Marking scheme – 2017

CHEMISTRY (043)/ CLASS XII

Outside Delhi set (56/1)

Q No.	Value Points	Marks
1.	H ₃ PO ₄	1
2.	2-Bromo-3-methylbut-2-en-1-ol	1
3.	a. Decreases	1/2
	b. No effect	1/2
4.	X	1
5.	Gel e.g. cheese, butter, jellies (any one)	1/2 + 1/2
6.	a. p-cresol < Phenol < p-nitrophenol	1
	$C = C < + H - \ddot{O} + H \Longrightarrow - \ddot{C} - \dot{C} - \dot{C} < + H^2 \ddot{O}$	1
	OR	
6	H ₃ C CH ₂	1
	a. b. CI H ₃ C CH ₃	1
7.	n= given mass / molar mass	1/2
	= 8.1 / 27 mol Number of atoms= $\frac{8.1}{27}$ x 6.022x10 ²³ Number of atoms in one unit cell= 4 (fcc)	1/2
	Number of unit cells = $\left[\frac{8.1}{27} \times 6.022 \times 10^{23}\right] / 4$	1/2
	$= 4.5 \times 10^{22}$	1/2
	Or	
	27g of Al contains= 6.022x10 ²³ atoms	1/2
	8.1g of AI contains =(6.022x10 ²³ / 27) x 8.1	1/2
	No of unit cells = total no of atoms /4	
	$= \left[\frac{8.1}{27} \times 6.022 \times 10^{23}\right] / 4$	1/2
	$=4.5 \times 10^{22}$	1/2

8.			1,1
0.		H	1,1
	s	CI	
	но		
	а.)	b.)	
9.	Mercury cell	D.)	1
J.	Anode: $Zn(Hg) + 2OH^{-} \rightarrow ZnO(s) + H_2O$) + 2e ⁻	1/2
	Cathode: $HgO + H_2O + 2e^{-} \rightarrow Hg(I) + 2e^{-}$		1/2
10.	(i) Na[Au(CN) ₂]		1
	(ii) [Pt(NH ₃) ₄ Cl (NO ₂)]SO ₄		1
11.	(a) Covalent solid / network solid , n	nolecular solid	1/2 + 1/2
	(b) $ZnO \xrightarrow{Heating} Zn^{2+} + 1/2 O_2 + 2e^{-\frac{2}{3}}$		
		erstitial sites and the electrons move	1
	to neighbouring voids (c) Compounds prepared by combin	ation of groups 12 and 16 hehave	
	like semiconductors. For eg ZnS, CdS	9 .	1/2 + 1/2
12.		,	
	(a) $\Delta G^0 = -nFE^0_{cell}$		1/2
	n= 2		
	ΔG^0 = - 2 x 96500 C /mol x 0.236 V = - 45548 J/mol		1/2
	= -45.548 kJ/mol		1/2
	13.3 13 13,11131		/-
	(b) Q=It = 0.5 x 2 x 60 x 60		1/2
	= 3600 C		
	96500 C = 6.023×10^{23} electrons 3600 C = 2.25×10^{22} electrons		1
13.			1
13.	(a) Linkage isomerism	6.015	-
		sence of Cl ⁻ , a weak field ligand	1
		in [Ni(CN) ₄] ²⁻ , CN ⁻ is a strong	
	field ligand and pairing tak representation	res hiace / migrammatic	
	•	which is not able to pair up the	1
	electrons.		-
14.			
	<u>(a)</u>		
	Multimolecular colloid	Associated colloid	
	(a) Aggregation of large	(a) Aggregation of large	1
	number of small atoms or molecules.	number of ions in concentrated solutions.	
	Indiecules.	concentiated solutions.	
	(b)		
	Coagulation	Peptization	
	(a) Settling down of colloidal	(a) Conversion of precipitate	
	particles.	into colloidal sol by	1
		adding small amount of	

		electrolyte.	
		,	
	(c)	1	
	Homogenous catalysis	Heterogeneous catalysis	
	(a) Reactants and catalyst	(a) Reactants and catalyst	1
	are in same phase.	are in different phases.	
		OR	
14	(a) Dispersed phase-liquid , D	·	1
		on / both increase with increase in	
	surface area (or any other co	orrect similarity)	1
		^{hydrolysis} -→ Fe(OH) ₃ (sol)+3HCl	1
15.	2.30	$\frac{13}{\log \frac{[A]o}{[A]}}$	1/2
	$\iota = \frac{1}{k}$	$-\log [A]$	
	20 min =	$\frac{2.303}{k} log \frac{100}{75}$ - (i)	1/
		κ /5	1/2
	_ 2.30	$\frac{03}{100} \log \frac{100}{25}$ -(ii)	
	$\iota = \frac{1}{k}$	— log ₂₅ -(II)	1/2
			/2
	Divide (i) equa	tion by (ii)	
	20 2 202	100	
	$\frac{20}{t} = \frac{2.303}{k}$	$log \frac{100}{75}$	1/2
		100	
	$\frac{2.303}{h}$	$\frac{3}{25} \log \frac{100}{25}$	
	= log 4,		
	log 4		
	9	0.1250/ 0.6021	
	t= 96.3 mi		1
		(or any other correct procedure)	
16.	(i) 1- Bromopentane		1
	(ii) 2-Bromopentane		1
	(iii) 2-Bromo-2-methylbutar	ne	1
17.		e more soluble in the melt than in the	1
	solid metal.		
	•	by oils forming froth while gangue	1
	particles are wetted by water		_
	adsorbent.	nixture are differently adsorbed on an	1
18.	(a) (A) CH ₃ CONH ₂		1/2
10.	(a) (A) CH ₃ CONH ₂ (B) CH ₃ NH ₂		1/2
	(C) CH ₃ NC		1/2
	w ==		
	NO ₂		
	(b) (A)		1/2
	NH ₂		
	(B)		1/2
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		

	(6)		
	(C)	1/2	
	H. N. O. CH	/2	
	H−N−C−CH₃		
10	(a) H N (CH) NH	1	
19.	(a) H ₂ N-(CH ₂) ₆ -NH ₂ , HOOC-(CH ₂) ₄ -COOH	1	
	(b)	1	
	H_2N NH_2		
	H ₂ N N NH ₂		
	NH		
	and HCHO	1	
20	(c) CH ₂ =CH-CH=CH ₂ , C ₆ H ₅ -CH=CH ₂	_	
20.	(a) Anionic detergents are sodium salts of sulphonated long chain alcohols or hydrocarbons / alkylbenzene sulphonate or		
	detergents whose anionic part is involved in cleansing action.	1	
	(b) Limited spectrum antibiotics are effective against a single	1	
	organism or disease.	1	
	(c) Antiseptics are the chemicals which either kill or prevent growth	1	
	of microbes on living tissues.	_	
21.	(a) Red phosphorous being polymeric is less reactive than white	1	
	phosphorous which has discrete tetrahedral structure.		
	(b) They readily accept an electron to attain noble gas configuration.	1	
	(c) Because of higher oxidation state(+5) of nitrogen in N ₂ O ₅	1	
22.	(i) Due to the resonance, the electron pair of nitrogen atom gets delocalised towards carbonyl group / resonating structures.		
		1	
	(ii)Because of +I effect in methylamine electron density at nitrogen increases whereas in aniline resonance takes place and electron		
	density on nitrogen decreases / resonating structures.		
	(iii)Due to protonation of aniline / formation of anilinium ion	1	
23.	(i) Concerned, caring, socially alert, leadership (or any other 2	1/2 + 1/2	
	values) (ii) Starch	1	
	(ii) Starch (iii) α -Helix and β-pleated sheets	1/2 + 1/2	
	(iv) Vitamin B / B_1 / B_2 / B_6 / C (any two)	1/2 + 1/2	
24.	a. (i) Availability of partially filled d-orbitals / comparable energies of ns	1	
	and (n-1) d orbitals		
	(ii) Completely filled d-orbitals / absence of unpaired d electrons cause	1	
	weak metallic bonding		
	(iii) Because Mn ²⁺ has d ⁵ as a stable configuration whereas Cr ³⁺ is	1	
	more stable due to stable t ³ 2g		
	b) Similarity-both are stable in +3 oxidation state/ both show		
	contraction/irregular electronic configuration (or any other suitable	1	
	similarity)		
	Difference- actinoids are radioactive and lanthanoids are not /		
	actinoids show wide range of oxidation states but lanthanoids don't	1	
	(or any other correct difference)		
24	OR	1/	
24	a. (i) Cr^{3+} , half filled t^3_{2g}	1/2 + 1/2	
	(ii) Mn ³⁺ , due to stable d ⁵ configuration in Mn ²⁺	1/2 + 1/2	

	(iii) Ti ⁴⁺ , No unpaired electrons	1/2 + 1/2	
	b. (i) $2MnO_4^- + 16H^+ + 5S^2 \rightarrow 5S + 2Mn^{2+} + 8H_2O$	1	
	(ii) $2KMnO_4 \rightarrow K_2MnO_4 + MnO_2 + O_2$	1	
25	a) $\Delta T_f = K_f m$	1/2	
	Here , $m = w_2 x 1000 / M_2 X M_1$		
	273.15-269.15 = K _f x 10 x1000/ 342 x90	1	
	K _f = 12.3 K kg/mol	1/2	
	$\Delta T_f = K_f m$		
	= 12.3 x 10 x1000/ 180x90		
	= 7.6 K $T_f = 273.15 - 7.6 = 265.55 \text{ K}$ (or any other correct method)	1	
	b) (i) Number of moles of solute dissolved in per kilo gram of the solvent.		
	(iii) Abnormal molar mass: If the molar mass calculated by using any of the	1	
	colligative properties to be different than theoretically expected molar	1	
	mass.	1	
	OR		
25.	$(P_A^0 - P_A)/P_A^0 = (w_B \times M_A)/(M_B \times w_A)$	1/2	
	$23.8 - P_A $		
	$\frac{23.8 - P_A}{23.8} = (30 \times 18) / 60 \times 846$	1	
	$23.8 - P_A = 23.8 \times [(30 \times 18) / 60 \times 846]$	1/	
		1/2	
	$23.8 - P_A = 0.2532$		
	$P_A = 23.55 mm Hg$		
	(b)		
	Ideal solution Non ideal solution		
	(a) It obeys Raoult's law (a) Does not obey Raoult's		
		4 .4	
	over the entire range of law over the entire	1+1	
	concentration. range of concentration.		
	(b) $\Delta_{mix}H=0$ (b) $\Delta_{mix}H$ is not equal		
	$(c) \Delta_{mix} V = 0$ to 0.		
	(c) $\Delta_{mix} V$ is not equal		
	$ (c) \Delta mix V $ is not equal		
	to 0.		
26	(any two correct difference)		
26.	a.		
	OH	1	
	CN	_	
	(i)		
	(ii)	1	
	11		

		1
	(iii) CH₃-CH=CH-CHO	1
	b. (i) Tollen's reagent test: Add ammoniacal solution of silver nitrate (Tollen's Reagent) in both the solutions. Butanal gives silver mirror	1
	whereas Butan-2-one does not.	
	(ii) Add neutral FeCl ₃ in both the solutions, phenol forms violet colour but benzoic acid does not.	1
	(or any other correct test)	
	OR	
26	(a) (i)Étard reaction	
	(4) (1)26414 164641611	
	CVV	
	$\begin{array}{c} \text{CH}_3 \\ + \text{ CrO}_2\text{Cl}_2 \xrightarrow{\text{CS}_2} & \begin{array}{c} \text{CH}(\text{OCrOHCl}_2)_2 \\ \\ \text{Chromium complex} \end{array} \xrightarrow{\text{H}_3\text{O}} & \begin{array}{c} \text{CHO} \\ \\ \text{Benzaldehyde} \end{array}$	
	Toluene CH ₃ (i) CrO2Cl2, CS2 CHO (ii) H3O+ Benzaldehyde	1
	(ii)Stephen reaction	
	11 0	
	$RCN + SnCl_2 + HCl \longrightarrow RCH = NH \xrightarrow{H_3O} RCHO$ Or	
		1
	(i) SnCl ₂ + HCl	1
	RCN → RCHO	
	(ii) H₃O+	
	(b) (i) COOH COCI CHO SOCI ₂ Benzolic acid Benzolic acid Chloride Rosenmund's reduction Pd/BaSO ₄ Benzaldehyde (ii)	1
	$\begin{array}{c} \text{COCH}_3 \\ \hline \\ \text{Acetophenone} \end{array} \xrightarrow{\text{I}_2/\text{NaOH}} \begin{array}{c} \text{COONa} \\ \hline \\ \text{Sodium} \\ \text{benzoate} \end{array} \xrightarrow{\text{Benzoic}} \begin{array}{c} \text{Benzoic} \\ \text{acid} \end{array}$	1

(c) $CH_3COOH \xrightarrow{Cl_2/P} CH_2COOH \xrightarrow{KOH(Aq)} CH_2COOH$	1
I I	
CI OH	
(or any other correct method)	

1	Dr. (Mrs.) Sangeeta Bhatia	12	Sh. S. Vallabhan
2	Dr. K.N. Uppadhya	13	Dr. Bhagyabati Nayak
3	Prof. R.D. Shukla	14	Ms. Anila Mechur Jayachandran
4	Sh. S.K. Munjal	15	Mrs. Deepika Arora
5	Sh. D.A. Mishra	16	Ms. Seema Bhatnagar
6	Sh. Rakesh Dhawan	17	Mrs. Sushma Sachdeva
7	Dr. (Mrs.) Sunita Ramrakhiani	18	Dr. Azhar Aslam Khan
8	Mrs. Preeti Kiran	19	Mr. Roop Narain Chauhan
9	Ms. Neeru Sofat	20	Mr. Mukesh Kumar Kaushik
10	Sh. Pawan Singh Meena	21	Ms. Abha Chaudhary
11	Mrs. P. Nirupama Shankar	22	Ms. Garima Bhutani

Marking scheme – 2017

CHEMISTRY (043)/ CLASS XII

Outside Delhi set (56/2)

Q.No	Value points	Marks
1.	a. Decreases	1/2
	b. No change	1/2
2.	Sol : example- paints, cell fluids (any one)	1/2 + 1/2
	3-phenyl-prop-2-en-1-ol	1
3.		
4.	H ₂ SO ₄	1
	X	1
5.		
6.	(i) [Cr(en) ₃]Cl ₃	1
	(ii) $K_2[Zn(OH)_4]$	1
	- · · · · · · · · · · · · · · · · · · ·	
	(a)	
7.		
		1
	S	
	0 0 0	
	ОН	
	(b)	
	F	
	CI	1
	CI	
	F	
8.	Lead storage battery	1
	Anode: $Pb_{(s)}+SO_4^{2-}$ (aq) $\rightarrow PbSO_{4(s)} + 2e^{-}$	1/2
	Cathode: $PbO_2 + SO_4^{2^-}_{(aq)} + 4H^+ + 2e^- \rightarrow PbSO_{4(s)} + 2 H_2O_{(l)}$	1/2
9.	n= given mass / molar mass	1/2
	= 8.1 / 27 mol	1/2
	Number of atoms= $\frac{8.1}{27}$ x 6.022x10 ²³	
	Number of atoms in one unit cell= 4 (fcc)	1/2
	Number of unit cells = $\left[\frac{8.1}{27} \times 6.022 \times 10^{23}\right] / 4$	1/2
	$=4.5 \times 10^{22}$	/2

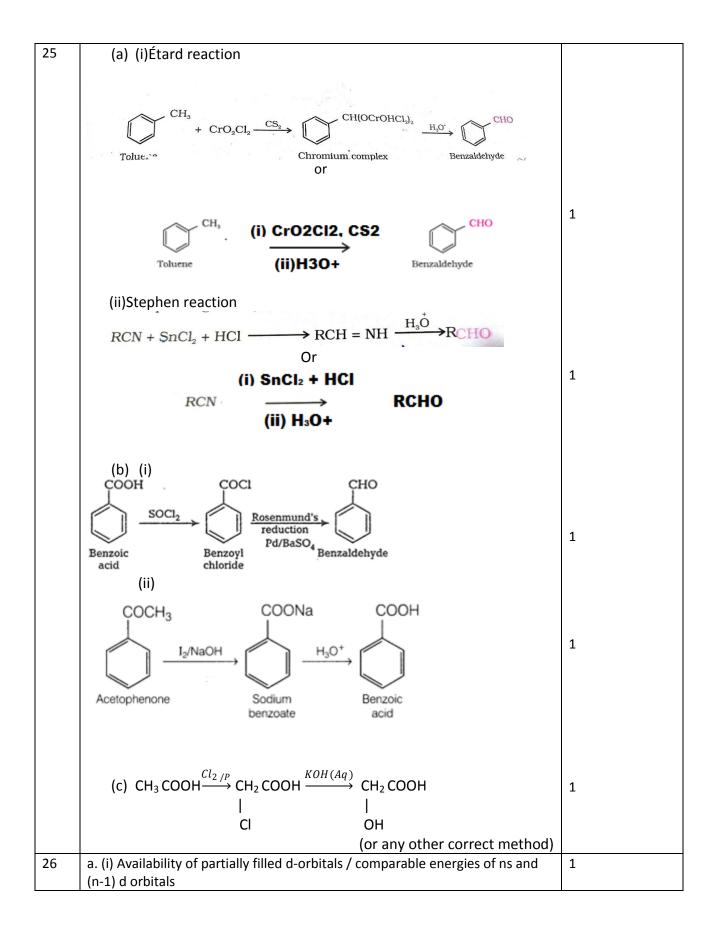
	Or	
	27g of Al contains= 6.022x10 ²³ atoms	1/2
	8.1g of Al contains = $(6.022x10^{23} / 27) \times 8.1$	
		1/2
	No of unit cells = total no of atoms /4	
	$= \left[\frac{8.1}{27} \times 6.022 \times 10^{23}\right] / 4$	1/2
	$=4.5 \times 10^{22}$	
	=4.5 X10	1/2
10.	a. p-cresol < Phenol < p-nitrophenol	1
10.		1
	$>C = C < + H - \ddot{O} + H \Longrightarrow - \ddot{C} - \ddot{C} + H^{5}\ddot{O}$	
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	1
	$C = C + H - O - H \Longrightarrow -C - C + H_2O$	
	b.	
	OR	
10		
		1
		1
	H ₃ C CH ₂	
	CH ₂	
	a.	
	b.	
	CI	
	<u></u> - ΟΙ	1
	H ₃ C \	_
	CH ₂	
	<u> </u>	
	(a)Metal is converted into volatile compound which on strong heating is	1
11.	decomposed to give pure metal.	
11.		
	(b)It acts as a leaching agent / forms soluble complex with Ag	1
	(c)Enhances non-wettability of mineral particles. For e.gPine oil, Fatty acids,	
	xanthates (Any one).	1/2 + 1/2
		1/2
	(a) (A) CH ₃ CONH ₂	
	(B) CH₃NH₂	1/2
12.	(C) CH ₃ NC	1/2
	, , - J - , , , , , , , , , , , , , , ,	
	NO ₂	
	(b) (A)	1/2
	NH ₂	
		1,
	(B)	1/2
	1-1	
	(6)	
	(C)	1/
	O Company of the Comp	1/2
	H-Ŋ-C-CH ₃	
	Ť	

13.	(a) $\Delta G^0 = -nFE^0_{cell}$ n=2	1/2
15.	ΔG^0 = - 2 x 96500 C /mol x 0.236 V = - 45548 J/mol	1/2
	= -45.548 kJ/mol	1/2
	(b) Q=It = 0.5 x 2 x 60 x 60	1/2
	= 3600 C 96500 C = 6.023×10^{23} electrons $3600 \text{ C} = 2.25 \times 10^{22}$ electrons	1
	(i) Due to the resonance, the electron pair of nitrogen atom gets delocalised towards carbonyl group / resonating structures. (ii)Because of +I effect in methylamine electron density at nitrogen	1
14.	increases whereas in aniline resonance takes place and electron density on nitrogen decreases / resonating structures.	1
	(iii)Due to protonation of aniline / formation of anilinium ion	1
	(a) Red phosphorous being polymeric is less reactive than white phosphorous which has discrete tetrahedral structure.	1
15	(b) They readily accept an electron to attain noble gas configuration.	1
	(c) Because of higher oxidation state(+5) of nitrogen in N_2O_5	1
16	(a) Anionic detergents are sodium salts of sulphonated long chain alcohols or hydrocarbons / alkylbenzene sulphonate or detergents whose anionic part is involved in cleansing action.	1
	(b) Narrow spectrum antibiotics- which are effective against either gram positive or gram negative bacteria.	1
	(c) Chemical compounds which are used for the treatment of excess acid produced in the stomach.	1
	(a) CH ₂ =CHCl (b)	1
17	H ₂ N N NH ₂ N NH ₂ NH ₃ NH ₄	1
	and HCHO (c)CH ₂ =CH-CH=CH ₂ , CH ₂ =CHCN	1
18.	(i) 1- Bromopentane (ii) 2-Bromopentane	1 1
	, ,	
	(iii) 2-Bromo-2-methylbutane	1

	2.:	[A] $[A]$	1/2
	t = -	$\frac{303}{k} \log \frac{[A]o}{[A]}$	
		ν []	
19.		2.202 100	
15.	20 min =-	1/	
		1/2	
	2 20		
	$t = \frac{2.30}{k}$		
	K	1/2	
	Divide (i) equa	tion by (ii)	
		400	
	$\frac{20}{t} = \frac{2.303}{k}$	$log \frac{100}{2r}$	1/2
	t k	- /5	/ -
	0.000	100	
	2.303	$-\log \frac{100}{25}$	
	$= \log 4/$		
	log 4		
		0.1250/ 0.6021	
	t= 96.3 mi		1
		(or any other correct procedure)	
	<u>(a)</u>		
	Multimolecular colloid	Associated colloid	
20	(a) Aggregation of large	(a) Aggregation of large	1
	number of small atoms or	number of ions in	
	molecules.	concentrated solutions.	
		5555	
	(b)		
		Dontization	
	Coagulation	Peptization	
	(a) Settling down of colloidal	(a) Conversion of precipitate	1
	particles.	into colloidal sol by	1
		adding small amount of	
		electrolyte.	
	(c)		
	Homogenous catalysis	Heterogeneous catalysis	
	(a) Reactants and catalyst	(a) Reactants and catalyst	
	are in same phase.	are in different phases.	
	are in same phase.	are in amerene phases.	1
		OR	
20	(a) Dispersed phase-liquid , D	ispersion medium – liquid	1
	1	on / both increase with increase in	
	1		1
	surface area (or any other co	1	
	(c) Hydrolysis / $\text{FeCl}_3 + 3\text{H}_2\text{O}$	\rightarrow Fe(OH) ₃ (sol)+3HCl	-
	l		I.

21.	(a) Linkage isomerism	1
	(b) In [NiCl ₄] ²⁻ , due to the presence of Cl ⁻ , a weak field ligand no pairing occurs whereas in [Ni(CN) ₄] ²⁻ , CN ⁻ is a strong field ligand and pairing takes place / diagrammatic representation	1
	(c) Because of very low CFSE which is not able to pair up the electrons.	1
22.	(a) Benzene – molecular solid	1/2
	Silver - metallic solid	1/2
	(b) Size of Ag ⁺ ion is smaller than Na ⁺ ion	1
	(c) p- type	1
23.	(i) Concerned , caring, socially alert, leadership (or any other 2 values) (ii) Starch	½ + ½ 1
	(iii) α -Helix and β-pleated sheets	1/2 + 1/2
	(iv) Vitamin B / B ₁ / B ₂ / B (any two)	1/2 + 1/2
	a) $\Delta T_f = K_f m$	1/2
	Here, $m = w_2 x 1000 / M_2 X M_1$	4
24	273.15-269.15 = K _f x 10 x1000/ 342 x90 K _f = 12.3 K kg/mol	1 1/2
24	$\Delta T_f = K_f m$	/2
	= 12.3 x 10 x1000/ 180x90	
	= 7.6 K	
	$T_f = 273.15 - 7.6 = 265.55 \text{ K}$ (or any other correct method)	1
	b) (i) Number of moles of solute dissolved in per kilo gram of the solvent.	1
	(ii) Abnormal molar mass: If the molar mass calculated by using any of the	1
	colligative properties to be different than theoretically expected molar mass.	
	OR	

24	$(P_A^0 - P_A)/P_A^0 = (w_B \times M_A)/(M_A^0)$	1/2	
	$\frac{23.8 - P_A}{23.8} = (30$	1	
	23.8	1	
	$23.8 - P_A = 23.8 \times [$	1/2	
		/2	
	$23.8 - P_A =$		
	$P_A = 23.55$		1
	(b)		
		T	
	Ideal solution	Non ideal solution	
	(a) It obeys Raoult's law over	(a) Does not obey Raoult's law	
	the entire range of	over the entire range of	1+1
	concentration.	concentration.	
	(b) $\Delta_{mix} H = 0$	(b) $\Delta_{mix} H$ is not equal to	
	(c) $\Delta_{mix} V = 0$	0.	
		(c) $\Delta_{mix} V$ is not equal to	
25	a.		
	OH		
	CN		1
	(i)		
	(ii)		1
	(ii) CH₃-CH=CH-CHO		1
	b. (i) Tollen's reagent test: Add ammonia		_
	Reagent) in both the solutions. Butanal g one does not.	1	
	(ii) Add neutral FeCl ₃ in both the solution		
	benzoic acid does not.	1	
	((or any other correct test)	



	(ii) Completely filled d-orbitals / absence of unpaired d electrons cause	1
	weak metallic bonding (iii) Because Mn ²⁺ has d ⁵ as a stable configuration whereas Cr ³⁺ is more stable due to stable t ³ _{2g}	1
	b) Similarity-both are stable in +3 oxidation state/ both show contraction/ irregular electronic configuration (or any other suitable similarity)	1
	Difference- actinoids are radioactive and lanthanoids are not / actinoids show wide range of oxidation states but lanthanoids don't (or any other correct difference)	1
	OR	
26	a. (i) Cr^{3+} , half filled t^3_{2g}	1/2 + 1/2
	(ii) Mn ³⁺ , due to stable d ⁵ configuration in Mn ²⁺	1/2 + 1/2
	(iii) Ti ⁴⁺ , No unpaired electrons	1/2 + 1/2
	b. (i) $2MnO_4^- + 16H^+ + 5S^2 \rightarrow 5S + 2Mn^{2+} + 8H_2O$	1
	(ii) $2KMnO_4 \rightarrow K_2MnO_4 + MnO_2 + O_2$	1

1	Dr. (Mrs.) Sangeeta Bhatia	12	Sh. S. Vallabhan	
2	Dr. K.N. Uppadhya	13	Dr. Bhagyabati Nayak	
3	Prof. R.D. Shukla	14	Ms. Anila Mechur Jayachandran	
4	Sh. S.K. Munjal	15	Mrs. Deepika Arora	
5	Sh. D.A. Mishra	16	Ms. Seema Bhatnagar	
6	Sh. Rakesh Dhawan	17	Mrs. Sushma Sachdeva	
7	Dr. (Mrs.) Sunita Ramrakhiani	18	Dr. Azhar Aslam Khan	
8	Mrs. Preeti Kiran	19	Mr. Roop Narain Chauhan	
9	Ms. Neeru Sofat	20	Mr. Mukesh Kumar Kaushik	
10	Sh. Pawan Singh Meena	21	Ms. Abha Chaudhary	
11	Mrs. P. Nirupama Shankar	22	Ms. Garima Bhutani	

Marking scheme – 2017

CHEMISTRY (043)/ CLASS XII

Outside Delhi set (56/3)

Q No.	Value Points	Mark
		S
1.	CI	1
2.	a. Decreases b. No effect	1/2 1/2
3.	HIO ₃	1
4.	Foam; e.g. froth, whipped cream, soap lather(any one)	1/2 + 1/2
5.	2-Methoxy-2-methylpropane	1
6.	a.	1,1
7.	Dry Cell / Leclanche cell Anode : $Zn_{(s)} \rightarrow Zn^{2+} + 2e^{-}$ Cathode : $MnO_2 + NH_4^+ + e^{-} \rightarrow MnO(OH) + NH_3$	1 ½ ½
8.	a. p-cresol < Phenol < p-nitrophenol	1
	OR	
8	H_3C CH_3 b.	1
	CI H ₃ C CH ₃	1
9.	a. K ₃ [Al(C ₂ O ₄) ₃] b. [Co Cl ₂ (en) ₂] ⁺	1 1
10.	n= given mass / molar mass	1/2
10.	= 8.1 / 27 mol	1/2
	Number of atoms= $\frac{8.1}{27}$ x 6.022x10 ²³	

	Number of stamp in angunit call	1 (foo)		
	Number of atoms in one unit cell=		1/2	
	Number of unit cells = $\left[\frac{8.1}{27} \times 6.022 \times 10^{23}\right] / 4$			
	$= 4.5 \times 10^{22}$			
	Or			
	27g of Al contains= 6.022x10 ²³ atc		½ ½	
	8.1g of Al contains =(6.022x10 ²³ / 27) x 8.1			
	No of unit cells = total no of atoms			
	$= \left[\frac{8.1}{27} \times 6.022 \times 10^{23}\right]$ $= 4.5 \times 10^{22}$	/ 4	1/2	
	$=4.5 \times 10^{22}$		1/2	
11.	(a) Linkage isomerism			
	(b) In [NiCl ₄] ²⁻ , due to the presence of Cl ⁻ , a weak field ligand			
		s in [Ni(CN) ₄] ²⁻ , CN ⁻ is a strong	1	
	_	kes place / diagrammatic		
		ikes place / diagrammatic		
	representation			
		which is not able to pair up the	1	
	electrons.			
12.				
	(a)			
	Multimolecular colloid	Associated colloid		
	(a) Aggregation of large	(a) Aggregation of large	1	
	number of small atoms	number of ions in		
	or molecules. concentrated solutions.			
	(b)			
	Coagulation	Peptization		
	(a) Settling down of	(a) Conversion of precipitate		
	colloidal particles.	into colloidal sol by	1	
	conoldar particles.	adding small amount of		
		electrolyte.		
		electrolyte.		
	(c)			
	Homogenous catalysis	Heterogeneous catalysis		
	(a) Reactants and catalyst	(a) Reactants and catalyst		
	are in same phase.	are in different phases.	1	
	are in same phase.	are in unferent phases.		
	C)R		
	(a) Dispersed phase-liquid, [Dispersion medium — liquid	1	
		non / both increase with increase in		
	surface area (or any other of	-	1	
		hydrolysis - \rightarrow Fe(OH) ₃ (sol)+3HCl	1	
12	(c) riyururysis / FeCi3+3H2O-	/ re(Un)3(SUI)+3HCI	-	
13.	(-) 0.00		1/	
	(a) $\Delta G^0 = -nFE^0_{cell}$		1/2	
	n= 2			
	$\Delta G^0 = -2 \times 96500 \text{ C/mol } \times 0.236 \text{ V}$	<i>I</i>	1/2	
	= - 45548 J/mol			
	= -45.548 kJ/mol		1/2	
	(1) 0 1+ 05 2 62 62		1/	
	(b) $Q = 1t = 0.5 \times 2 \times 60 \times 60$		1/2	

	= 3600 C	
	96500 C = 6.023 x 10 ²³ electrons	
	$3600 \text{ C} = 0.023 \times 10^{-2} \text{ electrons}$	1
14.		1/2 + 1/2
14.	_	1
		1
	c. In ferrimagnetism ,domains / magnetic moments are aligned in opposite direction in unequal numbers while in	1
	antiferromagnetic the domains align in opposite direction in	1
	equal numbers so they cancel magnetic moments completely	
	,net magnetism is zero / diagrammatic explanation.	
15.	a. On passing current through the electrolytic cell, the pure metal	1
	gets deposited on the cathode.	
	b. Evolution of SO ₂ gas	1
	c. It selectively prevents one of the sulphide ores from coming to	1
	the froth.	
16.	(a) (A) CH ₃ CONH ₂	1/2
	(B) CH ₃ NH ₂	1/2
	(C) CH ₃ NC	1/2
	NO ₂	
	(b) (A)	1/2
	NH ₂	
	(B)	1/2
	(C)	
	0	1/2
	H-N-C-CH ₃	
17.	(i) Due to the resonance, the electron pair of nitrogen atom gets	
	delocalised towards carbonyl group / resonating structures.	1
	(ii) Because of +I effect in methylamine electron density at nitrogen	
	increases whereas in aniline resonance takes place and electron	1
	density on nitrogen decreases / resonating structures. (iii) Due to protonation of aniline / formation of anilinium ion	1
18.	(a) Red phosphorous being polymeric is less reactive than white	1
10.	phosphorous which has discrete tetrahedral structure.	_
	(b) They readily accept an electron to attain noble gas	1
	configuration.	1
	(c) Because of higher oxidation state(+5) of nitrogen in N ₂ O ₅	
19.	a. Cationic detergents are quarternary ammonium salts of	1
	amines with acetates, chlorides or bromides as anions /	
	detergents whose cationic part is involved in cleansing	
	action.	1
	b. Broad spectrum antibiotics: Antibiotics which kill or inhibit a	
	wide range of Gram-positive and Gram-negative bacteria.	1
	c. Chemical compounds used for the treatment of stress and mild	
20	or severe mental diseases.	1
20.	a. $CF_2=CF_2$	1

		1
	H ₂ N N NH ₂ N NH ₂ and HCHO b.	1
	$ \begin{array}{c} $	1
21.	(i) 1- Bromopentane (ii) 2-Bromopentane (iii) 2-Bromo-2-methylbutane	1 1 1
22.		1/2
22.	$t = \frac{2.303}{k} \log \frac{[A]o}{[A]}$	/2
	$20 \min = \frac{2.303}{k} \log \frac{100}{75} - (i)$	1/2
	$t = \frac{2.303}{k} \log \frac{100}{25} -\text{(ii)}$	1/2
	Divide (i) equation by (ii)	
	$\frac{20}{t} = \frac{2.303}{k} \log \frac{100}{75}$	1/2
	$\frac{2.303}{k} \log \frac{100}{25}$	
	$= \frac{\log 4}{\log 4}$	
	20/t = 0.1250/ 0.6021	
	t= 96.3 min	1
22	(or any other correct procedure) (i) Concerned, caring, socially alert, leadership (or any other 2)	1/ + 1/
23.	values)	1/2 + 1/2
	(ii) Starch	1
	(iii) α -Helix and β-pleated sheets (iv) Vitamin B / B ₁ / B ₆ / C (any two)	1/2 + 1/2
24	, , , , , , , , , , , , , , , , , , , ,	1/2 + 1/2
24.	a. OH CN	1
		1
	(ii) CH ₃ -CH=CH-CHO	1
	b. (i) Tollen's reagent test: Add ammoniacal solution of silver nitrate (Tollen's Reagent) in both the solutions. Butanal gives silver mirror	1
	whereas Butan-2-one does not.	
	(ii) Add neutral FeCl₃ in both the solutions, phenol forms violet colour	

	but benzoic acid does not. (or any other correct test)	1
	OR	
2 4	(a) (i)Étard reaction $ \begin{array}{c} CH_3 \\ + CrO_2Cl_2 \xrightarrow{CS_2} \\ Or \end{array} $ CH(OCrOHCl ₂) ₂ $\xrightarrow{H_3O^*} $ CHO	
	Toluene (i) CrO2Cl2, CS2 (ii) H3O+ Benzaldehyde	1
	(ii)Stephen reaction $RCN + SnCl_2 + HCl \longrightarrow RCH = NH \xrightarrow{H_3O} RCHO$ Or (i) $SnCl_2 + HCl$ $RCN \longrightarrow RCHO$ (ii) H_3O+	1
	(b) (i) COOH COCI CHO SOCI ₂ Benzoic acid Benzoyl chloride (ii)	1
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1
	(c) $CH_3 COOH \xrightarrow{Cl_2/p} CH_2 COOH \xrightarrow{KOH(Aq)} CH_2 COOH$	1
25.	a. (i) Availability of partially filled d-orbitals / comparable energies of ns and (n-1) d orbitals (ii) Completely filled d-orbitals / absence of unpaired d electrons	1
	(ii) Completely filled d-orbitals / absence of unpaired d electrons cause weak metallic bonding	1

	1		
	(iii) Because Mn ²⁺ has d ⁵ as a stable configuration whereas Cr ³⁺	1	
	is more stable due to stable t_{2g}^3		
	b) Similarity-both are stable in +3 oxidation state/ both show		
	contraction/ irregular electronic configuration (or any other	1	
	suitable similarity)		
	Difference- actinoids are radioactive and lanthanoids are not /		
	actinoids show wide range of oxidation states but lanthanoids	1	
	don't (or any other correct difference)		
	OR		
	a. (i) Cr^{3+} , half filled t^{3}_{2g}	1/2 + 1/2	
	(ii) Mn ³⁺ , due to stable d ⁵ configuration in Mn ²⁺	1/2 + 1/2	
	(iii) Ti ⁴⁺ , No unpaired electrons	1/2 + 1/2	
	b. (i) $2MnO_4^- + 16H^+ + 5S^2 \rightarrow 5S + 2Mn^{2+} + 8H_2O$	1	
	(ii) $2KMnO_4 \rightarrow K_2MnO_4 + MnO_2 + O_2$	1	
26.	a) $\Delta T_f = K_f m$	1/2	
	Here, $m = w_2 x 1000 / M_2 X M_1$		
	273.15-269.15 = K _f x 10 x1000/ 342 x90	1	
	$K_f = 12.3 \text{ K kg/mol}$	1/2	
	$\Delta T_f = K_f m$		
	= 12.3 x 10 x1000/ 180x90		
	= 7.6 K		
	$T_f = 273.15 - 7.6 = 265.55 \text{ K}$ (or any other correct method)	1	
	b) (i) Number of moles of solute dissolved in per kilo gram of the solvent.	1	
	(ii) Abnormal molar mass: If the molar mass calculated by using any of	1	
	the colligative properties to be different than theoretically expected	1	
		-	
	molar mass _.		
	OR OR	1/	
	$(P_A^0 - P_A)/P_A^0 = (w_B \times M_A)/(M_B \times w_A)$	1/2	
	$\frac{23.8 - P_A}{23.8} = (30 \times 18) / 60 \times 846$	4	
	23.8	1	
	$23.8 - P_A = 23.8 \times [(30 \times 18) / 60 \times 846]$	1/	
		1/2	
	$23.8 - P_A = 0.2532$		
	$P_A = 23.55 mm Hg$	1	
l		1	

(b)			
	Ideal solution	Non ideal solution	1+1
	(a) It obeys Raoult's law	(a) Does not obey Raoult's	
	over the entire range of	law over the entire	
	concentration.	range of concentration.	
	$_{(b)} \Delta_{mix} H = 0$	(b) $\Delta_{mix}H$ is not equal	
	$_{(c)} \Delta_{mix} V = 0$	to 0.	
		(c) $\Delta_{mix}V$ is not equal	
		to 0.	
		(any two correct difference)	

1	Dr. (Mrs.) Sangeeta Bhatia	12	Sh. S. Vallabhan	
2	Dr. K.N. Uppadhya	13	Dr. Bhagyabati Nayak	
3	Prof. R.D. Shukla	14	Ms. Anila Mechur Jayachandran	
4	Sh. S.K. Munjal	15	Mrs. Deepika Arora	
5	Sh. D.A. Mishra	16	Ms. Seema Bhatnagar	
6	Sh. Rakesh Dhawan	17	Mrs. Sushma Sachdeva	
7	Dr. (Mrs.) Sunita Ramrakhiani	18	Dr. Azhar Aslam Khan	
8	Mrs. Preeti Kiran	19	Mr. Roop Narain Chauhan	
9	Ms. Neeru Sofat	20	Mr. Mukesh Kumar Kaushik	
10	Sh. Pawan Singh Meena	21	Ms. Abha Chaudhary	
11	Mrs. P. Nirupama Shankar	22	Ms. Garima Bhutani	