# **CBSE Class 12 Chemistry Question Paper Solution 2017**

#### Marking scheme – 2017

#### CHEMISTRY (043)/ CLASS XII

FOREIGN 2017 - Set - 56/2/1

Q.NO.	VALUE POINTS	MARKS
1	$P_3Q_4$	1
2	$H_2$ Te < $H_2$ Se < $H_2$ S < $H_2$ O	1
3	To make the surface available again for more reaction to occur / To remove the product formed from the surface of the catalyst.	1
4	2 – Phenylethanol	1
5	Neopentane / C(CH <sub>3</sub> ) <sub>4</sub>	1
6	a. $H_2O \qquad [O]$ $CH_3CH=CH_2 \longrightarrow CH_3CH(OH)CH_3 \longrightarrow CH_3COCH_3$ $H^+$ b.	1
	$CH_3CH_2COOH \xrightarrow{Br2/Red P} i) \text{ aq KOH or NaOH} $ $CH_3CH_2COOH  CH_3CH(Br)COOH  CH_3CH \text{ (OH)COOH} $ $ii)H^+$ $\text{ (or any other suitable method)}$	1
6	OR a. Etard reaction:	
	$\begin{array}{c} \text{CH}_3 \\ + \text{ CrO}_2\text{Cl}_2 \xrightarrow{\text{CS}_2} \end{array} \xrightarrow{\text{CH}(\text{OCrOHCl}_2)_2} \xrightarrow{\text{H}_3\text{O}^*} \xrightarrow{\text{CHO}} \\ \text{Toluene} \\ \text{Chromium complex} \\ \text{Or} \\ \end{array}$	1
	b. Wolff-Kishner reduction:  C=0 NH <sub>2</sub> NH <sub>2</sub> C=NNH <sub>2</sub> KOH/ethylene glycol heat  CH <sub>2</sub> + N <sub>2</sub>	
	or  (i) NH2NH2  ————————————————————————————————	1

7	Properties that depend on the number of solute particles irrespective of their nature relative to the total number of particles present in the solution.	1
	Osmotic Pressure	1
8	a.	1
	cis/ trans-diamminedichloridoplatinum(II)	
	b.	
	[Co(NH <sub>3</sub> ) <sub>4</sub> (H <sub>2</sub> O)Cl] (NO <sub>3</sub> ) <sub>2</sub>	1
9	a. Zinc to silver	1
	b. Concentration of Zn <sup>2+</sup> ions will increase and Ag <sup>+</sup> ions will	1
	decrease.	
10	a. $Cr^{3+}$	1/2
	b.Mn <sup>3+</sup>	1/2
	c. Ti <sup>4+</sup>	1/2
	d. Mn <sup>3+</sup>	1/2
11	$A = \pi r^2$	
	$= 3.14 \times 0.5 \times 0.5 \text{ cm}^2$	
	$= 0.785 \text{ cm}^2$	1/2
	/= 45.5 cm	
	$\rho = R \times A / I$	
	$\rho = 4.55 \times 10^{3} \Omega \times 0.785 \text{ cm}^{2} / 45.5 \text{ cm}$	1/
	$ ho$ = 78.5 $\Omega$ cm	1/2
	conductivity , κ = 1/ ρ	1/2
	$= 1/78.5 \mathrm{S  cm^{-1}} = 0.0127 \mathrm{S  cm^{-1}}$	1/2
	- 1/76.5 5 Cm - 0.0127 5 Cm	/2
	molar conductivity $\Lambda m = \kappa \times 1000/C$	1/2
	$= 0.0127 \text{ S cm}^{-1} \times 1000/0.05 \text{ mol/cm}^{3}$	
	$= 254.77  \text{S cm}^2  \text{mol}^{-1}$	1/2
	or	
	$A = \pi r^2$	
	$= 3.14 \times 0.5 \times 0.5 \text{ cm}^2$	
	$= 0.785 \text{ cm}^2$	1/2
	<i>I</i> = 45.5 cm	
	$G^* = I/A = 45.5 \text{ cm}/0.785 \text{ cm}^2$	
	= 57.96 cm <sup>-1</sup>	1/2
	$K = G^*/R$	1/2
	= 57.96 cm <sup>-1</sup> / $4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$	1/2
	$\Lambda m = \kappa \times 1000/C$	1/2
	= $[1.27 \times 10^{-2} \mathrm{S cm^{-1}}] \times 1000 / 0.05 \mathrm{mol/cm^3}$	

	= 254.77 S cm <sup>2</sup> mol <sup>-1</sup>	1/2
12	a. The particles of the dispersed phase have no affinity for the dispersion medium/solvent repelling (hating) colloidal sols. Example: metal and their sulphides	
	b. The reactant and the catalyst are in the same phase. $HCI(I)$ $CH_3COOCH_3(I) + H_2O(I) \rightarrow CH_3COOH(aq) + CH_3OH(aq)$	1/2 + 1/2
	c. oil is dispersed in water/Oil is dispersed phase and water is dispersion medium.  Ex- milk	1/2+ 1/2
	(or any other correct example) OR	
12	Physisorption Chemisorption  Because of van der Waals forces Caused by chemical bond formation	(1+1+1)
	2 Reversible 3 Enthalpy of adsorption is low(20-40 kJ/mol)  Enthalpy of adsorption is high(80-240)kJ/mol	
13	Given: $T_b$ of glucose solution= $100.20^\circ C$ $\Delta T_b = K_b.m$ $m = 0.20/0.512$ $m = 0.390$ mol/kg $\Delta T_f = K_f.m$ $\Delta T_f = 1.86$ K kg/mol x 0.390 mol/kg $\Delta T_f = 0.725$ K Freezing point of solution = $273.15K - 0.725$ $= 272.425K$	
14	<ul> <li>a. Metal is converted into a volatile compound which on strong heating decomposes to give pure metal.</li> <li>b. It selectively prevents one of the sulphide ores from coming to the froth.</li> <li>c. Coke</li> </ul>	
15	a. For bcc structure $a = 4r/\sqrt{3}$ or $r = \sqrt{3}a/4$ $r = \sqrt{3} \times 400 \text{ pm } /4$	1/2

	4.702 400 /4	
	= 1.732 x 400 pm/4	
	= 173.2 pm	1/2
	b.	
	(i) Impurity defect	1
	(ii) Cationic vacancies are created.	1
16	a. Due to steric hindrance and +I effect caused by two alkyl groups in	1/2+ 1/2
	propanone.	
	b. Due to electron withdrawing nature of –NO <sub>2</sub> group which	
	increases the acidic strength and decreases the pK <sub>a</sub> value.	1
	c. $(CH_3)_2CH$ -CHO has one $\alpha$ -H atom whereas $\alpha$ - H atom is absent in	
	$(CH_3)_3C$ -CHO.	1
17	a. Ethylene Glycol and Terephthalic acid	1/2 + 1/2
17	HOH <sub>2</sub> C-CH <sub>2</sub> OH , p-HOOC-C <sub>6</sub> H <sub>4</sub> -COOH	/2 1 /2
	110112C-C112011, p-1100C-C6114-C0011	
	h Totrofluoroothono CF -CF	1/2 + 1/2
	b. Tetrafluoroethene , CF <sub>2</sub> =CF <sub>2</sub>	/2 + /2
	c. Hexamethylenediamine and adipic acid	
	$H_2N(CH_2)_6NH_2$ , $HOOC(CH_2)_4$ COOH	1/2 + 1/2
18	a. It is the magnitude of difference in energy between the two sets	
	of d orbital i.e. t <sub>2</sub> g and e <sub>g</sub>	1
	$t_{2g}^3 eg^1$	1
	b. In $[Ni(H_2O)_6]^{2+}$ , $Ni^{+2}(3d^8)$ has two unpaired electrons which do not	
	pair up in the presence of weak field ligand H <sub>2</sub> O.	1
19	a. (CH <sub>3</sub> ) <sub>3</sub> C-OH undergoes dehydration.	1/2 + 1/2
	CH <sub>3</sub> CH <sub>3</sub>	
	$CH_3 - C - OH \xrightarrow{Cu} CH_3 - C = CH_2$	
	CH <sub>3</sub> 573K	
	b. Methyl group is introduced at ortho and para positions.	1/2+ 1/2
	OCH OCH, OCH,	/2  /2
	OCH <sub>3</sub>	
	+CH <sub>3</sub> Cl Anhyd. AlCl <sub>3</sub> +	
	CS <sub>2</sub> CH <sub>3</sub>	
	c. Phenol is converted to benzene.	
	OH	4, 4,
	$+$ Zn $\longrightarrow$ $+$ ZnO	1/2+ 1/2

20	a. b. C.	1,1,1
	CH OCH -Me  CH -Me  CH 2C1	
21	a. In CuCl <sub>2</sub> , Cu is in +2 oxidation state which is more stable due to high hydration enthalpy as compared to Cu <sub>2</sub> Cl <sub>2</sub> in which Cu is in +1 oxidation state	1
	<ul><li>b. Due to lanthanoid contraction</li><li>c. Because HCl is oxidised to chlorine.</li></ul>	1
22	a. Neurologically active drugs / chemical compounds used for treatment of stress / anxiety and mild or even severe mental diseases.	1
	<ul> <li>b. Anionic detergents are sodium salts of sulphonated long chain alcohols or hydrocarbons / alkylbenzene sulphonate or detergents whose anionic part is involved in cleansing action.</li> <li>c. Disinfectants kill or prevent growth of microbes and are applied</li> </ul>	1
	on inanimate / non living objects	1
23	(i)Concerned, caring, socially alert, leadership (or any other 2 values)	1/2 + 1/2
	(ii)starch	1
	(iii) $\alpha$ -Helix and $\beta$ -pleated sheets	1/2 + 1/2
	(iv)Vitamin B / $B_1$ / $B_2$ / $B_6$ / $C$ (any two )	1/2 + 1/2
24	k= 2.303 log [A] <sub>0</sub> t [A] = 2.303 log 100	1/2
	$ \begin{array}{r} -2.303 \log_{100} 100 \\ 40 25 \\ = 2.303 \log_{40} 4 \\ 40 \\ = 2.303 \times 0.6021 \\ 40 \end{array} $	1/2
	$k = 0.0347 \text{ min}^{-1}$ $t_{1/2} = 0.693$	1/2
	k k	1/2

	$t_{1/2} = 0.693$ = 19.98 min = 20min	1
	0.0347 min <sup>-1</sup> b. (i) First order reaction	1
	(ii) Zero order reaction	1
	OR	
24	(a)	
	Rate = $k [NO]^x [O_2]^y$	
	$7.2 \times 10^{-2} = k[0.3]^{x} [0.2]^{y}$ Eqn (1)	
	$6.0 \times 10^{-3} = k[0.1]^{x} [0.1]^{y}$ Eqn (2)	
	$2.88 \times 10^{-1} = k[0.3]^{x} [0.4]^{y}$ Eqn (3)	
	$2.40 \times 10^{-2} = k[0.4]^{x} [0.1]^{y}$ Eqn (4)	
	Dividing eqn 4 by eqn 2	
	$2.40 \times 10^{-2} = k[0.4]^{x} [0.1]^{y}$	
	$6.0 \times 10^{-3} = k[0.1]^{x} [0.1]^{y}$	
	x=1	1
	Dividing eqn 3 by eqn 1	
	$\frac{2.88 \times 10^{-1} = k[0.3]^{x}[0.4]^{y}}{1.50 \times 10^{-3}}$	
	$7.2 \times 10^{-2} = k[0.3]^{x} [0.2]^{y}$	
	y = 2	1
	order w.r.t. NO = 1, order w.r.t $O_2$ is 2	1/2 , 1/2
	01de1 w.i.t. 140 - 1, 01de1 w.i.t 02132	/2 , /2
	(b) Rate law	
	Rate = $k [NO]^1 [O_2]^2$ , over all order of the reaction is 3.	1/2 + 1/2
	c. Rate constant $k = rate = 7.2 \times 10^{-2}$	
	$[NO]^1 [O_2]^2 \overline{0.3 \times (0.2)^2}$	
	k= 6.0 mol <sup>-2</sup> L <sup>2</sup> min <sup>-1</sup>	1
25	a. (i) Thermal stability of hydrides decreases down the group/ Bond	1
	dissociation enthalpy decreases down the group.	
	(ii) Because Cl <sub>2</sub> in presence of moisture liberates nascent oxygen.	1
	(iii) Interatomic interactions are weak	1
	b.(i) (ii)	
	(11)	
	P P Xe F	1,1
	OR	
<u> </u>	- -	1

25	a) Size of Nitrogen is smaller than Chlorine.	1
	b) $2F_2 + 2H_2O \rightarrow 4HF + O_2$ / HF and $O_2$ are produced	1
	c) PH <sub>3</sub> /Phosphine	1
	d) XeF <sub>2</sub>	1
	e) $[Fe(H_2O)_6]^{2+} + NO - \rightarrow [Fe(H_2O)_5(NO)]^{2+} + H_2O$	1
26.		1×5=5
	O II	
	NHCOCH <sub>3</sub> HN CH <sub>3</sub>	
	NH <sub>2</sub>	
	$(A) \qquad (B) \qquad (C) \qquad ^{NO_2}$	
	(D) (E)	
	NH <sub>2</sub> NH <sub>3</sub> HSO <sub>4</sub>	
	NH <sub>3</sub> HSO <sub>4</sub>	
	NO <sub>2</sub>	
	OR	

26		
	a. i) iii) iii)	
		1,1,1
	b. $C_6H_5NH_2 < C_6H_5CH_2NH_2 < CH_3NH_2 < (CH_3)_2NH$	1
	c. Add $NaNO_2$ + HCl to both the compounds at 273K followed by	
	addition of phenol. Aniline gives orange dye	1
	(or any other correct test)	

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# Marking scheme – 2017

# CHEMISTRY (043)/ CLASS XII

#### FOREIGN 2017 - Set - 56/2/2

Q.NO	VALUE POINTS	MARK
		S
1	2-Methylbut-3-en-2-ol	1
2	Neopentane , C(CH₃)₄	1
3	$H_2Te > H_2Se > H_2S > H_2O$	1
4	$P_3Q_2$	1
5	To make the surface available again for more reaction to occur / To remove the product formed from the surface of the catalyst.	1
6	a. Pentaamminesulphatocobalt(III) chloride b.[Pt(NH <sub>3</sub> ) <sub>2</sub> Cl(NO <sub>2</sub> )]	1
7	<ul> <li>a. Zinc to silver</li> <li>b. Concentration of Zn<sup>2+</sup> ions will increase and Ag<sup>+</sup> ions will decrease.</li> </ul>	1
8	a. Cr <sup>3+</sup> b.Mn <sup>3+</sup> c. Ti <sup>4+</sup> d. Mn <sup>3+</sup>	½ ½ ½ ½ ½
9	a. $H_2O$ $CH_3CH=CH_2$ $H^+$ $H$	1
0	OR Standard and Standard Stand	
9	a.Etard reaction:	1

	or	
	CH, (i) CrO2CI2, CS2	
	Toluene (ii)H3O+ Benzaldehyde	
	b.Wolff-Kishner reduction:	
	b. Wolli-Risiller reduction.	
	$C = O \xrightarrow{NH_2NH_2} C = NNH_2 \xrightarrow{KOH/ethylene glycol} CH_2 + N_2$	
	or	
	$c=0$ (i) NH2NH2 $cH_2 + N_2$	1
10	(ii) KOH/ethylene glycol , heat	
10	The relative lowering of vapour pressure of a solution is equal to the mole fraction of the solute. /	
	The vapour pressure of a solution of a non-volatile solute is	_0_
	equal to the vapour pressure of the pure solvent at that	1
	temperature multiplied by its mole fraction.	
	Negative deviation due to formation of Hydrogen bond between chloroform and acetone.	1/ 1/
11		1/2 + 1/2
11	а. Phenol & Formaldehyde	1/2+ 1/2
	& HCHO	
	b.Vinyl chloride, CH <sub>2</sub> =CHCl	1/2+1/2
	c. 1,3-Butadiene & styrene	
	CH = CH <sub>2</sub>	
	CH <sub>2</sub> =CH-CH=CH <sub>2</sub> and	1/2+1/2
12	a. It is the magnitude of difference in energy between the	1
	two sets of d orbital i.e. t₂g and e <sub>g</sub>	
	$t_{2g}^4 eg^0$	1
	b. In [Ni(CN) <sub>4</sub> ] <sup>2-</sup> , CN <sup>-</sup> is a strong field ligand and pairing takes	
	place whereas in [NiCl <sub>4</sub> ] <sup>2-</sup> , due to the presence of Cl <sup>-</sup> , a weak	1
	field ligand no pairing occurs / diagrammatic representation	1

13.	2 (CH ) C OH undergoes debudration	1/2 + 1/2
15.	a. (CH <sub>3</sub> ) <sub>3</sub> C-OH undergoes dehydration.	/2 + /2
	$CH - C - OH \xrightarrow{Cu} CH - C = CH$	
	$CH_3 - C - OH \xrightarrow{Cu} CH_3 - C = CH_2$ $CH_3 - C - OH \xrightarrow{573K} CH_3 - C = CH_2$	
	b. Methyl group is introduced at ortho and para positions.	1/ 1/
	OCH,	1/2+1/2
	OCH <sub>3</sub>	
	+CH <sub>3</sub> Cl Anhyd. AlCl <sub>3</sub> +	
	CS <sub>2</sub> CH.	
	c. Phenol is converted to benzene.	
	ОН	
		1/2+1/2
	$+$ Zn $\longrightarrow$ $+$ ZnO	
	· ·	
14	a. Eu <sup>2+</sup> (4f <sup>7</sup> ) is a strong reducing agent because Eu <sup>3+</sup> is more	1
	stable than Eu <sup>2+</sup> .	1
	b. Dichromate ion changes to chromate ion /	
	OH <sup>-</sup>	1
	$Cr_2O_7^{2-}$ (orange) $\rightarrow$ $CrO_4^{2-}$ (yellow)	OX
	c. Due to the irregular variation in ionisation enthalpies (sum	. 7
	of 1 <sup>st</sup> and 2 <sup>nd</sup> ionisation enthalpies), heat of sublimation and	1
		1
	enthalpy of hydration/ due to irregular electronic	
	configurations from left to right in a period which changes the	
	ionisation potential.	
15	a. Antiseptics are the chemicals which either kill or prevent	
	growth of microbes on living tissues.	1
	b. Cationic detergents are quarternary ammonium salts of amines with acetates, chlorides or bromides as anions / detergents whose	
	cationic part is involved in cleansing action.	1
	c. Antibiotics which kill or inhibit a wide range of Gram-positive	
	and Gram-negative bacteria.	1
16	$A = \pi r^2$	
	$= 3.14 \times 0.5 \times 0.5 \text{ cm}^2$	
	$= 0.785 \text{ cm}^2$	1/2
	<i>I</i> = 45.5 cm	
	$\rho = R \times A/I$	
	$\rho = 4.55 \times 10^3 \Omega \times 0.785 \text{ cm}^2 / 45.5 \text{ cm}$	
	$\rho$ = 78.5 $\Omega$ cm	1/2
		/ <b>-</b>
	conductivity , κ = 1/ ρ	1/2
	$= 1/78.5  \text{S cm}^{-1} = 0.0127  \text{S cm}^{-1}$	1/2
	- 1/10.33 CIII - 0.012/3 CIII	/2

molar conductivity $\Lambda m = \kappa \times 1000/C$ $= 0.0127 \text{ S cm}^{-1} \times 1000/0.05 \text{ mol/cm}^3$ $= 254.77 \text{ S cm}^2 \text{ mol}^{-1}$ 72  or $A = \pi r^2$ $= 3.14 \times 0.5 \times 0.5 \text{ cm}^2$ $= 0.785 \text{ cm}^2$ $/= 45.5 \text{ cm}$ $G^* = I/A = 45.5 \text{ cm}/0.785 \text{ cm}^2$ $= 57.96 \text{ cm}^{-1}$ $/= 4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $/= 57.96 \text{ cm}^{-1}/4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $/= 57.96 \text{ cm}^{-1}/4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $/= 57.96 \text{ cm}^{-1}/4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $/= 57.96 \text{ cm}^{-1}/4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $/= 57.96 \text{ cm}^{-1}/4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $/= 57.96 \text{ cm}^{-1}/4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $/= 57.96 \text{ cm}^{-1}/4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $/= 57.96 \text{ cm}^{-1}/4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $/= 57.96 \text{ cm}^{-1}/4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $/= 57.96 \text{ cm}^{-1}/4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $/= 57.96 \text{ cm}^{-1}/4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $/= 57.96 \text{ cm}^{-1}/4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $/= 57.96 \text{ cm}^{-1}/4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $/= 57.96 \text{ cm}^{-1}/4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $/= 57.96 \text{ cm}^{-1}/4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}/4.55 \times$	
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$A = \pi r^2$ $= 3.14 \times 0.5 \times 0.5 \text{ cm}^2$ $= 0.785 \text{ cm}^2$ $/= 45.5 \text{ cm}$ $G^* = I/A = 45.5 \text{ cm} / 0.785 \text{ cm}^2$ $= 57.96 \text{ cm}^{-1}$ $K = G^* / R$ $= 57.96 \text{ cm}^{-1} / 4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $\Delta m = \kappa \times 1000 / C$ $= [1.27 \times 10^{-2} \text{ S cm}^{-1}] \times 1000 / 0.05 \text{ mol/cm}^3$ $= 254.77 \text{ S cm}^2 \text{ mol}^{-1}$ $2.54.77 \text{ S cm}^2 \text{ mol}^{-1}$ $3.  The particles of the dispersed phase have no affinity for the dispersion medium/solvent repelling (hating) colloidal sols. Example: metal and their sulphides  b. The reactant and the catalyst are in the same phase.$	
$= 3.14 \times 0.5 \times 0.5 \text{ cm}^2$ $= 0.785 \text{ cm}^2$ $/= 45.5 \text{ cm}$ $G^* = I/A = 45.5 \text{ cm}/ 0.785 \text{ cm}^2$ $= 57.96 \text{ cm}^{-1}$ $K = G^*/R$ $= 57.96 \text{ cm}^{-1}/ 4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $\Delta m = \kappa \times 1000/C$ $= [1.27 \times 10^{-2} \text{ S cm}^{-1}] \times 1000 / 0.05 \text{ mol/cm}^3$ $= 254.77 \text{ S cm}^2 \text{ mol}^{-1}$ $2.7  a. The particles of the dispersed phase have no affinity for the dispersion medium/solvent repelling (hating) colloidal sols. Example: metal and their sulphides  b. The reactant and the catalyst are in the same phase.$	
$= 0.785 \text{ cm}^2$ $I = 45.5 \text{ cm}$ $G^* = I/A = 45.5 \text{ cm} / 0.785 \text{ cm}^2$ $= 57.96 \text{ cm}^{-1}$ $K = G^* / R$ $= 57.96 \text{ cm}^{-1} / 4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $\Delta m = \kappa \times 1000/C$ $= [1.27 \times 10^{-2} \text{ S cm}^{-1}] \times 1000 / 0.05 \text{ mol/cm}^3$ $= 254.77 \text{ S cm}^2 \text{ mol}^{-1}$ $254.77 \text{ S cm}^2 \text{ mol}^{-1}$ $3a. \text{ The particles of the dispersed phase have no affinity for the dispersion medium/solvent repelling (hating) colloidal sols. Example: metal and their sulphides  254.77 \text{ S cm}^2 \text{ mol}^{-1} 35.77 \text{ S cm}^2 \text{ mol}^{-1} 35.77 \text{ S cm}^2 \text{ mol}^{-1} 36.77  mol$	
$G^* = I/A = 45.5 \text{ cm} / 0.785 \text{ cm}^2$ $= 57.96 \text{ cm}^{-1}$ $K = G^* / R$ $= 57.96 \text{ cm}^{-1} / 4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1}$ $\Delta m = \kappa \times 1000 / C$ $= [1.27 \times 10^{-2} \text{ S cm}^{-1}] \times 1000 / 0.05 \text{ mol/cm}^3$ $= 254.77 \text{ S cm}^2 \text{ mol}^{-1}$ $2$ 17  a. The particles of the dispersed phase have no affinity for the dispersion medium/solvent repelling (hating) colloidal sols.Example: metal and their sulphides  b. The reactant and the catalyst are in the same phase.	
$ = 57.96 \text{ cm}^{-1} $ $ K = G^*/R $ $ = 57.96 \text{ cm}^{-1}/4.55 \times 10^3 \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1} $ $ \Delta m = \kappa \times 1000/C $ $ = [1.27 \times 10^{-2} \text{ S cm}^{-1}] \times 1000 / 0.05 \text{ mol/cm}^3 $ $ = 254.77 \text{ S cm}^2 \text{ mol}^{-1} $ $ a. \text{ The particles of the dispersed phase have no affinity for the dispersion medium/solvent repelling (hating) colloidal sols. Example: metal and their sulphides $ $ b. \text{ The reactant and the catalyst are in the same phase.} $	
$= 57.96 \text{ cm}^{-1} / 4.55 \times 10^{3} \ \Omega = 1.27 \times 10^{-2} \text{ S cm}^{-1} $	
Am = κ x 1000/C  = [1.27 × 10 <sup>-2</sup> S cm <sup>-1</sup> ] × 1000 / 0.05 mol/cm <sup>3</sup> = 254.77 S cm <sup>2</sup> mol <sup>-1</sup> 2. The particles of the dispersed phase have no affinity for the dispersion medium/solvent repelling (hating) colloidal sols.Example: metal and their sulphides  b. The reactant and the catalyst are in the same phase.	
= [1.27 × 10 <sup>-2</sup> S cm <sup>-1</sup> ] × 1000 / 0.05 mol/cm <sup>3</sup> = 254.77 S cm <sup>2</sup> mol <sup>-1</sup> 2. The particles of the dispersed phase have no affinity for the dispersion medium/solvent repelling (hating) colloidal sols.Example: metal and their sulphides  b. The reactant and the catalyst are in the same phase.	
= 254.77 S cm <sup>2</sup> mol <sup>-1</sup> a. The particles of the dispersed phase have no affinity for the dispersion medium/solvent repelling (hating) colloidal sols.Example: metal and their sulphides  b. The reactant and the catalyst are in the same phase.	
a. The particles of the dispersed phase have no affinity for the dispersion medium/solvent repelling (hating) colloidal %+ ½ sols.Example: metal and their sulphides b. The reactant and the catalyst are in the same phase.	
dispersion medium/solvent repelling (hating) colloidal %+ ½ sols.Example: metal and their sulphides  b. The reactant and the catalyst are in the same phase.	_
b. The reactant and the catalyst are in the same phase.	
b. The reactant and the catalyst are in the same phase.	
HC(I)\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	<u>′</u>
$CH_3COOCH_3(I) + H_2O(I) \longrightarrow CH_3COOH(aq) + CH_3OH(aq)$	2
c. Oil is dispersed in water/Oil is dispersed phase and water is	
dispersion medium. ½+ ½	
Ex- milk	
(or any other correct example)	
OR	
17 Physisorption Chemisorption 1+1+1	1
1 Because of van der Waals Caused by chemical	
forces bond formation	
2 Reversible Irreversible	
3 Enthalpy of adsorption is Enthalpy of adsorption is	
low(20-40 kJ/mol) high(80-240)kJ/mol	
(Or any other correct difference)	
18 Given: T <sub>b</sub> of glucose solution= 100.20°C	
$\Delta T_b = K_b.m$	

	m= 0.20/ 0.512	
	m= 0.390 mol/kg	1
	$\Delta T_f = K_f \cdot m$	1/2
	$\Delta T_f = 1.86 \text{ K kg/mol x } 0.390 \text{ mol/kg}$	
	$\Delta T_f = 0.725 \text{ K}$	1/2
	Freezing point of solution = 273.15K – 0.725	
	= 272.425K	1
19	a) Zone Refining – Impurities are more soluble in the melt than in the solid metal.	1
	b) Collectors enhance non- wettability of the mineral	1
	particles.Ex Pine oil/ fatty acids	
	c) Carbon monoxide (CO)	1
20	a. For bcc structure	
	$a = 4r/\sqrt{3}$ or $r = \sqrt{3}a/4$	1/2
		26
	$r=\sqrt{3} \times 400 \text{ pm } /4$	1
	= 1.732 x 400 pm/4	1/
	= 173.2 pm	1/2
	b.  (i) Impurity defect	1
	(i) Impurity defect	1
21	(ii) Cationic vacancies are created.  a. b. C.	<del>  -</del>
21	Br C.	1,1,1
	CH 2C1	
	Br [ ]	
	c1 Ho	
22	a. Due to steric hindrance and +I effect caused by two alkyl	1/2+ 1/2
	groups in propanone.	/-
	b. Due to electron withdrawing nature of $-NO_2$ group which	
	increases the acidic strength and decreases the pK <sub>a</sub> value.	1
	c. $(CH_3)_2CH$ -CHO has one $\alpha$ -H atom whereas $\alpha$ - H atom is	
	absent in (CH <sub>3</sub> ) <sub>3</sub> C-CHO.	1
23	(i)Concerned, caring, socially alert, leadership (or any other	1/2 + 1/2
	2 values)	
•		1
	(ii)starch	1

	(iii) $\alpha$ -Helix and $\beta$ -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) Thermal stability of hydrides decreases down the	1
	group/ Bond dissociation enthalpy decreases down the group. (ii) Because Cl <sub>2</sub> in presence of moisture liberates nascent oxygen.	1
	(iii) Interatomic interactions are weak	1
	b.(i) (ii)	
	P P F Xe F	1,1
	OR	Υ'
24	a) Size of nitrogen is smaller than Chlorine. b) $2F_2 + 2H_2O \rightarrow 4HF + O_2$ / HF and $O_2$ are produced	1
	c) $PH_3$ /Phosphine	1
	d) XeF <sub>2</sub>	1
25	e) $[Fe(H_2O)_6]^{2+} + NO - \rightarrow [Fe(H_2O)_5(NO)]^{2+} + H_2O$	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
25	(A) $(B)$ $(B)$ $(B)$ $(B)$ $(B)$ $(C)$ $(C)$ $(C)$ $(C)$ $(C)$ $(C)$	1×5=5
	(D) (E) NH <sub>2</sub> NH <sub>3</sub> HSO <sub>4</sub>	
	OR	

25		
	a. i) iii)	
	CN	
	CI	
		111
		1,1,1
		4
	b. $C_6H_5NH_2 < C_6H_5CH_2NH_2 < CH_3NH_2 < (CH_3)_2NH$	1
	c. Add NaNO <sub>2</sub> + HCl to both the compounds at 273K followed	
	by addition of phenol. Aniline gives orange dye	1
	(or any other correct test)	
26.	k= <u>2.303</u> log <u>[A]</u>	1/2
	t [A]	
	= 2 <u>.303 log 100</u>	1/2
	40 25	Α,
	= <u>2.303</u> log 4	
	40	
	= 2.303 X 0.6021	
	40	
	k = 0.0347 min <sup>-1</sup>	1/2
	$t_{1/2} = 0.693$	
	k	1/2
	$t_{1/2} = 0.693$ = 19.98 min = 20min	
	0.0347 min <sup>-1</sup>	1
	b. (i) first order reaction	1
	(ii) zero order reaction	1
	OR	
26	(a)	
	Rate = $k [NO]^x [O_2]^y$	
	7.2 X $10^{-2} = k[0.3]^x [0.2]^y$ Eqn (1)	
	$6.0 \times 10^{-3} = k[0.1]^{x} [0.1]^{y}$ Eqn (2)	
	$2.88 \times 10^{-1} = k[0.3]^{x} [0.4]^{y}$ Eqn (3)	
	$2.40 \times 10^{-2} = k[0.4]^{x} [0.1]^{y}$ Eqn (4)	
	2.70 / 10 - K[0.7] [0.1] Eqn (4)	

Dividing eqn 4 by eqn 2	
$2.40 \times 10^{-2} = k[0.4]^{x} [0.1]^{y}$	
$6.0 \times 10^{-3} = k[0.1]^{x} [0.1]^{y}$	1
x=1	
Dividing eqn 3 by eqn 1	
$2.88 \times 10^{-1} = k[0.3]^{x} [0.4]^{y}$	
$7.2 \times 10^{-2} = k[0.3]^{x} [0.2]^{y}$	1
y = 2	
order w.r.t. NO = 1, order w.r.t $O_2$ is 2	1/2 , 1/2
(b) Rate law	
Rate = $k [NO]^{1} [O_{2}]^{2}$ ; The overall order of the reaction is 3.	1/2 + 1/2
c. rate constant $k = \frac{7.2 \times 10^{-2}}{10^{-2}}$	
$[NO]^{1}[O_{2}]^{2}$ 0.3 $X(0.2)^{2}$	
k= 6.0 mol <sup>-2</sup> L <sup>2</sup> min <sup>-1</sup>	1
	_0

1	Dr. (Mrs.) Sangeeta Bhatia	12	Sh. S. Vallabhan	VbA
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

#### FOREIGN 2017 - Set - 56/2/3

Q.NO	VALUE POINTS	MARK
		S
1	$H_2Te > H_2Se > H_2S > H_2O$	1
2	To make the surface available again for more reaction to	1
	occur / To remove the product formed from the surface of	
	the catalyst.	
3	2-Phenylpropan-2-ol	1
4	Neopentane , C(CH <sub>3</sub> ) <sub>4</sub>	1
5	$P_3Q_2$	1
6	a. Zinc to silver	1
	b. Concentration of Zn <sup>2+</sup> ions will increase and Ag <sup>+</sup> ions will	1/2+ 1/2
	decrease.	
7	a. Cr <sup>3+</sup>	1/2
	b.Mn <sup>3+</sup>	1/2
	c. Ti <sup>4+</sup>	1/2
	d. Mn <sup>3+</sup>	1/2
8	a.	1
	H <sub>2</sub> 0 [O]	
	$CH_3CH=CH_2 \longrightarrow CH_3CH(OH)CH_3 \longrightarrow CH_3COCH_3$	
	H <sup>+</sup> CrO3	
	b.	
	Br2/Red P i) aq KOH or NaOH	
	CH₃CH₂COOH → CH₃CH(Br)COOH → CH₃CH (OH)COOH	1
	ii)H <sup>+</sup>	
	(or any other suitable method)	
	OR	
8	a.Etard reaction:	
	$\begin{array}{c} CH_3 \\ + CrO_2Cl_2 \xrightarrow{CS_2} \end{array} \begin{array}{c} CH(OCrOHCl_2)_2 \\ \xrightarrow{H_3O^+} \end{array} \begin{array}{c} CHO \end{array}$	
	Toluene Chromium complex Benzaldehyde	1
	Carolina Car	
	or	

	CHO	
	$ \xrightarrow{\text{(i)}} \xrightarrow{\text{CrO2C12, CS2}} $	
	Tohiene (ii)H3O+ Benzaldehyde	
	b.Wolff-Kishner reduction:	
	$C = O \xrightarrow{NH_2NH_2} C = NNH_2 \xrightarrow{KOH/ethylene glycol} CH_2 + N_2$	1
	or	_
	c=0 (i) NH2NH2  (ii) KOH/ethylene glycol , heat	
9	The increase in boiling point of the solvent in a solution when a non-volatile solute is added.	1
	Because it depends upon molality / the number of solute	
	particles rather than their nature/ $^{\Delta T_{ m b}} \propto { m m}$	1
10	a. Tetraamminechloridonitrito-N-cobalt(III) chloride b.[CoCl <sub>2</sub> (en) <sub>2</sub> ]Cl	1
11	a. In CuCl <sub>2</sub> , Cu is in +2 oxidation state which is more stable	1
	due to high hydration enthalpy as compared to Cu <sub>2</sub> Cl <sub>2</sub> in which Cu is in +1 oxidation state	
	b. Due to lanthanoid contraction	1
	c. Because HCl is oxidised to chlorine.	1
12	<ul> <li>a. Drugs that reduce or abolish pain without causing impairment of consciousness, mental confusion or paralysis.</li> <li>b. Anionic detergents are sodium salts of sulphonated long chain alcohols or hydrocarbons / alkylbenzene sulphonate or</li> </ul>	1
	detergents whose anionic part is involved in cleansing action.	1
	c. Antacids are chemical compounds which are used for the	
	treatment of excess acid produced in the stomach.	1
13	$A = \pi r^2$ = 3.14 x 0.5 x 0.5 cm <sup>2</sup>	
	$= 0.785 \text{ cm}^2$	1/2
	/= 45.5 cm ρ = R x A/ /	
	$\rho = 4.55 \times 10^{3} \Omega \times 0.785 \text{ cm}^{2} / 45.5 \text{ cm}$	
	$ ho$ = 78.5 $\Omega$ cm	1/2
	conductivity , κ = 1/ ρ	1/2

	$= 1/78.5 \text{ S cm}^{-1} = 0.0127 \text{ S cm}^{-1}$		1/2	
	molar conductivity $\Lambda m = \kappa \times 1000$		1/2	
	= 0.0127 S cm <sup>-1</sup> x 1000/0.05 mo	l/cm³		
	$= 254.77  \text{S cm}^2  \text{mol}^{-1}$		1/2	
	or			
	$A = \pi r^2$			
	$= 3.14 \times 0.5 \times 0.5 \text{ cm}^2$			
	$= 0.785 \text{ cm}^2$		1/2	
	/= 45.5 cm			
	$G^* = I/A = 45.5 \text{ cm}/0.785 \text{ cm}^2$			
	= 57.96 cm <sup>-1</sup>		1/2	
	$K = G^*/R$	2 4	1/2	
	$= 57.96 \text{ cm}^{-1} / 4.55 \times 10^3 \Omega = 1.27$	× 10 <sup>-2</sup> S cm <sup>-1</sup>	1/2	
	$\Lambda m = \kappa \times 1000/C$		1/2	
	$= [1.27 \times 10^{-2} \mathrm{S cm^{-1}}] \times 1000 / ($	0.05 mol/cm <sup>3</sup>	~0	
	= 254.77 S cm <sup>2</sup> mol <sup>-1</sup>		1/2	
14	a. The particles of the dispersed p	phase have no affinity for the		
	dispersion medium/solvent repelling (hating) colloidal sols.			
	Example: metal and their sulphid	es		
	b. The reactant and the catalyst a	re in the same phase.		
	HCI(I)		1/2 + 1/2	
	$CH_3COOCH_3(I) + H_2O(I) \rightarrow CH_3$	COOH(aq) + CH₃OH(aq)		
	c. oil is dispersed in water/Oil is	dispersed phase and water is		
	dispersion medium.		1/2+ 1/2	
	Ex- milk			
		or any other correct example)		
	OR	, 1' -/		
14	Physisorption	Chemisorption	1+1+1	
	1 Because of van der Waals	Caused by chemical		
	forces	bond formation		
	2 Reversible	Irreversible		
	3 Enthalpy of adsorption is	Enthalpy of adsorption is		
	low(20-40 kJ/mol)	high(80-240)kJ/mol		
	1	any other correct difference)		
	(3.	, care some carron among		
L	1		l	

15	a. b. C.	1,1,1
	EH,	
	CH -Me  CH 2C1	
	C1 HO HO	
16	Given: T <sub>b</sub> of glucose solution= 100.20°C	
10	$\Delta T_b = K_b.m$	
	m = 0.20 / 0.512	
	m= 0.390 mol/kg	1
	$\Delta T_f = K_f \cdot m$	1/2
	$\Delta T_f$ = 1.86 K kg/mol x 0.390 mol/kg	4.
	$\Delta T_f = 0.725 \text{ K}$	1/2
	Freezing point of solution = 273.15K – 0.725	
	= 272.425K	1
17	a.(i) Vapour phase refining/ van Arkel method	1/2
	(ii) Zone refining	1/2
	(iii) Electrolytic refining	1/2
	b.(i) Froth floation process	1/2
	(ii) Magnetic separation	1/2
	(iii) Leaching	1/2
18	a. For bcc structure	
	$a = 4r/\sqrt{3}$ or $r = \sqrt{3}a/4$	1/2
	m-12 v 400 mm /4	
	$r=\sqrt{3} \times 400 \text{ pm }/4$ = 1.732 x 400 pm/4	
	= 173.2 pm	1/2
	b.	/2
	(i) Impurity defect	1
	(ii) Cationic vacancies are created.	1
19	a. Due to steric hindrance and +I effect caused by two alkyl	1/2+1/2
	groups in propanone.	
	b. Due to electron withdrawing nature of −NO <sub>2</sub> group which	
	increases the acidic strength and decreases the $pK_a$ value .	1
	c. $(CH_3)_2CH$ -CHO has one $\alpha$ -H atom whereas $\alpha$ - H atom is	
	absent in (CH <sub>3</sub> ) <sub>3</sub> C-CHO.	1
20	a. Chloroprene, CH <sub>2</sub> =C(Cl)-CH=CH <sub>2</sub>	1/2+1/2
	b. 1,3- Butadiene & Acrylonitrile	1/2+ 1/2
	CH <sub>2</sub> =CH-CH=CH <sub>2</sub> & CH <sub>2</sub> =CHCN	/2' /2
<u> </u>	1 - 2 - 3 - 1 - 1 - 2 - 1 - 1 - 1 - 1 - 1 - 1 - 1	1

	c. 3-Hydroxybutanoic acid & 3-Hydroxypentanoic acid CH <sub>3</sub> CH(OH)CH <sub>2</sub> COOH & CH <sub>3</sub> CH <sub>2</sub> CH(OH)CH <sub>2</sub> COOH	1/2+ 1/2
21	a) It is the magnitude of difference in energy between the two sets of d orbital i.e. $t_2g$ and $e_g$	1
	t <sup>4</sup> <sub>2g</sub> eg <sup>0</sup> b) sp <sup>3</sup> d <sup>2</sup> , paramagnetic	1 1/2 + 1/2
22	a. Methanol and 2-methyl-2-iodopropane are formed.  CH <sub>3</sub>	1
	OCH <sub>3</sub> + CH <sub>3</sub> COCl Anhyd. AlCl <sub>3</sub> COCH <sub>3</sub> + COCH <sub>3</sub> COCH <sub>3</sub> + COCH <sub>3</sub>	10
	c. o-Bromophenol and p-Bromophenol are formed.	1
23	(i)Concerned , caring, socially alert, leadership ( or any other 2 values) (ii)starch (iii) $\alpha$ -Helix and $\beta$ -pleated sheets (iv)Vitamin B / B <sub>1</sub> / B <sub>2</sub> / B <sub>6</sub> / C (any two )	1 1 1/2 + 1/2 1/2 + 1/2
24	$(A) \qquad (B) \qquad (C) $	1×5=5

	(D) (E) NH <sub>2</sub> NH <sub>3</sub> HSO <sub>4</sub>	
	NO <sub>2</sub>	
	OR	
24	a. i) iii) CN	1,1,1
	b. $C_6H_5NH_2 < C_6H_5CH_2NH_2 < CH_3NH_2 < (CH_3)_2NH$ c. Add $NaNO_2 + HCl$ to both the compounds at 273K followed by addition of phenol. Aniline gives orange dye (or any other correct test)	1
25.	$k = 2.303 \log_{100} [A]_{0}$ t [A] $= 2.303 \log_{100} 100$ $= 40 25$ $= 2.303 \log_{100} 4$ $= 2.303 \log_{100} 4$	1/2
	= $\frac{2.303}{40}$ X 0.6021 k = 0.0347 min <sup>-1</sup>	1/2
	$t_{1/2} = 0.693$ k	1/2

	$t_{1/2} = 0.693 = 19.98 \text{ min} = 20 \text{min}$ $0.0347 \text{ min}^{-1}$			
	b. (i) first order reaction			
	(ii) zero order reaction			
	OR	1		
25				
	Rate = $k [NO]^x [O_2]^y$			
	$7.2 \times 10^{-2} = k[0.3]^{x} [0.2]^{y}$ Eqn (1)			
	$6.0 \times 10^{-3} = k[0.1]^{x} [0.1]^{y}$ Eqn (2)			
	$2.88 \times 10^{-1} = k[0.3]^{x} [0.4]^{y}$ Eqn (3)			
	$2.40 \times 10^{-2} = k [0.4]^{x} [0.1]^{y}$ Eqn (4)			
	Dividing eqn 4 by eqn 2			
	$2.40 \times 10^{-2} = k[0.4]^{x} [0.1]^{y}$			
	$6.0 \times 10^{-3} = k[0.1]^{x} [0.1]^{y}$			
	x=1	1		
	Dividing eqn 3 by eqn 1	Α,		
	$2.88 \times 10^{-1} = k[0.3]^{x} [0.4]^{y}$			
	$7.2 \times 10^{-2} = k[0.3]^{x} [0.2]^{y}$			
	y = 2	1		
	order w.r.t. NO = 1, order w.r.t $O_2$ is 2	1/2,1/2		
	(b) Rate law			
	Rate = $k [NO]^1 [O_2]^2$ , The overall order of the reaction is 3.	1/2 + 1/2		
	c. rate constant $k = \frac{\text{rate}}{1.5 \times 10^{-2}} = \frac{7.2 \times 10^{-2}}{1.5 \times 10^{-2}}$			
	$[NO]^{1}[O_{2}]^{2} = 0.3 \times (0.2)^{2}$			
26	$k=6.0 \text{ mol}^{-2} \text{ L}^2 \text{ min}^{-1}$	1		
26.	a. (i) Thermal stability of hydrides decreases down the	1		
	group/ Bond dissociation enthalpy decreases down the group.	1		
	(ii) Because Cl <sub>2</sub> in presence of moisture liberates nascent	1		
	oxygen.	1		
	(iii) Interatomic interactions are weak	1		
	b.(i) (ii)			
<u> </u>	V-(1)			

	P P Xc F	1,1		
	OR			
26	a) Size of nitrogen is smaller than Chlorine.	1		
	b) $2F_2 + 2H_2O \rightarrow 4HF + O_2 / HF$ and $O_2$ are produced	1		
	c) PH <sub>3</sub> /Phosphine	1		
	d) XeF <sub>2</sub>	1		
	e) $[Fe(H_2O)_6]^{2+} + NO - \rightarrow [Fe(H_2O)_5(NO)]^{2+} + H_2O$	1		
	1 . 1 . 1 . 1 . 1 . 1 . 1 . 1 . 1 . 1 .			

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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

