Marking scheme – 2017 (Compartment)

CHEMISTRY (043)/ CLASS XII

Set 56(B)

Q.No	Value Points	Marks
1	n-type	1
2	H_3PO_2 , H_3PO_3 , HPO_3, H_3PO_4, $H_4P_2O_6$ (any two)	½ , ½
3	SO_2	1
4	Hexaamminecobalt(III) ion	1
5	$(C_2H_5)_2NH > C_2H_5NH_2 > C_6H_5NH_2$	1
6	Water is hypotonic so water enters inside the egg through semi-permeable membrane whereas saturated NaCl solution is hypertonic so water flows out of the egg.	1+1
7	(i) Order of a reaction is an experimental quantity. It can be zero and even a fraction but molecularity cannot be zero or a non integer. (ii) Order is applicable to elementary as well as complex reactions whereas molecularity is applicable only for elementary reactions. For complex reaction molecularity has no meaning. (iii) For complex reaction, order is given by the slowest step and generally, molecularity of the slowest step is same as the order of the overall reaction. (any two)	1+ 1
8	i) . $2NaOH + Cl_2 \rightarrow NaCl + NaOCl + H_2O$ (cold and dilute) ii). $6\ NaOH + 3Cl_2 \rightarrow 5NaCl + NaClO_3 + 3H_2O$ (hot and conc.)	1 1
	OR	
8	i) . $4H_3PO_3 \rightarrow 3H_3PO_4 + PH_3$ ii) Due to the formation of HCl and HOCl	1 1
9	i. Hydrogen bonding ii. D-(+)-glucose and D-(+)-galactose	1 ½ , ½
10.	i) It is water soluble and is readily excreted through urine ii) Starch	1 1
11	i) Schottky defect- Equal number of cations and anions are missing. ii) F- centre – anionic vacancies occupied by electrons iii) Ferromagnetism – when magnetic domains are aligned in same direction.	1 1 1
12	$\Delta T_f = i\ K_f\ m$ Here , $m = w_B x\ 1000 / M_B X\ w_A$ $2 = 3 \times 1.86 \times w_B \times 1000 / 111 \times 500$ $w_B = 19.89$ g (or any other correct method)	½ ½ 1 1
13	$k = \frac{2.303}{t} \log \frac{[A]o}{[A]}$ $= \frac{2.303}{10} \log \frac{100}{75}$	½

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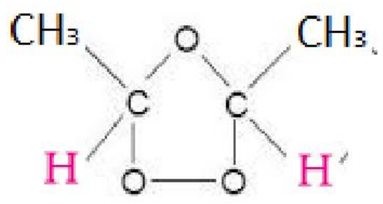
	$= \frac{2.303}{10} \times 0.125$ $= 0.0288\ min^{-1}$ $t_{1/2} = 0.693/k$ $= 0.693/ 0.0288$ $t_{1/2} = 24.06\ min$	1 ½ ½ ½
	OR	
13	$Log\ k_2/k_1 = \frac{Ea}{2.303\ R}\ [\frac{T2-T1}{T2.T1}]$ $Log\ 12.5 \times 10^{-2}/2.5 \times 10^{-2} = \frac{Ea}{2.303 \times 8.314}\ [\frac{20}{300 \times 320}]$ $Log\ 5 = \frac{Ea}{19.147}\ [\frac{20}{96000}]$ Ea= 64242 J/ mol = 64.242 kJ / mol	1 1 1
14	i) the impurities are more soluble in the melt than in the solid state of the metal. ii) The metal is converted into its volatile compound and collected elsewhere. It is then decomposed to get the pure metal. ii) Different components of a mixture are differently adsorbed on an adsorbent	1 1 1
15	a) Because of high bond dissociation enthalpy of H-O bond than H-S bond b) Bi is more stable in +3 state c) It has strong affinity for water	1 1 1
16	a) sp^3 , paramagnetic b) SCN^- / NO_2^-	1,1 1
17	a) $C_2H_5Cl + NaI \xrightarrow{acetone} C_2H_5I + NaCl$ b)  where X= Cl c) $CH_3Cl + KNO_2 \longrightarrow CH_3\text{-}ONO + KCl$	1 1 1 1
18.	A: $CH_3\text{-}CO\text{-}CH_2\text{-}CH_3$; B: $CH_3\text{-}CH(OH)\text{-}CH_2\text{-}CH_3$; C: $CH_3\text{-}CH{=}CH\text{-}CH_3$ D: 	1, ½ , ½ , 1
19.	i) Due to –I effect of chlorine ii) Due to absence of α-hydrogen iii) It forms crystalline addition product with carbonyl compound	1 1 1
20.	A: C_6H_5COOH B: $C_6H_5CONH_2$ C: $C_6H_5NH_2$	1,1,1
21	i) $CH_2{=}CH{-}CH{=}CH_2$ and $CH_2{=}\underset{\displaystyle CN}{\underset{|}{C}}H$ ii) Thermosetting iii) Addition polymerisation	½ , ½ 1 1
22	i) Medicines used to treat hyper-acidity. ii) Substances used to kill / prevent the growth of micro organisms when applied to living tissues. iii) Medicines used for the treatment of stress and mental disorders.	1 1 1
23	i) Caring, Responsible, helpful, kindness (any two)	½ , ½

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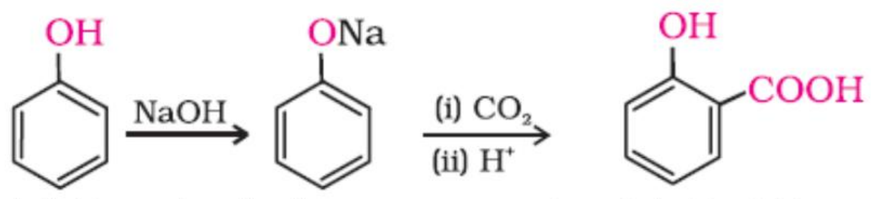
	ii) Due to coagulation iii) Due to greater charge of Fe^{3+} iv) Process of converting freshly prepared precipitate into sol by shaking it with dispersion medium along with a small amount of suitable electrolyte.	1 1 1
24	$\Lambda^{\circ}_{HCOOH} = \lambda^{\circ}_{HCOO^-} + \lambda^{\circ}_{H^+}$ $= 54.6 + 349.6 = 404.2\ S\ cm^2/mol$ Now, $\Lambda_m = k\times1000/M\ \ S\ cm^2/mol$ $= 1.152 \times 10^{-3} \times1000/0.025$ $\Lambda_m = 46.1\ \ S\ cm^2/mol$ $\alpha = \Lambda_m\ /\Lambda^{\circ}_m$ $= 46.1\ / 404.2 = 0.114$	1 1 ½ 1 ½ 1
	OR	
24	a) i)Magnesium prevents the oxidation of steel by transfering the excess of electrons to steel. ii) Because Zn^{2+} ions forms complex ion with NH_3 b) $\Lambda^{\circ}_{NaCl} = \lambda^{\circ}_{Cl^-} + \lambda^{\circ}_{Na^+}$ $= 76.5 + 50.1 = 126.6\ S\ cm^2/mol$ Now, $\Lambda_m = k\times1000/M\ \ S\ cm^2/mol$ $= 1.06 \times 10^{-2} \times1000/0.1$ $\Lambda_m = 106\ \ S\ cm^2/mol$ $\alpha = \Lambda_m\ /\Lambda^{\circ}_m$ $= 106\ / 126.6 = 0.837$	1 1 1 1 1
25	a) Due to strong inter-atomic metallic bonding, Zn b) The steady decrease of atomic radii with increase in atomic number due to poor sheilding by 4f electrons . Consequences : Similar size of elements of 4d and 5d series , their separation becomes difficult c) Because of variable oxidation states	1,1 1 ½ , ½ 1
	OR	
25	A: Cr_2O_3 ; B: Na_2CrO_4 ; C: $Na_2Cr_2O_7$; D: $(NH_4)_2Cr_2O_7$ b) 4	1 ×4 1
26	a) i) $CH_3CH_2CH_2OH \xrightarrow{\text{conc. H2SO4, Heat}} CH_3\text{-}CH{=}CH_2 \xrightarrow{HBr} CH_3\text{-}CH(Br)\text{-}CH_3 \xrightarrow{AqKOH} CH_3\text{-}CH(OH)\text{-}CH_3$ ii) .  b) i) Heat both the compounds with NaOH and I_2 , pentan-2-ol forms yellow ppt of iodoform while pentan-3-ol does not. ii) Add neutral $FeCL_3$ to both the compounds, phenol gives violet complex while cyclohexanol does not. c) 2-methylprop-2-en-1-ol	1 1 1 1 1
	OR	
26	a) .	

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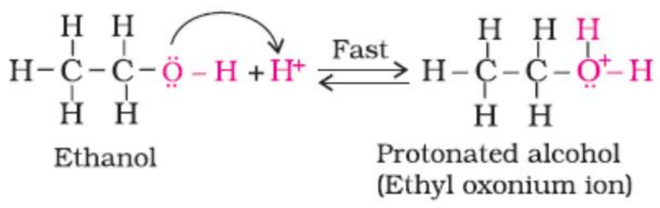
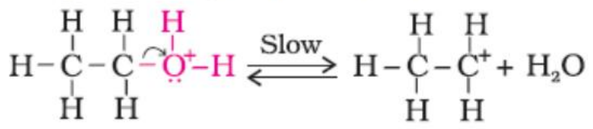
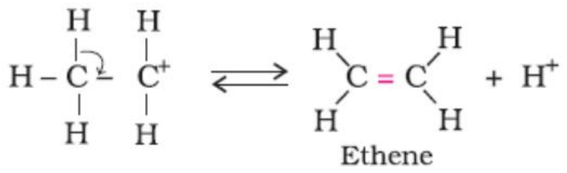
	Formation of protonated alcohol.  Ethanol — Protonated alcohol (Ethyl oxonium ion) Formation of carbocation: It is the slowest step and hence, the rate determining step of the reaction.  Formation of ethene by elimination of a proton.  Ethene b) i)Due to resonance / sp^2 hybridised carbon ii) Resonance stabilisation of phenoxide ion imparts acidic character to phenol.	1 1 1 1 1

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