $[Cr(NH_3)_4 Cl_2]Br$
Hybridisation of Cr in isomer A and B is d^2sp^3.
Number of unpaired electrons in $Cr^{3+}(3d^3)$ is 3
Magnetic moment = $\sqrt{n(n+2)}$
$= \sqrt{3(3+2)}$ = 3.87 BM
(deduct half mark for wrong unit/unit not written)</td><td>½
½
1

1</td></tr>
<tr><td>25.(a)

(b)
(i)

(ii)</td><td>A = $AgNO_2$
B = 
C = 
D = $CHCl_3$ + KOH , Heat.
<table>
<tr><th>Experiment</th><th>Aniline</th><th>Benzylamine</th></tr>
<tr><td>Azo dye test:
Dissolve the amine in HCl, cool it and then add cold aqueous solution of $NaNO_2$ and then solution of β - naphthol</td><td>A brilliant orange red dye is observed.</td><td>No dye is formed.</td></tr>
</table>
<table>
<tr><th>Experiment</th><th>Methylamine</th><th>Dimethylamine</th></tr>
<tr><td>Carbylamine test:
To the organic compound add chloroform and ethanolic potassium hydroxide and heat</td><td>A foul smelling substance (isocyanide)</td><td>No reaction.</td></tr>
</table>
(or any other suitable test)</td><td>½
½
½
½
1
1</td></tr>
</table>

(c)	A = $CH_3CH_2CH_2NH_2$ B = $CH_3CH_2CH_2OH$	½ ½
	OR	
(a)(i)	In strongly acidic medium, aniline is protonated to form the anilium ion which is meta directing.	1
(ii)	Aryl halides do not undergo nucleophilc substitution with the anion formed by phthalimide.	1
(b)(i)	$CH_3\text{- }COOH \xrightarrow{NH_3,\ \Delta} CH_3\text{-}CO\text{-}NH_2 \xrightarrow{NaOH\ +\ Br_2} CH_3NH_2$	1
(ii)		1
(c)	p- Nitroaniline < Aniline < p- Toludine.	1
26.(a)	E_{cell} decreases.	1
(b)	Anode: $Cl_2 \uparrow$ Cathode : $H_2 \uparrow$	½ ½
(c)	$Cu^{2+}(aq.) + Ni(s) \rightarrow Ni^{2+}(aq.) + Cu(s)$ $E^0{}_{cell} = E^0_{cathode} - E^0_{anode}$ $E^0{}_{cell} = 0.34 - (-0.25)$ $E^0{}_{cell} = 0.59V$ $E_{cell} = E^0_{cell} - \frac{2.303RT}{nF}\log\frac{[Ni^{2+}]}{[Cu^{2+}]}$ $E_{cell} = 0.59 - \frac{0.059}{2}\log\frac{[0.01\ ]}{[0.1\ ]}$ $E_{cell} = 0.6195V$	½ ½ ½ ½ ½ +½
	OR	
(a)	$\Lambda^0_{m(CaCl_2)} = \lambda^0_{Ca^{2+}} + 2\lambda^0_{Cl^-}$	1
(b)	Conductivity of NaCl decreases on dilution as the number of ions per unit volume decreases.	1

 (c)	Whereas molar conductivity of NaCl increases on dilution as on dilution the interionic interactions are overcome and ions are free to move. $G^{*} = \kappa R$ $\kappa = \frac{1.29}{100} = 0.0129\ S\,cm^{-1}$ $\Lambda_m = \frac{1000\ \kappa}{C}$ $\Lambda_m = \frac{1000\ x\ 0.0129}{0.1}$ $\Lambda_m = 129\,S\,cm^{2}\ mol^{-1}$	1 ½ ½ ½ ½
27. (a) (b)	(i)S atom in SF_4 is not sterically protected as it is surrounded by only four F atoms, so attack of water molecules can take place easily. In contrast, S atom in SF_6 is protected by six F aoms. Thus attack by water molecules cannot take place easily. (ii) Chlorine water produces nascent oxygen (causes oxidation) which is responsible for bleaching action. $Cl_2 + H_2O \rightarrow 2HCl + [O]$ (iii) Due to inert pair effect Bi(V) can accept a pair of electrons to form more stable Bi (III). (+3 oxidation state of Bi is more stable than its +5 oxidation state). (i)Phosphorus undergoes disproportionation reaction to form phosphine gas. $P_4 + 3NaOH + 3H_2O \rightarrow PH_3 + 3NaH_2PO_2$ (ii)On partial hydrolysis, XeF_6 gives oxyfluoride $XeOF_4$ and HF. $XeF_6 + H_2O \rightarrow XeOF_4 + 2HF$	1 1 1 1 1
	OR	
(a) (b) (c)	N.Bartlett first prepared a red compound $O_2^{+}PtF_6^{-}$. He then realised that the first ionisation enthalpy of molecular oxygen was almost identical with Xenon. So he carried out reaction between Xe and PtF_6. (i) $I_2 < F_2 < Br_2 < Cl_2$ (ii) $NH_3 > PH_3 > AsH_3 > SbH_3 > BiH_3$ (i) $2NaOH + Cl_2 \rightarrow NaCl + NaOCl + H_2O$ (ii) $2Fe^{3+} + SO_2 + 2H_2O \rightarrow 2Fe^{2+} + SO_4^{2-} + 4H^{+}$	1 1 1 1 1

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