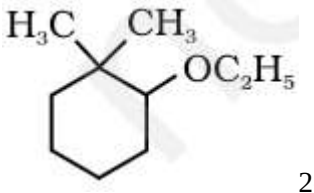
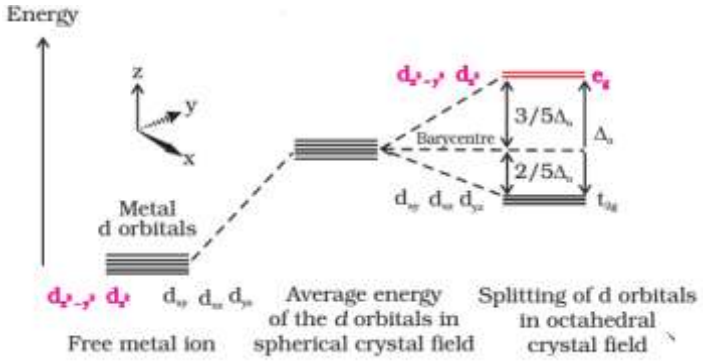
KENDRIYA VIDYALAYA SANGATHAN CHENNAI REGION
COMMON PRE-BOARD EXAM
Class : XII CHEMISTRY - SCORING KEY

1	Interstitial defect increases the density of a solid	1
2	A reaction that takes place in one step is called an elementary reaction.	1
3	a. Physical adsorption or physisorption b. Chemical adsorption or chemisorption.	1
4	Collectors (e. g., pine oils, fatty acids, xanthates, etc.) enhance non-wettability of the mineral particles.	1
5	diamminesilver(I)dicyanoargentate(I)	1
6	 2-Ethoxy -1,1-dimethylcyclohexane	1
7	Acidic Strength : 4-Methoxybenzoic acid <Benzoic acid< 4-Nitrobenzoic acid	1
8	1.Amylose is water soluble component. Amylopectin is insoluble in water. 2.Chemically amylose is a long unbranched chain polymer. Amylopectin is a branched chain polymer. (Any one difference)	1
9	Vapour pressure decreases. Mixture of chloroform and acetone forms a solution with negative deviation from Raoult's law. This is because chloroform molecule is able to form hydrogen bond with acetone molecule.	1 1
10	i)The sum of powers of the concentration of the reactants in the rate law expression is called the order of that chemical reaction. ii) The energy required to form intermediate, called activated complex (C), is known as activation energy (Ea) (or) Any suitable definition. (or) Factors Influencing Rate of a Reaction: (Any Two of the following (or) any other suitable answer) 1.Nature of reactants 2.Concentration of reactants (pressure in case of gases), 3.Temperature and 4.Catalyst .	1 1 2
11	Rate (r)= $k[A]^n$ Let the initial Concentration of [A] = a $\therefore$ Rate (r)= $k[a]^n$ --------(1) When the initial Concentration is increased three times [A] = 3a i.e, 27 x Rate (r)= $k[3a]^n$ --------(2) Now, equ(2)/equ(1) $\Rightarrow$ $\frac{27 \times \text{Rate (r)} k[3a]^n}{\text{Rate (r)} = k[a]^n}$ (or) $27 = 3^n$ (or) $(3)^3 = 3^n \therefore n=3$ i.e, Order =3	½ ½ ½+½
12	Electrolytic refining The impure metal is made to act as anode. A strip of pure metal is used as cathode. They are put ina suitable electrolytic bathcontaining soluble salt of the same metal. When current is passed At Anode: $M \rightarrow M^{n+} + ne^-$ At Cathode: $M^{n+} + ne^- \rightarrow M$ ii)Mond's process for refining of Nickel: $Ni + 4CO \xrightarrow{330-350\ K} Ni(CO)_4 \xrightarrow{450-470\ K} Ni + 4CO$ Impure volatile complex Pure	½ ½ 1

13 Interstitial compounds are those in which small atoms occupy the interstitial sites in the crystal lattice. 1

Interstitial compounds are well known for transition metals because small sized atoms like H, C or N etc can easily occupy positions in the voids present in the crystal lattices of transition metals. 1

14 

1

Depends on the relative magnitude of the crystal field splitting, Δo and the pairing energy, P

i)Ligands for which Δo< P are known as weak field ligandsand form high spin complexes. 1

ii Ligands for which Δo> P are known as Strong field ligands and form low spin complexes.

15 In aqueous solution, KOH is almost completely ionized to give OH^- ions which being a strong nucleophile brings about a substitution reaction on alkyl halides to form alcohols. In aqueous solution, OH^- ions are highly hydrated. This reduces the basic character of OH^- ions which fail to abstract a hydrogen from the β-carbon of the alkyl chloride to form an alkene. 1

On the other hand, an alcoholic solution of KOH contains alkoxide(OR^-) ions which being a much stronger base than OH^- ions preferentially eliminates a molecule of HCl from an alkyl chloride to form alkenes. 1

16 i) 2Chloroethane +Na ------wurtz reaction----→ butane 2

ii) Isopropyl alcohol $+4I_2+6NaOH$ ---Heat→ Iodoform

17 i) In Methylamine, the alkyl group increases electron density on 'N' making it more basic than NH_3. 1

ii)Aniline being a Lewis base reacts with Lewis acid ie., $AlCl_3$ to form a salt. As a result Aniline acquires +ive charge and hence its acts as a strong deactivating group for electrophilic substitution reaction. Hence, aniline does not undergo Fridel Crafts reaction. 1

18 i)Gabriel Phthalimidesysthesis ii)Hoffmann-Bromamide reaction(for correct reaction) 1+1

19 Edge length of Unit Cell (a) = 289 pm =289 x 10^{-10} cm 3

∴Volume of Unit Cell = $(a)^3$ = $(2.89 \times 10^{-8}\ cm)^3$

Density of Unit Cell (ρ) = 7.2 g cm^{-3}

Gram Atomic Mass (M) = 52.0 g mol^{-1}

Number of atoms per Unit Cell (Z) = ?

∴Number of atoms per Unit Cell (Z) = $[\rho \times (a)^3 \times N_0] / [M]$

i.e.,(Z) = $[\rho \times (a)^3 \times N_0] / [M] = [7.2 \times (2.89 \times 10^{-8})^3 \times 6.022 \times 10^{23}] / [52.0]$

$= 2$

The unit cell has 2 atoms ∴ It is Body centre Cubic Unit Cell.

(or)

Edge length of Unit Cell (a) = 3.608 x 10^{-8} cm

∴Volume of Unit Cell = $(a)^3$ = $(3.608 \times 10^{-8}\ cm)^3$ ½

Density of Unit Cell (ρ) = 8.92 g cm^{-3} ½

Number of atoms per fcc Unit Cell (Z) = 4 ½

∴Atomic Mass (M) = $[\rho \times (a)^3 \times N_0] / [Z] = [8.92 \times (3.608 \times 10^{-8})^3 \times 6.022 \times 10^{23}] / [4]$ ½+½

$= 63.07$ g/mol ½

$\therefore$ Atomic mass of the Element $= 63.07$ u

20 According to question, for NaCl i=2, K_b for water =0.512 K kg mol^{-1}, Molar mass of NaCl (M_B)=58.44 g Weight of Solute (W_B) =15 g Weight of Solvent(W_A) =250 g — 3

$\Delta T_b = i K_b m = [i \times K_b \times W_B \times 1000] / [M_B \times W_A] = [2 \times 0.512 \times 15 \times 1000]/[58.44 \times 250]$
$= 1.051$ K

$\therefore$Boiling point of Solution (T_b) $= 373$ K $+ 1.05$ K $= 374.05$ K (or) 101.05°C

21 Due to selective adsorption of ions: The particles constituting the dispersed phase adsorb only those ions preferentially which are common with their own lattice ions. — 1

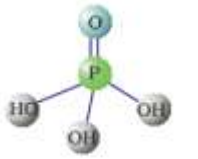
i) if silver nitrate solution is added to potassium iodide(excess), the precipitated silver iodide will adsorb negative I^- ions(common ion) from the dispersion medium form a negatively charged sol. — 1

$AgNO_3$ + KI (Excess) ------→ AgI + I^- -----→ AgI | I^-

ii) if potassium iodide is added to silver nitrate solution (excess), the precipitated silver iodide will adsorb negative Ag^+ ions(common ion) from the dispersion medium form a positively charged sol. — 1

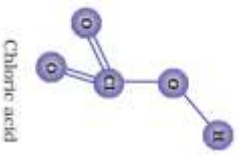
$AgNO_3$(Excess) + KI ------→ AgI + Ag^+ -----→ AgI | Ag^+

22 — 1

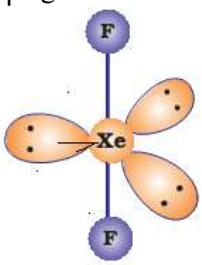


H_3PO_4
Orthophosphoric acid

i) — 1



ii) — 1



Linear — 1

23 **i)** $4\ FeCr_2O_4 + 8\ Na_2CO_3 + 7\ O_2 \rightarrow 8\ Na_2CrO_4 + 2\ Fe_2O_3 + 8\ CO_2$ — 1

ii) $2Na_2CrO_4 + 2\ H^+ \rightarrow Na_2Cr_2O_7 + 2\ Na^+ + H_2O$ — 1

iii) $Na_2Cr_2O_7 + 2\ KCl \rightarrow K_2Cr_2O_7 + 2\ NaCl$ — 1

24 **A = Phenol , B = Sodium Salicylate , C =Salicylic acid, D = Acetyl Salicyclic acid (or) Aspirin** — 4x½

A -Phenol

2x½

25 i) α-amino acids + α-amino acids ------→ peptide bond or peptidelinkage+ Water — 1

ii) Monosaccharides + Monosaccharides--------→ glycosidic linkage+ Water — 1

iii) When nucleoside is linked to phosphoric acid at 5′-position of sugar moiety, we get a nucleotide — 1

26 The polymer which degrade in the environment with time are called biodegradable polymers or biopolymers — 3

Example: 1) Poly β-hydroxybutyrate – co-β-hydroxyvalerate (PHBV)
2) Nylon -2–nylon-6

27 .i)Any one value. — 1

ii)Iproniazid (or)Phenelzine(Nardil) (or) Any other one correct answer — 1

iii)Any one help. — 1

28 i) Mg(s) + Cu^{2+}(aq) -----→ Mg^{2+}(aq) +Cu(s) — ½

$E_{cell} = E^{\circ}_{cell} - 0.0591/2 \times \log [anode] / [cathode]$

$= [0.34 - (-2.37)] - 0.0591/2 \times \log [Mg^{2+}(aq)] / [Cu^{2+}(aq)]$ ½

$= 2.71 - 0.0591/2 \times \log (0.1M) / (1.0 \times 10^{-3}M)$ ½

$= 2.71 - 0.0591/2 \times \log 100$ ½

$= 2.71 - 0.0591/2 \times 2$ ½

$= 2.71 - 0.0591$ ½

$= 2.65$ V

ii)a)Fuel cells are designed to convert the energy of the combustion of fuels such as hydrogen, methane etc., directly into electrical energy. 1

b)Fuel cell has high efficiency and eco-friendly (or) suitable answer. 1

(or)

i) Conductivity (κ) = 1/R x l/a

i.e., 0.146×10^{-3} Scm^{-1} = 1/1500 x Cell Constant ½

i.e., Cell Constant = $0.146 \times 10^{-3} \times 1500$ ½

i.e., Cell Constant = 0.219 cm^{-1} . ½

ii)Weak electrolytes are those electrolytes which do not dissociate into ions completely. ½

E.g., CH_3COOH 1

Strong electrolytes are those substances which dissociates into ions completely.

Eg., NaCl 1

iii) Y > Z > X is the order of reducing power. 1

29 i)Fluorine has no d orbitals 1

ii)Iodine is covalent in nature and therefore, it does not dissolve in water which polar. In KI solution, iodine reacts to form KI3 which is ionic in nature. ∴it becomes soluble in water. 1

iii) Because of increase in atomic sizes and hence increases in van der Waal's forces.

iv)Ammonia is a good complexing agent because of the presence of lone pair of electron on nitrogen. This lone pair of electron can easily be donated to electron deficient compounds forming complexes. 1 1

v)Nitric oxide (NO) is a clourless gas, when released in air, it immediately changes to nitrogen dioxide(NO2) which has a brown colour. $2NO(g) + O_2(g) \longrightarrow 2NO_2(g)$ 1

Colourless Brown

(or)

i) $P_4 + 6Cl_2 \rightarrow 4PCl_3$

ii) $XeF_4 + SbF_5 \rightarrow [XeF_3]^+ [SbF_6]^-$

iii) $4H_3PO_3 \rightarrow 3H_3PO_4 + PH_3$

iv) $2NaOH + Cl_2 \rightarrow NaCl + NaOCl + H_2O$

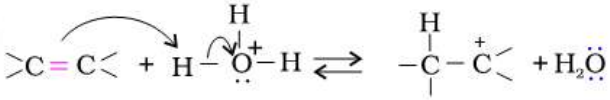
(cold and dilute)

v) $SO_3 + H_2SO_4 \rightarrow H_2S_2O_7$

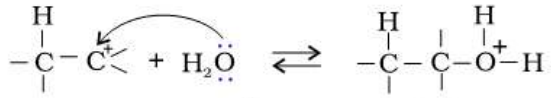
(Oleum)

30 a) Step 1: Protonation of alkene to form carbocation by electrophilic attack of H_3O^+. 2

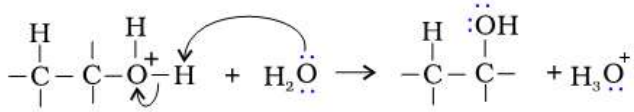
$H_2O + H^+ \rightarrow H_3O^+$



Step 2: Nucleophilic attack of water on carbocation.



Step 3: Deprotonation to form an alcohol.



b) i)Carbylamine reaction - Correct reaction 1

ii)Cross aldol condensation - Correct reaction 1

iii)Rosenmund reduction - Correct reaction 1

(or)

a)Tollen's reagent test Iodoform test (or) any other correct answer 1

ii)Neutral $FeCl_3$ Test and Iodoform test (or) any other correct answer 1

b)i)On nitration of aniline gives metaderivative also because aniline gets protonated which is meta directing. 1

ii)Conc.HI is a very strong acid and hence ether gets protonated readily. Also iodine ion is a good necleophile. 1

iii) $SOCl_2$ because all the other products are in gaseous state except alkyl halide. 1

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