KCET EXAMINATION – 2023
SUBJECT : CHEMISTRY (VERSION – A4)

DATE : 21-05-2023 **TIME : 02:30 PM TO 03:50 PM**

1. For the formation of which compound in Ellingham diagram ΔG^0 becomes more and more negative with increase in temperature?
(A) ZnO
(B) Cu_2O
(C) CO
(D) FeO

Ans. C
Sol.

2. Which of the following compound does not give dinitrogen on heating?
(A) NH_4NO_3
(B) $(NH_4)_2Cr_2O_7$
(C) $Ba(N_3)_2$
(D) NH_4NO_2

Ans. A
Sol.

3. Aqueous solution of raw sugar when passed over beds of animal charcoal, it becomes colourless. Pick the correct set of terminologies that can be used for the above example.

	Adsorbent	Adsorbate	Process
(A)	Animal Charcoal	Colouring Substance	Adsorption
(B)	Colouring Substance	Animal Charcoal	Adsorption
(C)	Solution of Sugar	Animal Charcoal	Sorption
(D)	Animal Charcoal	Solution of Sugar	Absorption

Ans. A
Sol.

4. For Freundlich adsorption isotherm, a graph of $\log\left(\frac{x}{m}\right)$ Vs. log (P) gives a straight line. The slope of line and its Y-axis intercept respectively are
(A) $\log\left(\frac{1}{n}\right), \log K$
(B) $\frac{1}{n}, K$
(C) $\log\left(\frac{1}{n}\right), K$
(D) $\frac{1}{n}, \log K$

Ans. D
Sol. $\log\frac{x}{m} = \log K + \frac{1}{n}\log P$

5. When $FeCl_3$ is added to excess of hot water gives a sol 'X'. When $FeCl_3$ is added to $NaOH_{(aq)}$ solution, gives sol 'Y'.
X and Y formed in the above process respectively are
(A) $Fe_2O_3 \cdot xH_2O / Cl^-$ and $Fe_2O_3 \cdot xH_2O / OH^-$
(B) $Fe_2O_3 \cdot xH_2O / Fe^{3+}$ and $Fe_2O_3 \cdot xH_2O / OH^-$
(C) $Fe_2O_3 \cdot xH_2O / OH^-$ and $Fe_2O_3 \cdot xH_2O / Fe^{3+}$
(D) $Fe_2O_3 \cdot xH_2O / H^+$ and $Fe_2O_3 \cdot xH_2O / Na^+$

Ans. B
Sol.

6. The reducing agent in the given equations:

$4Ag_{(s)} + 8CN^-_{(aq)} + 2H_2O_{(aq)} + O_{2(g)} \rightarrow 4[Ag(CN)_2]^-_{(aq)} + 4OH^-_{(aq)}$

$2[Ag(CN)_2]^-_{(aq)} + Zn_{(s)} \rightarrow [Zn(CN)_4]^-_{(aq)} + 2Ag_{(s)}$

(A) H_2O

(B) CN^-

(C) Zn

(D) O_2

Ans. **C**

Sol.

7. Which of the following is CORRECT with respect to melting point of a transition element?

(A) $Mn > Fe$

(B) $Ti > V$

(C) $V > Cr$

(D) $Cr > Mn$

Ans. **D**

Sol.

8. $aMnO_4^- + bS_2O_3^{-2} + H_2O \rightarrow xMnO_2 + ySO_4^{-2} + zOH^-$

a and y respectively are

(A) 3; 6

(B) 8; 8

(C) 8; 3

(D) 8; 6

Ans. **D**

Sol.

$8MnO_4^- + 3S_2O_3^{-2} + H_2O \rightarrow 8MnO_2 + 6SO_4^{-2} + 2OH^-$

9. Which formula and name combination is INCORRECT?

(A) $[CoCl_2(en)_2]Cl$ - Dichloridodiethylenediammine cobalt (II) chloride

(B) $[Co(NH_3)_4(H_2O)Cl]Cl_2$ - Tetraammineaquachloridocobalt (III) chloride

(C) $K_3[Al(C_2O_4)_3]$ - Potassium trioxalatoaluminate (III)

(D) $[Pt(NH_3)_2Cl(NO_2)]$ - Diamminechloridonitrito – N – platinum (II)

Ans. **A**

Sol.

10. Which of the following system is an octahedral complex has maximum unpaired electrons?

(A) d^4 (low spin)

(B) d^7 (high spin)

(C) d^9 (high spin)

(D) d^6 (low spin)

Ans. **B**

Sol.

t_{2g}^5 eg^2

11. The correct decreasing order of basicity of hydrides of Group-15 elements is

(A) $AsH_3 > SbH_3 > NH_3 > PH_3$

(B) $NH_3 > PH_3 > AsH_3 > SbH_3$

(C) $SbH_3 > AsH_3 > PH_3 > NH_3$

(D) $PH_3 > AsH_3 > SbH_3 > NH_3$

Ans. **B**

Sol.

12. Which one of the following oxoacids of phosphorus can reduce $AgNO_3$ to metallic silver?

(A) $H_4P_2O_6$

(B) H_3PO_4

(C) H_3PO_2

(D) $H_4P_2O_7$

Ans. **C**

Sol.

13. In solid state, PCl_5 is a/an

(A) Ionic solid with $[PCl_4]^+$ and $[PCl_6]^-$

(B) Covalent solid present in the form of P_2Cl_{10}

(C) Octahedral structure

(D) Ionic solid with $[PCl_6]^+$ and $[PCl_4]^-$

Ans. **A**

Sol.

14. In which one of the following pairs, both the elements does not have $(n-1)d^{10}ns^2$ configuration in its elementary state?

(A) Hg, Cn

(B) Cu, Zn

(C) Zn, Cd

(D) Cd, Hg

Ans. **B**

Sol. $Cu \rightarrow 4s^1 3d^{10}$

$Zn \rightarrow 4s^2 3d^{10}$

15.

$CH_3-CH=CH-CH_2OH \xrightarrow{PCC} CH_3-CH=CH-CHO$

Hybridisation change involved at $C-1$ in the above reaction.

(A) sp^2 to sp^3

(B) sp to sp^2

(C) sp^3 to sp

(D) sp^3 to sp^2

Ans. D

Sol.

16. If a didenate ligand ethane -1, 2-diamine is progressively added in the molar ratio $en:Ni::1:1, 2:1, 3:1$ to $[Ni(H_2O_6)]^{2+}$ aq solution, following co-ordination entities are formed.

I. $[Ni(H_2O)_4en]^{2+}_{(aq)}$ -pale blue

II. $[Ni(H_2O)_2(en)_2]^{2+}_{(aq)}$ - blue/purple

III. $[Ni(en)_3]^{2+}_{(aq)}$ - violet

The wavelength in nm of light absorbed in case of I and III are respectively.

(A) 310 nm and 500 nm

(B) 600 nm and 535 nm

(C) 475 nm and 310 nm

(D) 300 nm and 475 nm

Ans. D

Sol.

17. Which of the following is an organometallic compound?

(A) $(CH_3COO)_2Ca$

(B) CH_3ONa

(C) CH_3COONa

(D) CH_3CH_2MgBr

Ans. D

Sol.

18. A pair of compounds having the same boiling points are

(A) benzene and naphthalene

(B) (+) butan-2-ol and (-) butan-2-ol

(C) cis but-2-ene and trans but-2-ene

(D) n-hexane and neo-hexane

Ans. B

Sol. *d* and *l* isomers (enantiomers) have same physical properties

19. Identify A, B and C in the sequence :

$CH_3CH_2Br \xrightarrow[alc]{KCN} A \xrightarrow{LiAlH_4} B \xrightarrow[0^0C]{HNO_2} C$

(A) $CH_3CH_2CN,\ C_2H_5OH,\ C_2H_5N_2Cl$

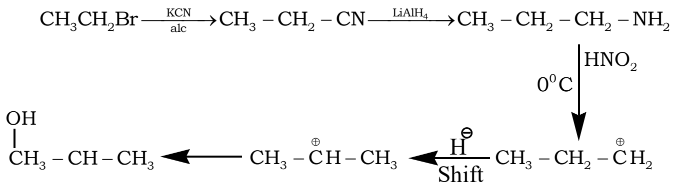
(B) $CH_3CH_2CN,\ CH_3CH_2NH_2,\ C_2H_5OH$

(C) $CH_3CH_2CN,\ CH_3CH_2CH_2NH_2,\ CH_3CH_2CH_2OH$

(D) $CH_3CH_2NC,\ CH_3CH_2OH,\ CH_3CH_2CH_2NH_2$

Ans. C

Sol.



Note: option is given without rearrangement

20. Compounds P and R in the following reaction are

$CH_3CHO \xrightarrow[(ii)H_3O^+]{(i)CH_3MgBr} P \xrightarrow[heat]{conc.H_2SO_4} Q \xrightarrow[(ii)H_2O_2,OH^-]{(i)B_2H_6} R$

(A) Metamers

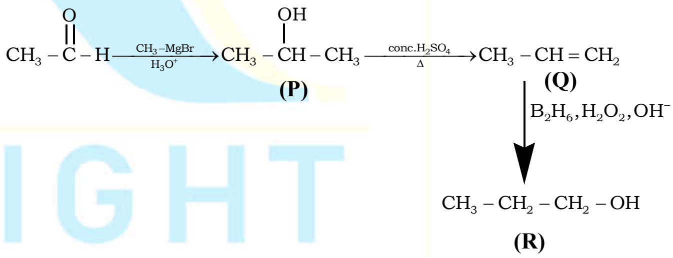
(B) Identical

(C) Position isomers

(D) Functional isomers

Ans. C

Sol.



P and R are positional isomers

21. Aniline does not undergo

(A) Friedel-Craft reaction

(B) Bromination

(C) Nitration

(D) Sulphonation

Ans. A

Sol. Conceptual

22. The heating of phenyl methyl ether with HI produces an aromatic compound A which on treatment with con. HNO_3 gives B. A and B respectively are,

(A) Iodobenzene, 1-Iodo-4-nitrobenzene

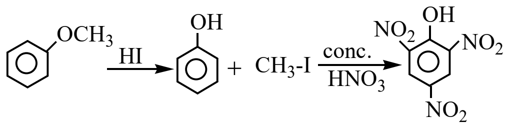
(B) Phenol, Picric acid

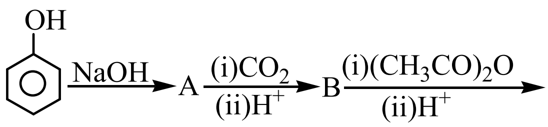
(C) Methanol, Ethanoic acid

(D) Picric acid, Phenol

Ans. B

Sol.



23. 

Y (Major product)

Y in the above reaction is

(A) Cumene

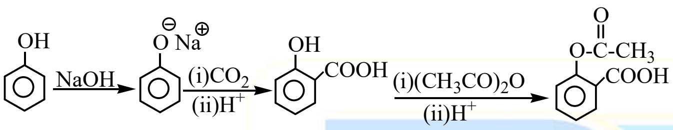
(B) Picric acid

(C) Salicylaldehyde

(D) Aspirin

Ans. D

Sol.



24. A better reagent to oxidize primary alcohols into aldehyde is:

(A) Acidified $K_2Cr_2O_7$

(B) CrO_3

(C) PCC

(D) Alkaline $KMnO_4$

Ans. C

Sol. PCC (Due to mild oxidising nature)

25. In the reaction:

$$C_6H_5CN \xrightarrow[\text{(ii) } H_3O^+]{\text{(i) } SnCl_2+HCl} X \xrightarrow{\text{con. KOH}} Y + Z,$$

Formation of X, formation of Y and Z are known by

(A) Wolff-Kishner reduction, Wurtz reaction.

(B) Stephen reaction, Cannizaro reaction.

(C) Rosenmund reduction, Cannizaro reaction.

(D) Clemmensen reduction, Sandmeyer reaction.

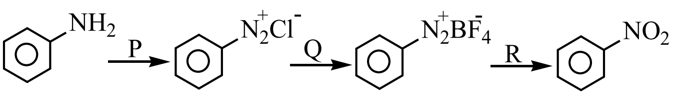
Ans. B

Sol.

$$C_6H_5\text{-}C{\equiv}N \xrightarrow[\text{ii) } H_3O^+]{\text{i)} SnCl_2+HCl} C_6H_5\text{-}CHO \xrightarrow{\text{con.KOH}}$$

$$\underset{\text{Y(oxidation)}}{C_6H_5COO^{\ominus}Na^{\oplus}} + \underset{\text{Z(reduction)}}{C_6H_5CH_2OH}$$

26. In the reaction:



P, Q and R respectively are:

(A) $NaNO_2 + \text{dil. HCl},\ BF_3, Cu + NaNO_2$

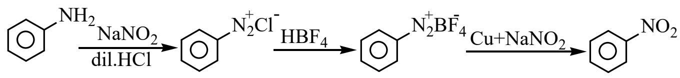
(B) $NaNO_3 + \text{dil. HCl}, F_2, Cu + NaNO_3$

(C) $NaNO_2 + \text{dil. HCl}, HBF_4, Cu + NaNO_2$

(D) $NaNO_2 + \text{con.HCl}, F_2, Cu + NaNO_3$

Ans. C

Sol.



27. Thyroxine produced in the thyroid gland is an iodinated derivative of ________

(A) tyrosine

(B) tryptophan

(C) threonine

(D) lysine

Ans. A

Sol. Conceptual

28. Sucrose is dextrorotatory but after hydrolysis the mixture show laevorotation, this is because of

(A) Recemic mixture is formed.

(B) Laevorotation of fructose is more than dextrorotation of glucose.

(C) Laevorotation of glucose is more than dextrorotation of fructose.

(D) Sucrose is a non-reducing sugar.

Ans. B

Sol. Conceptual

29. The correct order of match between column X and column Y is:

X	Y
I. Vitamin A	i. Muscular weakness
II. Vitamin D	ii. Increased blood clotting time
III. Vitamin E	iii. Night blindness
IV. Vitamin K	iv. Osteomalacia

(A) I - iii, II - ii, III - iv, IV – i

(B) I - iii, II - iv, III - i, IV – ii

(C) I - iv, II - iii, III - ii, IV – i

(D) I - ii, II - i, III - iii, IV - iv

Ans. B

Sol. Vitamin A – Night blindness

Vitamin D – Osteomalacia

Vitamin E - Muscular weakness

Vitamin K – Blood clotting time

30. Which of the following monomers form biodegradable polymers?

(A) Phenol and formaldehyde

(B) 3-hydroxybutanoic acid and 3-hydroxypentanoic acid

(C) Ethylene glycol and pthalic acid

(D) Caprolactum and 1,3-Butadiene

Ans. B

Sol. PHBV

31. Match the List-I with List-II in the following:

	List-I		List-II
1.	Caprolactum	a)	$\left(CH_2 - \underset{\large CH_3}{\underset{\vert}{CH}} \right)_n$
2.	Vinyl chloride	b)	$\left(CH_2 - \underset{\large C_6H_5}{\underset{\vert}{CH}} \right)_n$
3.	Styrene	c)	$\left(CH_2 - \underset{\large C\ell}{\underset{\vert}{CH}} \right)_n$
4.	Propene	d)	$\left(\overset{\large O}{\overset{\Vert}{C}} \left(CH_2 \right)_5 \underset{\large H}{\underset{\vert}{N}} \right)_n$

(A) 1-d, 2-c, 3-a, 4-b
(B) 1-d, 2-c, 3-b, 4-a
(C) 1-c, 2-d, 3-a, 4-b
(D) 1-a, 2-d, 3-c, 4-b

Ans. B

Sol. Conceptual

32. Which one of the following is a non-narcotic analgesic?
(A) Aspirin
(B) Morphine
(C) Heroin
(D) Codeine

Ans. A

Sol. Conceptual

33. Receptors are proteins and crucial to body communication process. These receptors are embedded in
(A) Endocrine gland
(B) Chromosomes
(C) Cell membrane
(D) Protein

Ans. C

Sol. Conceptual

34. A gas at a pressure of 2 atm is heated from $25^{\circ}C$ to $323^{\circ}C$ and simultaneously compressed to $\frac{2^{rd}}{3}$ of its original value. Then the final pressure is
(A) 2 atm
(B) 4 atm
(C) 1.33 atm
(D) 6 atm

Ans. D

Sol. $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

$P_2 = \frac{2 \times 1}{298} \times \frac{3 \times 596}{2}$

$= 6\,\text{atm}$

35. Lattice enthalpy for NaCl is $+788$ kJ mol^{-1} and $\Delta H^{\circ}_{Hyd} = -784$ kJ mol^{-1}. Enthalpy of solution of NaCl is
(A) -572 kJ mol^{-1}
(B) -4 kJ mol^{-1}
(C) $+572$ kJ mol^{-1}
(D) $+4$ kJ mol^{-1}

Ans. D

Sol. $\Delta H_{sol} = \Delta H_L + \Delta H_{hyd}$

$= 788 + (-784)$

$= 4\,\text{kJmol}^{-1}$

36. At $500\,K$, for a reversible reaction $A_{2(g)} + B_{2(g)} \rightleftharpoons 2AB_{(g)}$ in a closed container, $K_C = 2 \times 10^{-5}$. In the presence of catalyst, the equilibrium is attaining 10 times faster. The equilibrium constant K_C in the presence of catalyst at the same temperature is
(A) 2×10^{-10}
(B) 2×10^{-5}
(C) 2×10^{-4}
(D) 2×10^{-6}

Ans. B

Sol. Catalyst does not affects the K_C, only T can alter the value of K_C of a given reaction.

37. A weak acid with $pK_a\,5.9$ and weak base with $pK_b\,5.8$ are mixed in equal proportions. pH of the resulting solution is
(A) 7
(B) 7.05
(C) 7.005
(D) 7.5

Ans. B

Sol. $p^H = 7 + \frac{1}{2}\left(p^{K_a} - p^{K_b}\right)$

$= 7 + \frac{1}{2}(5.9 - 5.8)$

$= 7.05$

38. Temperature of $25^\circ C$ in Fahrenheit and Kelvin scale respectively are

(A) $45^\circ F$ and 260.15 K

(B) $47^\circ F$ and 312.15 K

(C) $77^\circ F$ and 298.15 K

(D) $17^\circ F$ and 298.15 K

Ans. **C**

Sol. $K = 273.15 + {}^\circ C$

$$F = \frac{9}{5}\,{}^\circ C + 32$$

39. The number of protons, neutrons and electrons in the ion ${}^{32}_{16}S^{2-}$ respectively are

(A) 18, 16, 16
(B) 16, 16, 16
(C) 16, 18, 16
(D) 16, 16, 18

Ans. **D**

Sol. No. of Protons = 16
No. of Neutrons = 32-16 = 16
No. of electrons = 16+2 = 18

40. The correct order of first ionisation enthalpy of given elements is

(A) $C < B < Be < Li$

(B) $Li < Be < B < C$

(C) $Li < B < Be < C$

(D) $Be < Li < B < C$

Ans. **C**

Sol. $Be > B$

41. Which of the following statements is INCORRECT?

(A) Bond length of O_2 < Bond length of O_2^{2-}

(B) Bond order of O_2 > Bond order of O_2^{2-}

(C) Bond length O_2 > Bond length of O_2^{2+}

(D) Bond order of O_2^{+} < Bond order of O_2^{2-}

Ans. **D**

Sol.

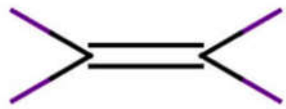
B.O	O_2	O_2^{+}	O_2^{2+}	O_2^{-1}	O_2^{2-}
	2	2.5	3	1.5	1

$$B.L \propto \frac{1}{B.O}$$

$$B.O = O_2^{+2} > O_2^{+} > O_2 > O_2^{-} > O_2^{2-}$$

$$B.L = O_2^{2+} < O_2^{+} < O_2 < O_2^{-} < O_2^{2-}$$

42. IUPAC name of the compound is

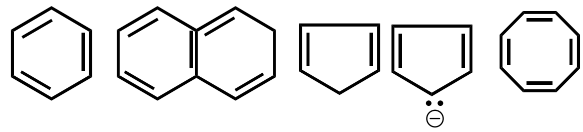


(A) 1,1,2,2-tetra methylethene
(B) 2,3 - dimethyl butene
(C) 2,3-dimethylbut-2-ene
(D) 2, 3 - dimethyl butyne

Ans. **C**

Sol. 2,3 – dimethyl but - 2 – ene

43. Among the following:



I II III IV V

The set which represents aromatic species is
(A) II and III
(B) I, II and IV
(C) I, II and III
(D) III, IV and V

Ans. **B**

Sol. I, II, III

44. Which one of the following gases converts haemoglobin into carboxy haemoglobin?

(A) NO

(B) CO_2

(C) CO

(D) O_2

Ans. **C**

Sol. CO

45. What is the oxidation number of S in $H_2\ S_2O_8$?

(A) +7
(B) +6
(C) +5
(D) +4

Ans. **B**

Sol. $HO-\overset{\overset{O}{||}}{S}-\overset{-1}{O}-\overset{-1}{O}-\underset{\underset{O}{||}}{\overset{\overset{O}{||}}{S}}-OH$

$$2x + 2 + 2(-1) + 6(-2) = 0$$

$$x = +6$$

46. A 30% solution of hydrogen peroxide is
(A) '50 volume' hydrogen peroxide
(B) '100 volume' hydrogen peroxide
(C) '30 volume' hydrogen peroxide
(D) '10 volume' hydrogen peroxide

Ans. **B**

Sol. $30\%(w/v)H_2O_2$ solution is equal to $100\ v\ H_2O_2$

47. A pair of amphoteric oxides is

(A) BeO, MgO

(B) BeO, ZnO

(C) Al_2O_3, Li_2O

(D) BeO, BO_3

Ans. **B**

Sol.

48. The composition of water gas is

(A) $CO_{(g)} + H_2O_{(g)}$

(B) $CO_{(g)} + H_2(g)$

(C) $CO_{(g)} + N_2(g)$

(D) CH_4 (g)

Ans **B**

Sol.

49. The swelling in feet and ankles of an aged person due to sitting continuously for long hours during travel, is reduced by soaking the feet in warm salt water. This is because of:

(A) Edema

(B) Diffusion

(C) Reverse Osmosis

(D) Osmosis

Ans **D**

Sol.

50. A sample of water is found to contain $5.85\%\left(\frac{w}{w}\right)$ of AB (molecular mass 58.5) and $9.50\%\left(\frac{W}{w}\right)XY_2$ (molecular mass 95). Assuming 80% ionisation of AB and 60% ionisation of XY_2, the freezing point of water sample is [Given: K_f for water $1.86\,K\,kg\,mol^{-1}$ Freezing point of pure water is 273 K and A, B and Y are monovalent ions)

(A) 280.44 K

(B) 281.75 K

(C) 264.25 K

(D) 265.56 K

Ans **C**

Sol.

AB	**XY₂**
5.85%	9.5%
$m = \frac{5.85}{58.5} \times \frac{1000}{84.65}$	$m = \frac{9.5}{95} \times \frac{1000}{84.65}$
$= 1.181$	$= 1.181$
$\alpha = 0.8$	$\alpha = 0.6$
$I = 1 + (2-1)0.8 = 1.8$	$1 = 1 + (3-1)0.6 = 2.2$

$\Delta T_f = K_f[i_1m_1 + i_2m_2]$

$= 1.86(1.8(1.81) + 2.2(1.181))$

$= 1.86(4.72) = 8.78$

$T_f^s = 264.25\,K$

51. Match the column A (type of crystalline solid) with the column B (example for each type):

Column-A	Column-B
P. Molecular Solid	i. SiC
Q. Ionic Solid	ii. Mg
R. Metallic Solid	iii. H_2O
S. Network Solid	iv. MgO

(A) P – ii Q – iv R – iii S – i

(B) P – iii Q – IV R – ii S – i

(C) P – iii Q – i R – ii S – iv

(D) P – iv Q – iii R – ii S – i

Ans **B**

Sol. Molecular solid H_2O

Ionic solid MgO

Metallic solid Mg

Network solid $\Rightarrow$ SIC

52. A metal crystallises in a body centered cubic lattice with the metallic radius $\sqrt{3}\,\overset{0}{A}$. The volume of the unit cell in m^3 is

(A) 6.4×10^{-29}

(B) 4×10^{-10}

(C) 64×10^{-29}

(D) 4×10^{-29}

Ans **A**

Sol. BCC $r = \frac{\sqrt{3}a}{4}$

$a = \frac{4r}{\sqrt{3}} = \frac{4 \times \sqrt{3} \times 10^{-10}}{\sqrt{3}} = 4 \times 10^{-10}$

$a^3 = 64 \times 10^{-30} \Rightarrow 6.4 \times 10^{-29}$

53. If 'a' stands for the edge length of the cubic systems - The ratio of radii in simple cubic, body centered cubic and face centered cubic unit cells is

(A) $\frac{1}{2}$ a: $\frac{\sqrt{3}}{2}$a : $\frac{\sqrt{2}}{2}$a

(B) $\frac{1}{2}a : \sqrt{3}a : \frac{1}{\sqrt{2}}a$

(C) $1a : \sqrt{3}a : \sqrt{2}a$

(D) $\frac{1}{2}a : \frac{\sqrt{3}}{4}a : \frac{1}{2\sqrt{2}}a$

Ans D

Sol.

54. Dimerisation of solute molecules in low dielectric constant solvent is due to:
(A) Co-ordinate bond
(B) Ionic bond
(C) Hydrogen bond
(D) Covalent bond

Ans C

Sol.

55. For a reaction, the value of rate constant at $300\ K$ is $6.0\times10^5\ s^{-1}$. The value of Arrhenius factor A at infinitely high temperature is:
(A) $\frac{6\times10^{-5}}{300}$
(B) 6×10^5
(C) $6\times10^5\times e^{-Ea/300R}$
(D) $e^{-Ea/300R}$

Ans B

Sol. $K = Ae^{-\frac{\varepsilon a}{RT}}$ at $T=\alpha$

$K = A = 6\times10^5$

56. The rate constants k_1 and k_2 for two different reactions are $10^{16}\times e^{-2000/T}$ and $10^{15}\times e^{-1000/T}$ respectively. The temperature at which $k_1 = k_2$ is:
(A) $\frac{1000}{2.303}$ K
(B) 1000 K
(C) $\frac{2000}{2.303}$ K
(D) 2000 K

Ans A

Sol. $K_1 = 10^{16}\times e^{\frac{-2000}{T}}$

$K_2 = 10^{15}\times e^{\frac{-1000}{T}}$

$K_1 = K_2$

$10^{16}\times e^{\frac{-2000}{T}} = 10^{15}\times e^{\frac{-1000}{T}}$

$10 = e^{\frac{1000}{T}}$

$\ln 10 = \frac{1000}{T}\ln_e$

$2.303\log10 = \frac{1000}{T}$

$T = \frac{1000}{2.303}$

57. During the electrolysis of brine, by using inert electrodes,
(A) Na deposits on cathode
(B) Cl_2 liberates at anode
(C) O_2 liberates at anode
(D) H_2 liberates at anode

Ans B

Sol.

58. Consider the following 4 electrodes

$A : Ag^+(0.0001M)/Ag_{(s)}$

$B : Ag^+(0.1M)/Ag_{(s)}$

$C : Ag^+(0.01M)/Ag_{(s)};$

$D : Ag^+(0.001M)/Ag_{(s)}; E^0_{Ag^+/Ag} = +0.80\ V$

Then reduction potential in volts of the electrodes in the order
(A) $A > D > C > B$
(B) $A > B > C > D$
(C) $B > C > D > A$
(D) $C > D > A > B$

Ans C

Sol. $E_{Ag^+/Ag} = E^0_{Ag^+/Ag} + \frac{0.059}{n}\log[Ag^+]$

As concentration of metal ion increases reduction potential of metal electrode also increases

$E \propto$ conc.

$B > C > D > A$

59. The resistance of 0.1M weak acid HA in a conductivity cell is 2×10^3 Ohm. The cell constant of the cell is $0.78 Cm^{-1}$ and λ°_m of acid HA is $390\ S\ cm^2\ mol^{-1}$. The pH of the Solution is
(A) 5
(B) 3
(C) 3.3
(D) 4.2

Ans B

Sol. $C = 0.1M$ $\quad\quad \Lambda^0_m = 390\,s\,cm^2 mol^{-1}$

$R = 2\times10^3$ ohm

$G^* = 0.78\ cm^{-1}$

$K = \frac{R}{G^*} = \frac{0.78}{2\times10^3} = 3.9\times10^{-4}$

$\Lambda_m = \frac{K\times1000}{C} = \frac{3.9\times10^{-4}\times1000}{0.1} = 3.9$

$\alpha = \frac{\Lambda_m}{\Lambda^0_m} = \frac{3.9}{390} = 10^{-2}$

$[H^+] = c\alpha = 0.1\times10^{-2} = 10^{-3}$

$pH = -\log 10^{-3} = 3$

60. In which one of the following reactions, rate constant has the unit $mol L^{-1} s^{-1}$?

(A) $2NO_{(g)} + O_{2(g)} \rightarrow 2NO_{2(g)}$

(B) Decomposition of HI on the surface of Gold

(C) Acid catalysed hydrolysis of CH_3COOCH_3

(D) $CHCl_3 + Cl_2 \rightarrow CCl_4 + HCl$

Ans **B**

Sol. Zero order reaction