

## GYAN BHARATI SCHOOL PRE BOARD EXAMINATION (2023-24) Class – SS2 Subject – Chemistry-043 (SET A )



Time: 3 Hours

Maximum Marks: 70

	General Instructions: Read the following instru	ctions care	efully.		
	(a) There are 33 questions in this question	paper with	h internal choice.		
17.2	(b) SECTION A consists of 16 multiple -choice	e question	ns carrying 1 mark each		
	(c) Section B consists of 5 short answer gu	estions car	reving 2 marks each		
	(u) Section C consists of 7 short answer gu	estions car	rrving 3 marks each		
	(e) SECTION D consists of 2 case - based que	estions car	rving 4 marks each		
	(i) Section E consists of 3 long answer que	stions carr	rying 5 marks each		
	(6) An questions are compulsory.		ying 5 marks each.		
	(h) Use of log tables and calculators is not a	llowed			
	$R=8.314 \text{ JK}^{-1}\text{Mol}^{-1}$ , Atomic number: $Ti=22$ ,	Cr = 24. Fe	= 26 Co = 27 Ni - 28 7n -	- 30	
		C 2-1, ( C	20, 60 - 27, 141 - 28, 211 -	30	
		ECTION A		1.500	
	The following questions are multiple-choice	auestions i	with one correct answer 5	b	1
	carries 1 mark. There is no internal choice in	this section	on confect answer. E	ach question	1
	t in the second	LING SCCIO	12 75 75 250		
1	If the E°cell for a given reaction has a negative	value, wh	hich of the following gives t	he correct	1
1 2 3 4	relationships for the values of $\Delta G^{\circ}$ and $Keq$ ?	, , , , , , , , , , , , , , , , , , , ,	men of the following gives t	ne correct	1
	(a) ∆ G° > 0; Keq < 1		(b) $\Delta G^{\circ} > 0$ ; Keq > 1		
	(c) $\Delta G^{\circ} < 0$ ; Keq > 1		(d) ΔG° < 0; Keq < 1	Aprillo P. Warren	
			(d) AO 10, Req 1		
2	In the Arrhenius plot of ln k vs 1/T a linear pl	lot is obtai	ined with a slone of -2 × 1	OAK The energy	- 1
	of activation of the reaction (in kJ mole-1) is	(R value is	8.3 J K <sup>-1</sup> mol <sup>-1</sup> )	o K. The energy	1
	(a) 83 (b) 166	(c) 249	(d) 332		
			(-,		
3	Reactivity order of halides for dehydrohalog	enation is:	er ku		1
	(a) $R - F > R - CI > R - Br > R - I$		b) $R-1>R-Br>R-Cl>R$	- F	<u> </u>
	(c) $R - 1 > R - C1 > R - Br > R - F$	15 1	d) $R - F > R - I > R - Br > R -$		
	The state of the s	//	AND THE PERSON NAMED IN COLUMN TWO		
4	In Williamson synthesis if tertiary alkyl halid	e is used t	:han:		1
	(a) Ether is obtained in good yield			4	
	(b) Ether is obtained in poor yield				
	(c) Alkene is the only reaction product				
	(d) A mixture of alkene as a major product a	nd ether a	is a minor product forms.		
	X 1 5 X 1				
5	Which of the following statements are corre	ct?			-1
	(i) Chromium has the highest melting point a		3d series elements.		SHAN

	(ii) Number of unpaired electrons is greater in or than other or the atomic number increases.  (iii) In any row the melting point of transition metal increases as the atomic number increases.						
	(a) (i) and (iii)	(b) (i) and (ii)	(c) (ii) and (iii)	(d) (i), (ii) and (iii)			
5	this relation is:			correct statement with regard to	1		
	(b) For this reaction (c) The rate of form	mation of Z is half the r	nt of [X] and [Y]. f initial concentrations rate of disappearance of al to rate of disappeara	of X.			
7			be carried out by Clemi	mensen Reduction?	1		
		nto benzyl alcohol					
	[ASSESSED 1988]	e into cyclohexane					
	THE PARTY OF THE P	de into benzaldehyde e into diphenyl metha	ne.				
	(a) (ii) and (iv)	(b) (i) and (iv)	(c) (i) and (iii)	(d) (iii) and (iv)			
8	the main reason	being:		ds than those by the lanthanoids,	1		
	C C C C C C C C C C C C C C C C C C C	re diffused than the 5					
			and 6d than between				
			and 6d than between 4 Is than the lanthanoids				
9		enerally more reactive tements accounts for t		philic addition reactions. Which of	1		
	(i) Sterically, the presence of two relatively large substituents in ketones hinders the approach of nucleophile to carbonyl carbon.						
	1503050 p	(ii) Aldehydes show resonance whereas ketones do not.					
	(iii) Electronically, the presence of two alkyl groups, reduce the electrophilicity of the carbonyl carbon more effectively.						
	(iv) Electronically	y carbonyl carbon aton	n in ketones is more ele	ectrophilic than in aldehydes.			
	(a) (i) and (iii)	(b) (i) and (iv)	(c) (ii) and (i	ii) (d) (ii) and (iv)			
The correct statement regarding RNA and DNA, respectively is  (a) The sugar component in RNA is a arabinose and the sugar component in DNA is rib  (b) The sugar component in RNA is 2'-deoxyribose and the sugar component in DNA is  (c) The sugar component in RNA is arabinose and the sugar component in DNA is 2'-deox  (d) The sugar component in RNA is ribose and the sugar component in DNA is 2'-deox					1		

11	Which of the following factors affect the basic strength of amine? (i) Inductive effect (ii) Steric hindrance (iii) Solvation effect (iv) Solubility in organic solvents.	1
	(a) (i) and (iv) (b) (i), (ii) and (iii) (c) (ii) and (iii) (d) (ii) and (iv)	
12	Which one of the following will show the highest pH value?  (a) m – nitrophenol. (b) p – nitrophenol. (c) o – nitrophenol. (d) Both (b) and (c).	1
	Q. Nos. 13-16 consist of two statements, one is Assertion and the other is Reason. Select the most appropriate answer from the options given below:  a. Both A and R are true and R is the correct explanation of A	1
	b. Both A and R are true but R is not the correct explanation of A.  c. A is true but R is false.  d. A is false but R is true.	
13	Assertion: The bond angle in alcohols is slightly less than the tetrahedral angle.  Reason: In alcohols, the oxygen of -OH group is attached to sp <sup>3</sup> hybridized carbon atom.	1
14	Assertion: The boiling points of aldehydes and ketones are lesser than alcohols of comparable molecular masses.  Reason: There is a weak molecular association in aldehydes and ketones arising out of the dipole-dipole interactions.	1
15	Assertion (A): During electrolysis of aqueous copper sulphate solution using copper electrodes hydrogen gas is released at the cathode.  Reason (R): The electrode potential of Cu <sup>2+</sup> /Cu is greater than that of H <sup>+</sup> /H <sub>2</sub>	1
16	The small amount of HCl is required in the reduction of nitro compounds with iron	1
	SECTION B	
	This section contains 5 questions with internal choice in one question. The following questions are very short answer type and carry 2 marks each.	100 miles
17	What is meant by negative deviation from ideal behaviour? Draw the vapour pressure diagram for the Same with an example.	2
11.8	$O(g) + O_2(g) + O_2(g)$ , the rate of formation of $NO_2(g)$ is 2.8 $\times$ 10 <sup>-3</sup> M s <sup>-1</sup> .	2

(ii) Number of unpaired electrons is greater in Cr than other elements of series 22 (iii) In any row the melting point of transition metal increases as the atomic number increases						
	(a) (i) and (iii)	(b) (i) and (ii)	(c) (ii) and (iii)	(d) (i), (ii) and (iii)		
6	The rate law for th	e reaction $2X + Y \rightarrow Z$	is Rate = k[X][Y]. The	correct statement with regard to	;	
	this relation is:					
	(a) The rate of the	reaction is independe	nt of [X] and [Y].			
	(c) The rate of form	ti/2 is independent o	f initial concentrations	of reactant.		
	(d) The rate of disa	ppearance of X is equ	ate of disappearance of the rate of disappeara	of X. ance of Y.		
7	Which of the follow	ving conversions can be	e carried out by Clemr		1	
	(-) - will an a city ac III	ILU DELIZVI AICOROL	e carried out by cicin	Helisen Reductions	-	
	(II) Cyclohexanone	into cyclohevano				
	(III) Benzoyl chlorid	e into henzaldobuda				
	(iv) Benzophenone	into diphenyl methan	е.			
	(a) (ii) and (iv)	(b) (i) and (iv)	(c) (i) and (iii)	(d) (iii) and (iv)		
0			State of the second state of the second			
8	Larger number of oxidation states are exhibited by the actinoids than those by the lanthanoids, the main reason being:  (a) 4f orbitals more diffused than the 5f orbitals.					
	(b) Lesser and	diffused than the 5f	orbitals.	(e)		
	(n) resset energy d	(b) Lesser energy difference between 5f and 6d than between 4f and 5d orbitals.  (c) More energy difference between 5f and 6d than between 4f and 5d orbitals.  (d) More reactive nature of the active ideals.				
				and 5d orbitals		
	(d) More reactive n	nature of the actinoids	than the lanthanoids.			
9				* X JE II. og sen		
,	the following state	erally more reactive th ments accounts for th	an ketones in nucleophis?	nilic addition reactions. Which of	1	
	(i) Sterically, the presence of two relatively large substituents in ketones hinders the approach of nucleophile to carbonyl carbon.					
	(ii) Aldehydes show resonance whereas ketones do not					
	(iii) Electronically, the presence of two alkyl groups, reduce the electrophilicity of the carbonyl carbon more effectively.					
	(iv) Electronically ca	arbonyl carbon atom i	ketones is more elect	rophilic than in aldehydes.		
	(a) (i) and (iii)	(b) (i) and (iv)	(c) (ii) and (iii)	(d) (ii) and (iv)		
.0	The correct stateme	The correct statement regarding RNA and DNA, respectively is				
8	(a) The sugar compo	onent in RNA is a arab	nose and the sugar cou	mponent in DNA is ribose	1	
	Int the angar combi	(a) The sugar component in RNA is a arabinose and the sugar component in DNA is ribose. (b) The sugar component in RNA is 2'-deoxyribose and the sugar component in DNA is arabinose.				
	tol the sugar component in KIVA is alabinose and the cligar component in DALA					
•	(d) The sugar compo	onent in RNA is ribose	and the sugar compon	ent in DNA is 2'-deoxyribose.		

	Which of the followi (i) Inductive effect (ii) Steric hindrance (iii) Solvation effect (iv) Solubility in orga	ng factors affect the bas	ic strength of amine?		1
	(a) (i) and (iv)	(b) (i), (ii) and (iii)	(c) (ii) and (iii)	(d) (ii) and (iv)	
12	Which one of the fol (a) m – nitrophenol.	lowing will show the hig (b) $p - \text{nitrophenol}$	hest pH value? . (c) o – nitrophenol.	(d) Both (b) and (c).	1
	most appropriate ar	nswer from the options g true and R is the correct true but R is not the corr alse.	explanation of A	er is Reason. Select the	1
13	Assertion: The bond Reason: In alcohols,	angle in alcohols is sligh the oxygen of -OH grou	tly less than the tetrahed p is attached to sp³ hybric	ral angle. lized carbon atom.	1
14	malacular maccas		nd ketones are lesser than	alcohols of comparable es arising out of the dipole-	1
15	Assertion (A): Durin	acod at the cathode	copper sulphate solution  Cu is greater than that of		1
16	Assertion: Only a sm scrap and HCl in the Reason: FeCl <sub>2</sub> forme	nall amount of HCl is requ presence of steam. d gets hydrolysed to rele	ired in the reduction of nase HCl.	itro compounds with iron	1
		S S		5 1 53	
	are very short answe	er type and carry 2 marks	al choice in one question. s each.		
17	What is meant by ne for the Same with ar	gative deviation from id	eal behaviour? Draw the	vapour pressure diagram	2
18			the rate of formation of g) and rate of appearance	$NO_2(g)$ is 2.8 X $10^{-3}$ M s <sup>-1</sup> . e of $O_2(g)$ .	2

		1
19	(a) How will you convert toluene to 2-phenylethanoic acid? (b) Why is the dipole moment of chlorobenzene lower than that of cyclohexyl chloride?	ì
20	Give reasons for the following:  (a). The melting points and solubility in water of amino acids are generally higher than that of the corresponding halo acids.	1
	(b) Despite having an aldehyde group Glucose does not form DNP derivative.	1
21	How would you distinguish between the following pairs of compounds?  (a) Benzoic acid and Ethyl benzoate.	1
	(b) Ethanal and Propanal.	1
	OR	
	An organic compound with the molecular formula C <sub>9</sub> H <sub>10</sub> O forms 2,4-DNP derivative, reduces Tollens' reagent and undergoes Cannizzaro reaction. It gave benzene-1,2- dicarboxylic acid on vigorous oxidation. Identify the compound and write the reaction involved.	2
	. SECTION C	
	This section contains 7 questions with internal choice in two questions. The following questions are short answer type and carry 3 marks each.	
22	(a) Identify the major product formed when 2-Chloro-2-methylbutane undergoes dehydrohalogenation reaction. Name the reagent which is used to carry out the reaction.	1
	(b) Write IUPAC name of the compound: CH₃CH=CHC(Br)(CH₃)₂.	1
	(c) The treatment of alkyl chlorides with aqueous KOH leads to the formation of alcohols, but in	1
	the presence of alcoholic KOH, alkenes are major products. Explain.  OR	-
	(a) Name the possible alkenes which will yield 1-chloro-1-methylcyclohexane as major product on their reaction with HCl. Write the reactions involved.	1
	(b) Allyl chloride is hydrolyzed more readily than n-propyl chloride. Why?	1
	(c) Write the structure of following compound: 1 -Bromo-4-sec-butyl-2-methylbenzene.	. 1
23	(a) On the basis of crystal field theory explain why [Fe(H₂O) <sub>6</sub> ] <sup>3+</sup> has a magnetic moment value of 5.92 BM whereas [Fe(CN) <sub>6</sub> ] <sup>3-</sup> has a value of only 1.74 BM?	2
	(b) What is the coordination entity formed when aqueous KCN is added to copper sulphate solution? Will it form a ppt if H₂S is passed in the same mixture?	1
24	(a) Calculate the electrode potential of silver electrode dipped in a 0.1 M AgNO <sub>3</sub> at 298 K	2
	assuming AgNO <sub>3</sub> to be completely dissociated. The reduction potential of Ag <sup>+</sup> / Ag is 0.8 V.  (b) What products are obtained when aqueous solution of AgNO <sub>3</sub> is electrolysed using Platinum Electrodes?	n 1
25	(a) Write the reaction when Anisole is treated with CH <sub>3</sub> COCl in the presence of AlCl <sub>3</sub> . Write the name of the major product.	1
		1
	(b) How do you distinguish between?	2 <del>127</del> 0
	ma .	Page 4 of 7

(a) Name the reagents used in the following reactions:  (i) Oxidation of a primary alcohol to aldehyde.  (ii) Bromination of phenol to 2, 4, 6-tribromophenol.  a. CH <sub>3</sub> -CH <sub>2</sub> -CH (CH <sub>3</sub> )-CH <sub>2</sub> -C-CH <sub>2</sub> -CH <sub>3</sub> .  b. CH <sub>3</sub> -CH <sub>2</sub> -CH (CH <sub>3</sub> )-CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub> .  1 b. CH <sub>3</sub> -CH <sub>2</sub> -CO-C (CH <sub>3</sub> ) <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub> .  26 (a) How is primary structure of a protein different from its secondary structure?  (b) Vitamin C cannot be stored in the body. Justify.  (c) Write the equation for what happens when glucose is reacted with Bromine water.  1 For first order decomposition: SO <sub>2</sub> Cl <sub>2</sub> (g) → SO <sub>2</sub> (g) + Cl <sub>2</sub> (g)  28 (a) What compound will be formed when cyclohexanecarbaldehyde reacts with excess ethanol?  (b) How do you convert?  (i) Ethanal into But-2-enoic acid.  (ii) Benzoic acid to m- Nitrobenzyl alcohol.  29 Metallic conductance involves movement of electrons whereas electrolytic conductance Involves movement of ions. Specific conductance. Electrochemical cells convert chemical energy into electrical energy. Dry cell and mercury cell are primary cells, whereas lead storage battery and Ni-Cd cell are secondary ones. Fuel cells are special type of electrochemical cells with a number of advantages.  (a) When does an electrochemical cell behave as electrolytic cell?  (b) How is fuel cell advantageous over other cells? Mention two of its uses.  (a) When does an electrochemical cell behave as electrolytic cell?  (b) How is fuel cell advantageous over other cells? Mention two of its uses.  (c) Write the anode and cathode reactions in lead storage battery. Write the reaction when lead to the molar conductivity of HCl increases with dilution. Can you suggest what may be the 1 the molar conductivity of HCl increases with dilution. Can you suggest what may be the 1 the molar conductivity of HCl increases with dilution. Can you suggest what may be the 1 the molar conductivity of HCl increases with dilution. Can you suggest what may be the 1 the molar conductivity of HCl increases with dilution. Can you suggest what may be the 1 the molar con	(i) Prop (ii) Phe	an-1-ol and nol and cyc	i propan-2-o lohexanol.	i. *	•	
(b) Give the major products that are formed by heating each of the following ethers with HI.  a. CH <sub>3</sub> -CH <sub>2</sub> -CH (CH <sub>3</sub> )-CH <sub>2</sub> -CH <sub>3</sub> .  b. CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub> .  1  26 (a) How is primary structure of a protein different from its secondary structure?  (b) Vitamin C cannot be stored in the body. Justify.  (c) Write the equation for what happens when glucose is reacted with Bromine water.  1  For first order decomposition: SO <sub>2</sub> Cl <sub>2</sub> (g) → SO <sub>2</sub> (g) + Cl <sub>2</sub> (g)  27 For first order decomposition: SO <sub>2</sub> Cl <sub>2</sub> (g) → SO <sub>2</sub> (g) + Cl <sub>2</sub> (g)  28 EXPT TiME(s) TOTAL PRESSURE (atm)  1. 0 0.5  2. 100 0.6  Calculate the rate of the reaction when total pressure is 0.65 atm.  10 How do you convert?  (i) Ethanal into But-2-enoic acid.  (ii) Benzoic acid to m- Nitrobenzyl alcohol.  1 SECTION D  The following questions are case-based questions. Each question has an internal choice and carries 4 (1+1+2) marks each. Read the passage carefully and answer the questions that follow.  10 Metallic conductance involves movement of electrons whereas electrolytic conductance involves movement of ions. Specific conductance increases with increase in concentration whereas same is not true with molar conductance. Electrochemical cells convert chemical energy into electrical energy. Dry cell and mercury cell are primary cells, whereas lead storage battery and Ni-Cd cell are secondary ones. Fuel cells are special type of electrochemical cells with a number of advantages.  (a) When does an electrochemical cell behave as electrolytic cell?  (b) How is fuel cell advantageous over other cells? Mention two of its uses.  (a) When does an electrochemical cell behave as electrolytic cell?  (b) How of the anode and cathode reactions in lead storage battery. Write the reaction when lead to the passage battery is recharged.  (d) The molar conductivity of HCl increases with dilution. Can you suggest what may be the						1
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(b) Give the major products that are formed by heating each of the following ethers with HI.  a. CH <sub>3</sub> -CH <sub>2</sub> -CH (CH <sub>3</sub> )-CH <sub>2</sub> -CH <sub>3</sub> .  b. CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub> .  1  26 (a) How is primary structure of a protein different from its secondary structure?  (b) Vitamin C cannot be stored in the body. Justify.  (c) Write the equation for what happens when glucose is reacted with Bromine water.  1  For first order decomposition: SO <sub>2</sub> Cl <sub>2</sub> (g) → SO <sub>2</sub> (g) + Cl <sub>2</sub> (g)  27 For first order decomposition: SO <sub>2</sub> Cl <sub>2</sub> (g) → SO <sub>2</sub> (g) + Cl <sub>2</sub> (g)  28 EXPT TiME(s) TOTAL PRESSURE (atm)  1. 0 0.5  2. 100 0.6  Calculate the rate of the reaction when total pressure is 0.65 atm.  10 How do you convert?  (i) Ethanal into But-2-enoic acid.  (ii) Benzoic acid to m- Nitrobenzyl alcohol.  1 SECTION D  The following questions are case-based questions. Each question has an internal choice and carries 4 (1+1+2) marks each. Read the passage carefully and answer the questions that follow.  10 Metallic conductance involves movement of electrons whereas electrolytic conductance involves movement of ions. Specific conductance increases with increase in concentration whereas same is not true with molar conductance. Electrochemical cells convert chemical energy into electrical energy. Dry cell and mercury cell are primary cells, whereas lead storage battery and Ni-Cd cell are secondary ones. Fuel cells are special type of electrochemical cells with a number of advantages.  (a) When does an electrochemical cell behave as electrolytic cell?  (b) How is fuel cell advantageous over other cells? Mention two of its uses.  (a) When does an electrochemical cell behave as electrolytic cell?  (b) How of the anode and cathode reactions in lead storage battery. Write the reaction when lead to the passage battery is recharged.  (d) The molar conductivity of HCl increases with dilution. Can you suggest what may be the	(I) Ox	idation of a	oriman th	e following reactions:		1/2
a. CH <sub>3</sub> -CH <sub>2</sub> -CH (CH <sub>3</sub> )-CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub> .  b. CH <sub>3</sub> -CH <sub>2</sub> -CH (CH <sub>3</sub> )-CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub> .  26 (a) How is primary structure of a protein different from its secondary structure?  (b) Vitamin C cannot be stored in the body. Justify.  (c) Write the equation for what happens when glucose is reacted with Bromine water.  1 For first order decomposition: SO <sub>2</sub> Cl <sub>2</sub> (g) → SO <sub>2</sub> (g) + Cl <sub>2</sub> (g)  28 (a) What compound will be formed when total pressure is 0.65 atm.  Calculate the rate of the reaction when total pressure is 0.65 atm.  28 (a) What compound will be formed when cyclohexanecarbaldehyde reacts with excess ethanol?  (b) How do you convert?  (i) Ethanal into But-2-enoic acid.  (ii) Benzoic acid to m- Nitrobenzyl alcohol.  1 SECTION D  The following questions are case-based questions. Each question has an internal choice and carries 4 (1+1+2) marks each. Read the passage carefully and answer the questions that follow.  29 Metallic conductance involves movement of electrons whereas electrolytic conductance involves movement of ions. Specific conductance increases with increase in concentration whereas same is not true with molar conductance. Electrochemical cells convert chemical energy into electrical energy. Dry cell and mercury cell are primary cells, whereas lead storage battery and Ni- Cd cell are secondary ones. Fuel cells are special type of electrochemical cells with a number of advantages.  (a) When does an electrochemical cell behave as electrolytic cell?  (b) How is fuel cell advantageous over other cells? Mention two of its uses.  (b) How is fuel cell advantageous over other cells? Mention two of its uses.  (c) Write the anode and cathode reactions in lead storage battery. Write the reaction when lead (d) The molar conductivity of HCl increases with dilution. Can you suggest what may be the	(II) Br	omination of	of phone!	ohol to aldehyde.		25534025
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reason for this? Page 5 of 7	(d)	The molar	conductivity of	of HCl increases with dilutio	on. Can you suggest what may at the	St.
	(4)	reason for	this?	*		Page 5 of 7

Write an expression for calculating molar conductance at infinite dilution for water.

Most distinctive properties of transition metal complexes is their wide range of colours. The colour of complex is complementary to that which is absorbed. The complementary colour is the colour generated from the wavelength left over. The following table gives the relationship of the different wavelength absorbed and the colour observed.

Coordination Entity	Wavelength absorbed (nm)	Colour of light absorbed	Colour of complex entity
[CoCl(NH <sub>3</sub> ) <sub>5</sub> ]	635	Yellow	Violet
$[Co(NH_3)_5(H_2O)]^{3+}$	500		
[Co(NH <sub>3</sub> ) <sub>6</sub> ] <sup>3+</sup>	475	Blue green	Red
[Co(CN) <sub>6</sub> ] <sup>3</sup> -	310	Blue	Yellow orange
[Cu(H <sub>2</sub> O) <sub>4</sub> ] <sup>2+</sup>	600	Ultraviolet	Pale yellow
[Ti(H <sub>2</sub> O) <sub>6</sub> 3+		Red	Blue
[11(1120)6	480	Blue Green	Violet

(a) Why does [Co(CN) <sub>6</sub> ] <sup>3-</sup> absorb in U.V. light and not in the visible range?	1
(b) A solution of this (t) and and the time visible range?	_
1 IN 1120/61 IS REPORT DUT 2 Solution of [NII/CALL 12-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	1
, r. ( z. )01 colodilext.	1
(d) Arrange CN-, NH <sub>3</sub> and CI in order of splitting they produce.	1
OP	
What will be the correct order of wavelength absorption for the first	1
What will be the correct order of wavelength absorption for the following complexes: $[Co(CN)_6]^{3-}$ , $[Co(NH_3)_6]^{3+}$ and $[CoCl_6]^{3-}$ Give reasons for your answer.	_

## SECTION E

The following questions are long answer type and carry 5 marks each. Two questions have an internal choice.

- (a) What is the effect of temperature on the solubility of glucose in water?
   (b) Prakhar collected a 10 mL each of fresh water and ocean water. He observed that one sample labeled "P" froze at 0 °C while the other "Q" at -1.3 °C, but forgot which of the two, "P" or "Q" was ocean water. Help him identify which container contains ocean water, give reason for your answer.
   (c) Calculate Van't Hoff factor for an aqueous solution of K<sub>3</sub> [Fe(CN)<sub>6</sub>] if the degree of dissociation (α) is 0.852. What will be boiling point of this solution if its concentration is 1 molal? (K<sub>b</sub>= 0.52 K kg/mol)
  - (a) Why do substances show abnormal molecular masses. Support your answer with examples.

    (b) The vapour pressure of pure water at a certain temperature is 23.80 mm Hg. If 1 mole of a non-volatile non- electrolytic solute is dissolved in 100 g water, Calculate the resultant vapour pressure of the solution.

3

32	Attempt any five of the following:	
	(a) Which of the following ions will have a magnetic moment value of 1.73 BM? Sc <sup>3+</sup> , Ti <sup>3+</sup> , Ti <sup>2+</sup> , Cu <sup>2+</sup> , Zn <sup>2+</sup>	1
	(b) The second ionization enthalpies of chromium and manganese are 1592 and 1509 kJ/mol respectively. Explain the lower value of Mn.	1
	(c) Give two similarities in the properties of Sc and Zn.	1
	(d) What is actinoid contraction? What causes actinoid contraction?	1
	(e) What is the oxidation state of chromium in chromate ion and dichromate ion?	1
	(f) Write the ionic equation for reaction of KI with acidified KMnO <sub>4</sub> .	1
₹3	An organic compound 'A' $(C_7H_7NO_2)$ exists in three isomeric forms. On reduction gives compound 'B' with molecular formula $C_7H_9N$ . 'B' on treatment with NaNO <sub>2</sub> /HCl at 0-5 °C to form compound 'C'. On treating C with $H_3PO_2$ , it gets converted to D with formula $C_7H_8$ , which on further reaction with $C_7PO_2Cl_2$ followed by hydrolysis forms 'E' $C_7H_6O$ which does not undergo aldol condensation Write the structure of compounds A to E. Write the chemical equations involved.	5
	(a) Account for the following:	1
	the state desired in water reacts with ferric chloride to precipitate hydrated terric oxide.	1
	(ii) Although amino group is o— and p— directing in aromatic electrophilic substitution reactions, aniline on nitration gives a substantial amount of m-nitroaniline.	-
	reactions, aniline on hitration gives a substantial children for reactions, aniline on hitration gives a substantial children for reactions, aniline on hitration gives a substantial children for reactions, aniline on hitration gives a substantial children for reactions, aniline on hitration gives a substantial children for reactions, aniline on hitration gives a substantial children for reactions, aniline on hitration gives a substantial children for reactions, aniline on hitration gives a substantial children for reactions, aniline on hitration gives a substantial children for reactions.  (b) Arrange the following in increasing order of solubility in water: C <sub>2</sub> H <sub>5</sub> Cl, C <sub>2</sub> H <sub>5</sub> NH <sub>2</sub> ,	1
	C₂H₅OH	
	(a) How would you convert:	1
	(i) Nitrobenzene to benzoic acid.	1
	(i) Apiline to p-Bromoaniline.	

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