CBSE Class 12 Chemistry Question Paper Solution 2015

QUESTION PAPER CODE 56/1/1

EXPECTED ANSWERS/VALUE POINTS

1. 3 — 1

2. 2, 5 - dinitrophenol — 1

3. CH_3-CH_2-Br

   Because it is a primary halide / (1^0) halide — ½+½

4. $BaCl_2$ because it has greater charge / +2 charge — ½+½

5. X_2Y_3 — 1

6. Elements which have partially filled d-orbital in its ground states or any one of its oxidation states. — 1

   1) Variable oxidation states. — ½+½

   2) Form coloured ion

   Or any other two correct charactenstics

7. 1) Diamminedichloridoethylenediaminechromium(III) chloride 1+1

2) $[Co(NH_3)_5(ONO)]^{2+}$

8. (i) $LiAlH_4$ / $NaBH_4$ /H_2, Pt 1

(ii) $KMnO_4$, KOH 1

9. When vapour pressure of solution is higher than that predicted by Raoult's law / the intermolecular attractive forces between the solute-solvent/(A-B) molecules are weaker than those between the solute-solute and solvent-solvent molecules/ A-A or B-B molecules. 1

½

Eg. ethanol-acetone/cthanol-cyclohexane/CS_2-acetone or any other correct example $\Delta_{mix}H$ is positive ½

OR

(a) Azeotropcs are binary mixtures having the same composition in the liquid and vapour phase and boil at a constant temperature. 1

(b) Minimum boiling azeotrope ½

eg - ethanol + water or any other example ½

10. (i) $Ag^+(aq) + e \rightarrow Ag(s)$ ½

Reaction with higher E^o value / ΔG^o negative ½

(ii) Molar conductivity of a solution at infinite dilution or when concentration approaches zero ½

Number of ions per unit volume decreases ½

11. $\Delta T_f = i K_f m$ ½

$$\Delta T_f = i K_f \frac{w_b \times 1000}{M_b \times w_a}$$

$$1.62\ K = i \times 4.9K\ kg\ mol^{-1} \times \frac{3.9\ g}{122\ gmol^{-1}} \times \frac{1000}{49\ g}$$ 1

$i = 0.506$ ½

Or by any other correct method

As i<l , therefore solute gets **associated**. 1

12 (i) Zinc being low boiling will distil first leaving behind impurities/ or on electrolysis the pure metal gets deposited on cathode from anode. 1

(ii) Silica acts as flux to remove iron oxide which is an impurity as slag or

$FeO + SiO_2 \rightarrow FeSiO_3$ 1

(iii) Wrought iron 1

13. $d = \frac{z \times M}{a^3\ N_A}$ ½

$$z = \frac{d\ a^3\ N_A}{M}$$

$$z = \frac{2.7\ g\ cm^{-3} \times 6.022 \times mol^{-1} \times (4.05 \times 10^{-8}\ cm)^3}{M}$$ 1

$= 3.999 \approx 4$ ½

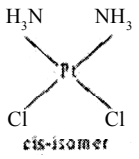
Face centered cubic cell / fcc 1

14. (i) 5f orbital electrons have poor shielding effect than 4f . 1

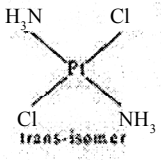
(ii) due to d-d transition / or the energy of excitation of an electron from lower d-orbital to' higher d-orbital lies in the visible region /presence of unpaired electrons in the d-orbital. 1

(iii) $2\ MnO_4^- + 6\ H^+ + 5\ NO_2^- \rightarrow 2\ Mn^{2+} + 3\ H_2O + 5\ NO_3^-$ 1

15. (i)



cis-isomer



trans-isomer

1

(ii) $t2g^3\ e\ g^1$ 1

(iii) sp^3, diamagnetic ½+½

16. The cell reaction : $Fe(s) + 2H^+(aq) \rightarrow Fe^{2+}(aq) + H_2(g)$

$E^o_{cell} = E^o_c - E^o_a$

$= [0-(-0.44)]\ V = 0.44V$

$$E_{cell} = E^o_{cell} - \frac{0.059}{2} \log \frac{[Fe^{2+}]}{[H^+]^2}$$ 1

$$E_{cell} = 0.44\ V - \frac{0.059}{2} \log \frac{(0.001)}{(0.01)^2}$$ 1

$$= 0.44\ V - \frac{0.059}{2} \log (10)$$

$= 0.44\ V - 0.0295\ V$

$= \approx \mathbf{0.410\ V}$ 1

17. (i) mutual coagulation 1

(ii) strong interaction between dispersed phase and dispersion medium or solvated layer 1

(iii) CO acts as a poison for catalyst 1

18. (i) Hexamethylene diamine $NH_2(CH_2)_6NH_2$ and ½

adipic acid $HOOC - (CH_2)_4 - COOH$ ½

(ii) 3 hydroxybutanoic acid $CH_3CH(OH)CH_2COOH$ and ½

3 hydroxypentanoic acid $CH_3CH_2CH(OH)CH_2COOH$ ½

(iii) Chloroprene $H_4C=C(Cl)CH=CH_2$ ½

IUPAC names are accepted ½

Note: ½ mark for name /s and ½ mark for structure / s

19. (i) $CH_3CH_2CH_3$ 1

(ii) $C_6H_5COONa + CHI_3$ ½, ½

(iii) CH_4 1

20. (i) $C_6H_5OH + NaOH \rightarrow C_6H_5ONa \xrightarrow{CH_3X} C_6H_5OCH_3$

Or

$C_6H_5OH + Na \rightarrow C_6H_5ONa \xrightarrow{CH_3X} C_6H_5OCH_3$ 1

(ii) $CH_3CH(OH)CH_3 \xrightarrow{CrO_3 \text{ or } Cu/573K} CH_3COCH_3 \xrightarrow[(ii)H_2O]{(i)CH_3MgX} (CH_3)_2C(OH)CH_3$

1

(iii) $C_6H_5NH_2 \xrightarrow[273K]{NaNO_2 + HCl} C_6H_5N_2Cl \xrightarrow{H_2O \text{ warm}} C_6H_5OH$

1

OR

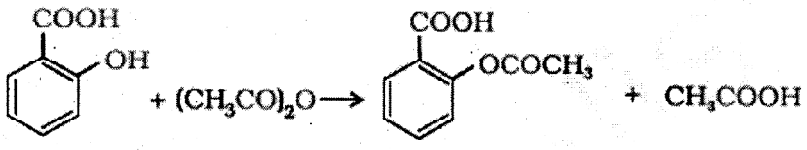
a) ½

(i) $CH_3-CH_2-\ddot{O}-H + H^+ \longrightarrow CH_3-CH_2-\overset{+}{\ddot{O}}(H)-H$ ½

(ii) $CH_3-CH_2-\ddot{O}(H)-H + CH_3-CH_2-\overset{+}{O}(H)_2 \longrightarrow CH_3CH_2-O(H)-CH_2CH_3 + H_2O$

(iii) $CH_3CH_2-\overset{+}{O}(H)-CH_2CH_3 \longrightarrow CH_3CH_2-O-CH_2CH_3 + H^+$ 1

b)



1

(Acetyl chloride instead of acetic anhydride may be used)

21. (i) Maltose 1

(ii) fibrous proteins: parallel polypeptide chain, insoluble in water, Globular proteins: spherical shape, soluble in water, (or any I suitable difference) 1

(iii) Vitamin D 1

22 (i) Larger surface area, higher van der Waals' forces ,higher the boiling point 1

(ii) Rotation due to one enantiomer is cancelled by another enantiomer 1

(iii) - NO_2 acts as Electron withdrawing group or –I effect 1

23. (i) Concern for students health, Application of knowledge of chemistry to daily life, empathy, carirg or any other ½, ½

(ii) Through posters, nukkad natak in community, social media, play in assembly or any other 1

(iii) Tranquilizers are drugs used for treatment of stress or mild and severe mental disorders .. Eg: equanil (or any other suitable example) ½, ½

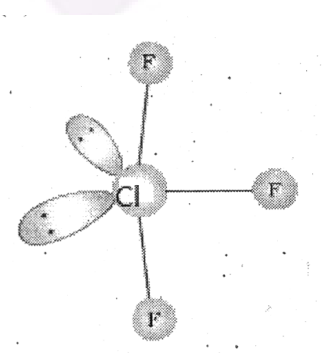
(iv) Aspartame is unstable at cooking temperature. 1

24. (a) (i) Due to decrease in bond dissociation enthalpy from HF to HI , there is an increase in acidic character observed. 1

(ii) Oxygen exists as diatomic O_2 molecule while sulphur as polyatomic S_8 1

(iii) Due to non availability of d orbitals 1

(b)



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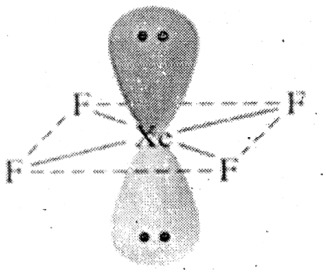


1

OR

(i) White Phosphorus because it is less stable due to angular strain ½+½

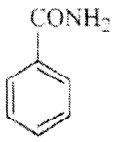
(ii) Nitrogen oxides emitted by supersonic jet planes are responsible for depletion of ozone layer. 1

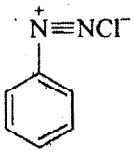
Or $NO+O_3 \rightarrow NO_2 + O_2$

(iii) due to small size of F, large inter electronic repulsion / electron- electron repulsion among the lone pairs of fluorine 1

(iv) Helium 1

(v) $XeF_2 + PF_5 \rightarrow [XeF]^+ [PF_6]^-$ 1

25. A = 

B = 

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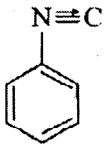
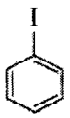
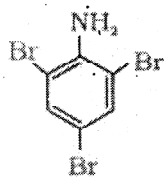
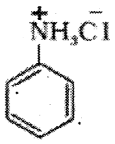
D = 

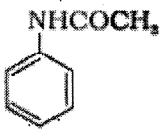
E = 

1×5 = 5

OR

a. i) 

ii) 

iii) 

1

1

b. $(CH_3)_3N < C_2H_5NH_2 < C_2H_5OH$ 1

c. By Hinsberg test secondary amines $(CH_3)_2NH$ shows ppt formation which is insoluble in KOH tertiary amines $(CH_3)_3N$ do not react with benzene sulphonyl choride 1

26. $k = \frac{2.303}{t} \log \frac{[A_0]}{[A]}$ 1

$k = \frac{2.303}{30} \log \frac{0.60}{0.30}$

$k = \frac{2.303}{30} \times 0.301 = 0.023\ s^{-1}$ ½

$k = \frac{2.303}{60} \log \frac{0.60}{0.15}$ ½

$k = \frac{2.303}{60} \times 0.6021 = 0.023\ s^{-1}$ 1

As k is constant in both the readings, hence it is a pseudo first order reaction. ½

ii) Rate $= -\Delta[R]/\Delta t$ ½

$= \frac{-[0.15 - 0.30]}{60 - 30}$

$= 0.005\ mol\ L^{-1}\ s^{-1}$ 1

OR

a) (i) Rate will increase 4 times of the actual. rate of reaction. 1+1

(ii) Second order. reaction

b) $t_{1/2} = \frac{0.693}{k}$

$30\ min = \frac{0.693}{k}$ ½

$k = 0{:}0231 min^{-1}$ ½

$$k = \frac{2.303}{t} \log \frac{[A_0]}{[A]}$$

$$t = \frac{2.303}{0.0231} \log \frac{100}{10}$$ ½

$$t = \frac{2.303}{0.0231} \text{ min}$$ ½

$$t = 99.7\text{min}$$ 1