### NEET 2024 - Paper Code R3

### Chemistry

**Question 51:** The most stable carbocation among the following **Options:** (a)







In Option (c)  $\max \propto H$  present

**Question 52:** For the reaction  $2A \rightleftharpoons B + C$ ,  $K_c = 4 \times 10^{-3}$ . At a given time, the composition of reaction mixture is :  $[A] = [B] = [C] = 4 \times 10^{-3}$ Then, which of the following is correct?

#### **Options:**

CH

(b)

(c)

CH3

- (a) Reaction has a tendency to go in forward direction.
- (b) Reaction has a tendency to go in backward direction.
- (c) Reaction has gone to completion in forward direction.
- (d) Reaction is at equilibrium.

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Answer: (b)
Solution:
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$$K_{\rm C} = \frac{\begin{bmatrix} \mathbf{B} \end{bmatrix} \begin{bmatrix} \mathbf{C} \end{bmatrix}}{\begin{bmatrix} \mathbf{A} \end{bmatrix}^2}$$
$$Q_{\rm C} = \frac{\begin{bmatrix} 2 \times 10^{-3} \end{bmatrix} \begin{bmatrix} 2 \times 10^{-3} \end{bmatrix}}{\begin{bmatrix} 2 \times 10^{-3} \end{bmatrix}^2} = 1$$

 $Q_{\rm C} > K_{\rm C}$ 

Question 53: 'Spin only' magnetic moment is same for which of the following ions?

A. Ti<sup>3+</sup>, B. Cr<sup>2+</sup> C. Mn<sup>2+</sup>, D. Fe<sup>2+</sup>

E. Sc<sup>3+</sup>

Chose the most appropriate answer from the options given below:

**Options:** 

(a) A and E only

(b) B and C only

(c) A and D only (d) B and D only 1: 2015 Certified

#### Answer: (d)

Solution:

 $Ti = 3d^2 4s^2$  $\mathrm{Ti}^{+3} = 3\mathrm{d}^1$  $Cr^{+2} = 3d^4$  $Mn^{+2} = 3d^5$  $Fe^{+2} = 3d^{6}$  $Sc^{+3} = 3d^0$ Cr<sup>+2</sup> and Fe<sup>+2</sup> both have unpaired electrons

**Question 54:** The energy of an electron in the ground state (n = 1) for He<sup>+</sup> ion is -xJ, then that for an electron in n = 2 state for Be<sup>3+</sup> ion in J is

**Options:** 

(a)  $-\frac{x}{-}$ 9

(b) -4xEER INSTITUTE PVT.LTD. (c)  $-\frac{4}{9}x$ (d) - xAnswer: (d) Solution:  $E_n \propto \frac{Z^2}{n^2}$ In case He<sup>+</sup> z = 2, n = 1 = -xJIn case Be<sup>+3</sup> z = 4, n = 2 = -xJ

Question 55: Which reaction is NOT a redox reaction ? **Options:** (a)  $2KClO_3 + I_2 \rightarrow 2 KIO_3 + Cl_2$ 

(b)  $H_2 + Cl_2 \rightarrow 2 \text{ HCL}$ (c)  $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$ (d)  $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$ Answer: (c) Solution:  $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$ No change in oxidation state

#### Question 56: Match List-I with List-II

List-I(Molecule)	List-II(Number and types of bond/s	
	between two carbon atoms)	
A. ethane	I. one $\sigma$ -bond and two $\pi$ -bonds	
B. ethene	II. two $\pi$ -bonds	
C. carbon molecule, C <sub>2</sub>	III. one $\sigma$ -bonds	
D. ethyne	IV. one $\sigma$ -bond and one $\pi$ -bonds	

Choose the correct answer from the options given below:

#### **Options:**

(a) A-IV, B-III, C-II, D-I
(b) A-III, B-IV, C-II, D-I
(c) D-I</l

(c) A-III, B-IV, C-I, D-II (d) A-I, B-IV, C-II, D-III Answer: (b)

#### Solution: Ethane



1 sigma bond Ethene

H-c=c-#

1 sigma bond & 1 pi bond

C<sub>2</sub>: As per MOT, bond order is 2 and both are pi bonds ethyne

H-C ERC-H

Thus one sigma and 2 pi bonds

Question 57: Match List I with List II	
List I (Complex)	List II (types of isomerism)
A. $[Co(NH_3)_5(NO_2)]Cl_2$	I. Solvate isomerism
B. $[Co(NH_3)_5(SO_4)]Br$	II. Linkage isomerism
C. $[Co(NH_3)_6Cr(CN)_6]$	III. Ionization isomerism
D. $[Co(H_2O)_6]Cl_3$	IV. Coordination isomerism

Choose the correct answer from the options given below

#### **Options:**

(a) A -I, B - III, C- IV, D-II
(b) A -I, B - IV, C- III, D-II
(c) A -II, B - IV, C- III, D-I
(d) A -II, B - III, C- IV, D-I
Answer: (d)
Solution: A -II, B - III, C- IV, D-I

 $[Co(NH_3)_5(NO_2)]Cl_2 \Rightarrow Linkage isomerism$  $[Co(NH_3)_5(SO_4)]Br \Rightarrow Ionization isomerism$  $[Co(NH_3)_6Cr(CN)_6] \Rightarrow Coordination isomerism$  $[Co(H_2O)_6]Cl_3 \Rightarrow Solvate isomerism$ 

Question 58: The  $E^o$  value for the  $Mn^{3+}/Mn^{2+}$  couple is more positive than that of  $Cr^{3+}/Cr^{2+}$  or  $Fe^{3+}/Fe^{2+}$  due to change of

#### **Options:**

(a) d<sup>5</sup> to d<sup>2</sup> configuration
(b) d<sup>4</sup> to d<sup>5</sup> configuration
(c) d<sup>3</sup> to d<sup>5</sup> configuration
(d) d<sup>5</sup> to d<sup>4</sup> configuration

#### Answer: (b)

**Solution:** The valence electronic configuration of  $Mn^{3+}$  and  $Mn^{2+}$  are  $3d^4$  and  $3d^5$  respectively and thus  $E^o_{Mn^{3+}/Mn^{*2}}$  is positive as the  $3d^5$  system will be most stable to symmetricity and higher exchange energy compared to  $3d^4$ 

### Question 59: The highest number of helium atoms is in

**Options:** (a) 4 u of helium (b) 4 g of helium (c) 2.271098 L of helium at STP (d) 4 mol of helium **Answer:** (d) **Solution:** Total Helium atoms = moles  $\times$  N<sub>A</sub>  $\times$  Aromaticity Number of atoms =  $4 \times$  N<sub>A</sub>  $\times$  1 = 4 N<sub>A</sub> atoms

**Question 60:** Which plot of ln k vs 1/T is consistent with Arrhenius equation? **Options:** 

(a)



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(b)







Answer: (c) Solution:



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Question 61: The compound that will undergo  $S_N$ 1 reaction with the fastest rate is Options:









(d)



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Answer: (c) Solution:



#### Question 62: Match List-I with List-II

List-I	(Quantum Number)	List-II(Information provided)
A.	ml	I. shape of orbital
B.	ms	II. size of orbital
C.	1	III. orientation of orbital
D.	n	IV. orientation of spin of electrons

Choose the correct answer from the options given below

#### **Options:**

(a) A-III, B-IV, C-I, D-II

(b) A-III, B-IV, C-II, D-I

(c) A-II, B-I, C-IV, D-III

(d) A-I, B-III, C-II, D-IV

Answer: (a) 01: 2015 Certified

#### Solution:

m<sub>l</sub> = magnetic quantum number

m<sub>s</sub> = orientation of spin of electrons

l = shape of orbital

n = size of orbital(principle quantum number)

**Question 63:** The Henry's law constant (K<sub>H</sub>) values of three gases (A, B, C) in water are 145m  $2 \times 10^{-5}$  and 35 kbar, respectively. The solubility of these gases in water follow the order:

Options: (a) B > C > A(b) A > C > B(c) A > B > C(d) B > A > CAnswer: (a) Solution:

Solution		
	K <sub>H</sub> (K bar)	
ADDDT	145	
ВАЛИИ	$2 \times 10^{-5}$	
С	35	

$$\begin{split} & \overline{K_{H}-A > C > B} \\ & P = K_{\text{H}} \chi \\ & \overline{K_{\text{H}} \propto \frac{1}{\text{solubility}}} \end{split}$$

 $\therefore B > C > A$ 

Question 64: In which of the following processes entropy increases?

A. A liquid evaporates to vapour.

- B. Temperature of a crystalline solid lowered from 130 K to 0 K
- C. 2 NaHCO<sub>3</sub>(s)  $\rightarrow$  Na<sub>2</sub>CO<sub>3</sub>(s) + CO<sub>2</sub>(g) + H<sub>2</sub>O(g)

D.  $Cl_2(g) \rightarrow 2Cl(g)$ 

Choose the correct answer from the options given below:

#### **Options:** (a) A, B and D (b) A, C and D (c) C and D (d) A and C **Answer: (b) Solution:** A. $1 \rightarrow vap$ . Entropy in c B. temperature decreases entropy decreases C. $2 \text{ NaHCO}_3(s) \rightarrow \text{Na}_2\text{CO}_3(s) + \text{CO}_2(g) + \text{H}_2\text{O}(g)$ More number of moles of gas on product side $\rightarrow$ entropy increases D. $\text{Cl}_2(g) \rightarrow 2\text{Cl}(g)$ Entropy increases Option (b) is correct

Question 65: Given below are two statements:

Statement I: Aniline does not undergo Friedel-Crafts alkylation reaction.

Statement II: Aniline cannot be prepared through Gabriel synthesis

In the light of the above statement, choose the correct answer from the options given below: **Options:** 

(a) Both statement I and statement II are false

(b) Statement I is correct but statement II is false

(c) Statement I is incorrect but statement II is true

(d) Both statement I and statement II are true

#### Answer: (d) Solution:

Statement-I right statement

Aniline will undergo acid base reaction with Lewis acid catalyst of Friedel-Crafts alkylation

Statement-II right statement

Aromatic halides cannot undergo S<sub>N</sub>2 reactions

### Question 66: Fehling's solution 'A' is Options:

(a) alkaline copper sulphate

(b) alkaline solution of sodium potassium tartrate (Rochell's salt)

(c) aqueous sodium citrate

(d) aqueous copper sulphate

#### Answer: (d)

**Solution:** aqueous copper sulphate Knowledge based (NCERT)

**Question 67:** Activation energy of any chemical reaction can be calculated if one knows the value of

#### **Options:**

- (a) Probability of collision.
- (b) Orientation of reactant molecules during collision.
- (c) rate constant at two different temperatures.
- (d) rate constant at standard temperature.

Answer: (c)

#### Solution:

According to Arrhenius equation  $K = Ae^{-Ea/RT}$ At different temperature  $log \begin{bmatrix} K_2 \\ - \end{bmatrix} = Ea \begin{bmatrix} T_2 - T_1 \\ - T_2 \end{bmatrix}$   $\begin{bmatrix} k_1 \\ - \end{bmatrix} \begin{bmatrix} 2.303 \\ - TT \end{bmatrix} \begin{bmatrix} TT_2 \\ - T \end{bmatrix}$ 

**Question 68:** Arrange the following elements in increasing order of first ionization enthalpy: Li, Be, B, C, N Choose the answer from the options given below:

**Options:** 

(a) Li < B < Be < C < N(b) Li < Be < C < B < N(c) Li < Be < N < B < C(d) Li < Be < B < C < NAnswer: (a) Solution: Li < B < Be < C < NI.E  $\propto Z_{\text{eff}}$ From left to right I.E increases

**Question 69:** 1 gram of sodium hydroxides was treated with 25ml of 0.75M HCl solution, the mass of sodium hydroxide left unreacted is equal to

**Options:** 

(a) 250 mg (b) Zero mg (c) 200 mg (d) 750 mg Answer: (a) Solution: NaOH + HCl  $\rightarrow$ 1 gram, limiting reagent  $25 \times 0.75$  millimoles  $\frac{25 \times 0.75}{1} = \frac{W_{\text{NaOH}}}{1}$   $W_{\text{NAOH}} = 25 \times 0.75$ Weight of NaOH  $= \frac{25 \times 0.75 \times 40}{1000} = 0.75$ 

Weight of NaOH left = 1 - 0.75 = 0.250 gram or 250 mg

**Question 70:** A compound with a molecular formula of  $C_6H_{14}$  has two tertiary carbons. Its IUPAC name is:

#### **Options:**

- (a) 2-methylpentane
- (b) 2,3-dimethylbutane
- (c) 2,2-dimethylbutane
- (d) n-hexane
- Answer: (b) Solution:



2,3-dimethylbutane

**Question 71:** Given below are two statements:

Statement I: The boiling point of three isomeric pentanes follows the order

n-pentane > isopentane > neopentane

**Statement II:** When branching increases, the molecule attains a shape of sphere. This results in smaller surface area for contact, due to which the intermolecular forces between the spherical molecules are weak, thereby lowering the boiling point.

In the light of the above statements, choose the most appropriate answer from the options given below:

#### **Options:**

(a) Both statement I and statement II are incorrect

(b) Statement I is correct but statement II is incorrect

(c) Statement I is incorrect but statement II is correct

(d) Both statement I and statement II are correct

#### Answer: (d) Solution:

Boiling point  $\propto \frac{1}{\text{Branching}}$ 

Branching increases boiling point decreases Pentane, 309.1 K Isopentane, 300.9 K Neopentane, 282.9 K Option (d) is correct

**Question 72:** In which of the following equilibria,  $K_p$  and  $K_c$  are NOT equal? **Options:** 

(a)  $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$ (b)  $CO_2(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$ (c)  $2BrCl(g) \rightleftharpoons Br_2(g) + Cl_2(g)$ (d)  $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ 

#### Answer: (d)

Solution:

$$\begin{split} \Delta K_{p} &= K_{c} \left( RT \right)^{\Delta n_{g}} \\ \text{In option 4 PCl}_{5}(g) \rightleftharpoons PCl_{3}(g) + Cl_{2}(g) \\ \Delta n_{g} &= 1 \\ K_{p} &= K_{c}RT \\ \text{In rest option 1,2,3 } \Delta n_{g} &= 0 \\ \text{So, in that } K_{p} &= K_{c} \end{split}$$

Question 73: The reagents with which glucose does not react to give the corresponding test/products areA. Tollen's reagentB. Schiff's reagent

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C. HCN

#### D. NH<sub>2</sub>OH

E. NaHSO<sub>3</sub>

Choose the correct options from the given below:

#### **Options:**

(a) A and D

(b) B and E

(c) E and D

(d) B and C

#### Answer: (b)

**Solution:** NaHSO<sub>3</sub>, Scheff's reagent no effect an glucose. This is due to the fact that the aldehyde group in glucose participation in the synthesis of Hemiacetals and is not free.

#### Question 74: Match List-I with List-II



Question 75: Among Group 16 elements, which one does NOT show -2 oxidation state? Options:

(a) Se

(b) Te(c) Po(d) OAnswer: (c)Solution: Elect

**Solution:** Electropositive character increases as we move down the group. So due to high electropositive Po does not show -2 oxidation state

List-I (Reaction)	List-II(Reagents Condition)
A. $OO \rightarrow O=$	I. Anhyd. AlCl <sub>3</sub>
B. O→O <sup>®</sup> O	II. CrO <sub>3</sub>
с. 0 он → 0 о	III. KMnO <sub>4</sub> /KOH, $\Delta$
S C C C C C C C C C C C C C C C C C C C	IV. (i) O <sub>3</sub> , (ii) Zn-H <sub>2</sub> O
D.	

Question 76: Match List I with List II

Choose the correct answer from the options given below: **Options:** 

(a) A-III, B-I, C-II, D-IV
(b) A-IV, B-I, C-II, D-III
(c) A-I, B-IV, C-II, D-III
(d) A-IV, B-I, C-III, D-II
Answer: (b)
Solution: A-IV, B-I, C-II, D-III

Question 77: Arrange the following elements in increasing order of electronegativity: N, O, F, C, Si Choose the correct answer from the options given below: Options: (a) Si < C < O < N < F(b) O < F < N < C < Si(c) F < O < N < C < Si(d) Si < C < N < O < F

Answer: (d) Solution:  $EN \propto Z_{eff}$ 

$$EN \propto \frac{1}{size}$$

Si < C < N < O < F

**Question 78:** Intramolecular hydrogen bonding is present in **Options:** 



**Question 79:** Identify the correct reagents that would bring about the following transformation

Options:(a) (i) BH<sub>2</sub> (ii) H<sub>2</sub>O<sub>2</sub>(OH<sup>2</sup> (iii) PCC

(a) (i)  $BH_3$ , (ii)  $H_2O_2/OH^-$ , (iii) PCC (b) (i)  $BH_3$ , (ii)  $H_2O_2/OH^-$ , (iii) alk. KMnO<sub>4</sub>, (iv)  $H_3O^+$ (c) (i) $H_2O/H^+$  (ii) PCC (d)  $H_2O/H_+$ **Answer: (a)** 

#### Solution:



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#### Question 80: Match List-I with List-II

List-I (Conversion)	List-II (No. of Faraday required)
A. 1 mol of $H_2O$ to $O_2$	I. 3F
B. 1 mol of $MnO_4$ <sup>-</sup> to $Mn^{2+}$	II. 2F
C. 1.5 mol of Ca from molten $CaCl_2$	III. 1F
D. 1 mol of FeO to Fe <sub>2</sub> O <sub>3</sub>	IV. 5F

Choose the correct answer from the options given below: **Options:** 

(a) A-III, B-IV, C-I, D-II
(b) A-II, B-III, C-I, D-IV
(c) A-III, B-IV, C-II, D-I
(d) A-II, B-IV, C-I, D-III
Answer: (d)
Solution: (d) A-II, B-IV, C-I, D-III

Question 81: Given below are two statements:

Statement I: The boiling point of hydrides of Group 16 elements follow the order  $H_2O>H_2Te>H_2Se>H_2S$ 

Statement II: On the basis of molecules mass,  $H_2O$  is expected to have lower boiling point than the other members of the group but due to the presence of extensive H-bonding in  $H_2O$ . It has higher boiling point.

In the light of the above statements, choose the correct answer from the options given below: **Options:** 

(a) Both statement I and statement II are false

(b) Statement I is true but statement II is false

(c) Statement I is false but statement II is true

(d) Both statement I and statement II are true.

Answer: (d)

Solution: (d) Both statement I and statement II are true.

Question 82: Given below are two statements:

**Statement 1:** Both  $[Co(NH_3)_6]^{3+}$  and  $[CoF_6]^{3-}$  complexes are octahedral but differ in their magnetic behaviour

**Statement 2:**  $[Co(NH_3)_6]^{3+}$  is diamagnetic whereas  $[CoF_6]^{3-}$  is paramagnetic In the light of above statements,

choose the correct answer from the options given below:

#### **Options:**

(a) Both Statements 1 and Statement II are false.

(b) Statements 1 is true but Statement II is false.

(c) Statements 1 is false but Statement II is true.

(d) Both Statements 1 and Statement II are true.

Answer: (d)

Solution: Both Statements 1 and Statement II are true.

**Question 83:** Which one of the following alcohols reacts instantaneously with Lucas reagent ?

#### **Options:**

(a)

CH3 - CH2 - CH - OH

ĆH.

(b)

CH1 - CH - CH,OH CH,

(c)

$(\mathbf{d}) \mathbf{CH}_3 - \mathbf{CH}_2 - \mathbf{CH}_2 - \mathbf{CH}_2 - \mathbf{CH}_2\mathbf{OH}$		
Answer: (c)		
Answer. (c) Solution:		
CH - CH - CH - OH		
C13-012 1 011		
1. $^{CH_3}$ 2° alcohol		
CH-CH-CHOH		
3 1 4		
2 primary alcohol		
CH3		
CH-C-OH		
31		
3. tertiary alcohol		
4. CH <sub>3</sub> - CH <sub>2</sub> - CH <sub>2</sub> - CH <sub>2</sub> OH primary alcohol		

3º alcohols gives instant white turbidity with Lucas reagent

Question 84: Match List-I with List-II				
List-I(Process)	List-II(Conditions)			
A. Isothermal process	I. No heat exchange			
B. Isochoric process	II. Carried out at constant temp.			
C. Isobaric process	III. Carried out at constant volume			
D. Adiabatic process	IV. Carried out at constant pressure			
Choose the correct answer from the options given below:				
Options:				
(a) A-IV, B-II, C-III, D-I				
(b) A-I, B-II, C-III, D-IV				
(c) A-II, B-III, C-IV, D-I				
(d) A-IV, B-III, C-II, D-I				
Answer: (c)				
Solution:				
A. Isothermal process	I. Carried out at constant temp.			
B. Isochoric process II. Carried out at constant volume				
. Isobaric process III. Carried out at constant pressure				
D. Adiabatic process	IV. No heat exchange			

**Question 85:** On heating, some solid substances changes from solid to vapour state without passing through liquid state. The technique used for the purification of such substances based on the above principle is known as

#### **Options:**

- (a) Sublimation
- (b) Distillation
- (c) Chromatography
- (d) Crystallization

Answer: (a)

**Solution:** Sublimation is a purification technique used for solid substance that are convert into vapour state directly without going through liquid state.

Question 86: The products A and B obtained in the following reactions, respectively are  $3ROH + PCl_3 \rightarrow 3RCl + A$   $ROH + PCl_5 \rightarrow RCl + HCl + B$  **Options:** (a) POCl<sub>3</sub> and H<sub>3</sub>PO<sub>4</sub> (b) H<sub>3</sub>PO<sub>4</sub> and POCl<sub>3</sub> (c) H<sub>3</sub>PO<sub>3</sub> and POCl<sub>3</sub> (d) POCl<sub>3</sub> and H<sub>3</sub>PO<sub>3</sub> **Answer:** (c) **Solution:** The reactions are as follows  $3ROH + PCl_3 \rightarrow 3RCl + H_3PO_3$   $ROH + PCl_5 \rightarrow RCl + POCl_3 + HCl$ Hende, correct answer is option (c)

**Question 87:** Mass in grams of copper deposited by passing 9.6487 A current through a voltmeter containing copper sulphate solution for 100 seconds is: (Given: Molar mass of Cu :





**Question 88:** Consider the following reactions in a sealed vessel at equilibrium with concentrations of

 $N_2 = 3.0 \times 10^{-3}$  M,  $O_2 = 4.2 \times 10^{-3}$  M and NO = 2.8 × 10<sup>-3</sup> M 2NO(g)  $\rightleftharpoons N_2$  (g) + O<sub>2</sub> (g) If 0.1 mol L<sup>-1</sup> of NO(g) is taken in a closed vessel, what will be degree of dissociation (α) of NO(g) at equilibrium? **Options:** (a) 0.0889 (b) 0.8889 (c) 0.717 (d) 0.00889 **Answer: (c)** 

**Solution:** 0.717

Question 89: Given below are two statements:

Statement I :  $[Co(NH_3)_6]^{3+}$  is a homoleptic complex where as  $[Co(NH_3)_4Cl_2]^+$  is heteroleptic complex.

Statement II : complex  $[Co(NH_3)_6]^{3+}$  has one kind of ligands but  $[Co(NH_3)_4Cl_2]$  + has more than one kind of ligands.

In the light of the above statements, choose the correct answer from the options given below: **Options:** 

(a) Both statement I and statement II are false

(b) Statement I is true but statement II is false

(c) Statement I is false but statement II is true

(d) Both statement I and statement II are true.

#### Answer: (d)

**Solution:** :  $[Co(NH_3)_6]^{3+}$  has only type of legends, thus it is a homoleptic complex, however  $[Co(NH_3)_4Cl_2]^+$  has 2 types of legends NH<sub>3</sub> and CL<sup>-</sup>, therefore it is a hetroleptic

Question 90: Identify the major product C formed in the following reaction sequence:



### **Question 91:** The pair of lanthanoid ions which are diamagnetic isd **Options:**

(a)  $Ce^{3+}$  and  $Eu^{2+}$ (b)  $Gd^{3+}$  and  $Eu^{3+}$  (c)  $Pm^{3+}$  and  $Sm^{3+}$ (d)  $Ce^{4+}$  and  $Yb^{2+}$ **Answer:** (d) **Solution:** Ce  $4f^1 5d^1 6s^2$ Ce  $^{+4} 4f^0$ Zero unpaired electron Yb  $4f^{14} 6s^2$ Yb<sup>2+</sup>  $4f^{14}$ Zero unpaired electron

#### **Question 92:** For the given reaction:



Question 93: A compound X contains 32% of A, 20% of B and remaining percentage of C.
Then, the empirical formula of X is (Given atomic masses of $A = 64$ ; $B = 40$ ; $C = 32u$ )
Ontions

<b>Options:</b>				
(a) $ABC_3$				
(b) $AB_2C_2$				
(c) ABC <sub>4</sub>				
(d) $A_2BC_2$				
Answer: (a)				
Solution:				
Elements	Mass%	Atomic mass	moles	Simplest ratio

А	32	64	32/64 = 0.5	$(0.5) \times 2 = 1$
В	40	40	20/40 = 0.5	$(0.5) \times 2 = 1$
С	32	32	40/32 = 1.5	$(1.5) \times 2 = 3$

Empirical formula =  $ABC_3$ 

**Question 94:** Given below are certain cations. Using increase qualitative analysis arrange them in increasing group number from O to VI

A.  $Al^{3+}$ 

B. Cu<sup>2+</sup>

C. Ba<sup>2+</sup>

D. Co<sup>2+</sup>

E.  $Mg^{2+}$ 

Choose the correct answer from the options given below: **Options:** 

(a) B, C, A, D, E (b) E, C, D, B, A (c) E, A, B, C, D (d) B, A, D, C, E **Answer:** (d) **Solution:** Group II =  $Cu^{2+}$ Group II =  $Al^{+3}$ Group III =  $CO^{+2}$ Group IV =  $Ba^{+2}$ Group V =  $Mg^{+2}$ 

**Question 95:** The work done during reversible isothermal expansion of one mole of hydrogen gas at 25°C from pressure of 20 atmospheric to 10 atmosphere is: (Given R = 2.0 and  $K^{-1}$  mol<sup>-1</sup>)

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#### **Options:**

(a) -413.14 calories
(b) 413.14 calories
(c) 100 calories
(d) 0 caloric
Answer: (a)

**Solution:**  $W_{rev} = -2.303 \text{ nRT} \log \frac{P_1}{2}$ 

20

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 $= -2.303 \times 2 \times 298 \log 2$ = -413.19 calories

 $= -2.303 \times 1 \times 2 \times 298 \log$ 

Question 96: Major products A and B formed in the following reaction sequence, are



**Options:** (a)





**Question 98:** During the preparation of Mohr's salt solution (Ferrous ammonium sulphate), which of the following acid is added to prevent hydrolysis of  $Fe^{2+}$  ion?

#### **Options:**

- (a) Concentrated sulphuric acid
- (b) Dilute nitric acid
- (c) dilute sulphuric acid
- (d) dilute hydrochloric acid

#### Answer: (c)

**Solution:** Cationic hydrolysis takes place during crystallization of mohrs salt, which needs to be avoided. Cationic hydrolysis, leada to acidic solution, so dilute acid is added to suppress hydrolysis.

In order to avoid contamination, same anion acid is used.

**Question 99:** The plot of osmotic pressure (II) vs concentration (molL<sup>-1</sup>) for a solution gives a straight line with slope 25.73L bar mol<sup>-1</sup>. The temperature at which the osmotic pressure measurement is done is: (Use R = 0.083 L bar mol<sup>-1</sup>K<sup>-1</sup>)

PVT.LTD.

H)



**Question 100:** Identify the correct answer.

#### **Options:**

- (a) BF<sub>3</sub> has non-zero dipole moment
- (b) Dipole moment of NF<sub>3</sub> is greater than that of NH<sub>3</sub>
- (c) Three canonical forms can be drawn for  $CO_3^{2-}$  ion.
- (d) Three resonance structures can be drawn for ozone.

Answer: (c)

Solution:

$$\frac{1}{F} \xrightarrow{120}_{B} F$$

 $\mu_{net} = 0$  due to symmetrical structure So, it has zero dipole moment 2)

