JEE Main April 2026

Question Paper With Text Solution

04 April | Shift -2

CHEMISTRY

MATRIX

JEE Main & Advanced | XI-XII Foundation| VI-X Pre-Foundation

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JEE MAIN APRIL 2026 | 04 APRIL SHIFT-2

SECTION – A

Question ID : 695278426

51. The correct order of total number of atoms present in

(A) 2 moles of cyclohexane

(B) 684 g of sucrose

(C) 90.8 L of dihydrogen at STP

is :

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(1) C > A > B (2) C > B > A (3) B > C > A (4) B > A > C

Ans. (4)

Sol. (A) 2 moles of cyclohexane (C_6H_{12})

No of atoms = $18 \times 2 \times N_A$

(B) Mole of sucrose = $\frac{684}{342} = 2$

No of atoms = $2 \times 45 \times N_A = 90N_A$

(C) Mole = $90.8|22.4 = 4$

No of atoms = $8N_A$

B > A > C

Question ID : 695278427

52. The species having identical radii according to the Bohr's theory are :

A. H (first orbit) B. He^+ (first orbit)

C. He^+ (Second orbit) D. Li^{2+} (first orbit)

E. Be^{3+} (Second orbit)

Choose the correct answer from the options given below :

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(1) A and C only (2) A and E only

(3) B and E only (4) C and D only

Ans. (2)

Sol. Radius of n^{th} orbit =0.529 Å $\frac{n^2}{Z} = a_0 \frac{n^2}{Z}$

(A) $r = a_0\left[\frac{1^2}{1}\right] = a_0$ (B) $r = a_0\left[\frac{1^2}{2}\right] = \frac{a_0}{2}$

(C) $r = a_0\left[\frac{2^2}{2}\right] = 2a_0$

(D) $r = a_0\left[\frac{2^2}{3}\right] = \frac{4a_0}{3}$

(E) $r = a_0\left[\frac{2^2}{4}\right] = a_0$

Question ID : 695278428

53. Which of the following picotrial diagram most correctly represents the π^* (π–antibonding) molecular orbital between two atoms if the internuclear axis is taken to be in the z-direction $\left(\xrightarrow{z-axis}\right)$?

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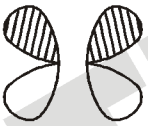
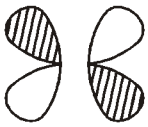
(1) 

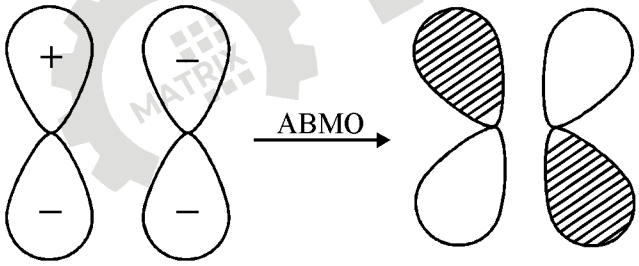
(2) 

(3) 

(4) 

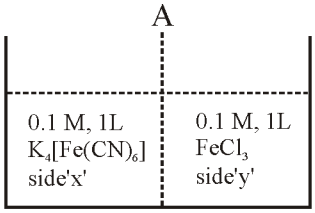
Ans. (3)

Sol. If INA $\rightarrow$ Z axis



Question ID : 695278429

54. At 27°C, 0.1 M, 1 L $K_4[Fe(CN)_6]$ aqueous solution and 0.1 M, 1 L $FeCl_3$ aqueous solution are placed in a container separated by a semi permeable membrane AB. Assume complete dissociation of both the solutes. Which of the following statements is correct ?



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(1) Blue color is formed on both sides

(2) Ionic solutes in aqueous solution can pass through semi-permeable membrane.

(3) Solution on side 'y' is hypotonic.

(4) To cause the reverse flow of solvent during osmosis, external pressure (any value) should be applied to side 'x'.

Ans. (3)

Sol. On x-side

$i = 5$

On y-side

$i = 4$

So $\pi_x > \pi_y$

Only solvent molecule passes, so no blue colour

X→ hypertonic, y-hypotonic

Only solvent molecule passes through SPM

Pressure applied should be more than (π) but not any pressure

Question ID : 695278430

55. 20 mL of a solution of acetic acid required 28.4 mL of 0.1 M NaOH for its neutralization. A solution (X) was prepared by mixing 20 mL of the above acetic acid and 14.2 mL of 0.1 M NaOH solution. What is the pH of the solution (X) ? (pK_a value of acetic acid is 4.75).

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(1) 7.0 (2) 4.75 (3) 3.5 (4) 4.82

Ans. (2)

Sol. $CH_3COOH + NaOH \rightarrow CH_3COO^- Na^+ + H_2O$

In the experiment 1, 28.4 ml is required for complete neutralization therefore for 14.2 ml half equivalence point will be achieved to form acidic buffer.

pH = pKa of CH_3COOH +log [Salt/acid]

pH = pKa =4.75

Question ID : 695278431

56. Match the **List-I** with **List-II**.

List-I Reaction	List-II Mechanism
A. Williamson Synthesis	I. Electrophilic addition
B. Friedel Craft Reaction	II. Free radical substitution
C. Bromination of vinyl benzene	III. Nucleophilic substitution
D. Chlorination of toluene in light	IV. Electrophilic substitution

Choose the correct answer from the options given below :

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(1) A-III, B-I, C-II, D-IV (2) A-III, B-IV, C-II, D-I

(3) A-III, B-IV, C-I, D-II (4) A-I, B-III, C-IV, D-II

Ans. (3)

Sol. A. Williamson Synthesis → Nucleophilic substitution

B. Friedel Craft Reaction → Electrophilic substitution

C. Bromination of vinyl benzene → Electrophilic addition

D. Chlorination of toluene in light → Free radical substitution

Question ID : 695278432

57. The 1st ionization enthalpy for Mg is +737 kJ/mol. The most probable estimated value of the 2nd ionization enthalpy of Mg is _____.

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(1) –906 kJ/mol (2) –856 kJ/mol (3) +1450 kJ/mol (4) +590 kJ/mol

Ans. (3)

Sol. Sine successive ionization energy increases thus $IE_2 > IE_1$

Question ID : 695278433

58. The electronegativity of a group 13 element 'E' is same as that of Ge (on Pauling scale and upto one decimal point). The **CORRECT** statements about E^{3+} are

A. It can act as a reducing agent.

B. It can act as an oxidizing agent.

C. E^{3+} is more stable than E^{+}.

D. The standard electrode potential value for E^{3+}/E is positive.

Choose the correct answer from the options given below :

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(1) A and C only (2) B and C only

(3) B and D only (4) A and D only

Ans. (3)

Sol. EN based on Pauling scale of Ge =1.8 in group 13

; EN of $T\ell = 1.8$

Element 'M' is $T\ell$

$\Rightarrow T\ell^{3+}$ is a good oxidizing agent

$\Rightarrow E^{\circ}\left(T\ell^{3+}/T\ell\right) = +1.26\,V$

$\Rightarrow T\ell^{+1}$ is more stable than $T\ell^{3+}$ (Inert Pair Effect)

Question Id : 695278434

59. Pairs of elements with the same number of electrons in their respective 4f orbital are

[Atomic number. Eu-63, Gd-64, Dy-66, Ho-67, Tm-69, Yb-70, Lu-71, Hf-72]

A. (Eu and Gd) B. (Dy and Ho) C. (Yb and Hf) D. (Lu and Tm)

Choose the correct answer from the options given below :

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(1) B and C only (2) A and B only (3) A and D only (4) A and C only

Ans. (4)

Sol. $Hf - [Xe]4f^{14}6s^2 5d^2$

$Yb - [Xe]4f^{14}6s^2$

$Lu - [Xe]4f^{14}5d^1 6s^2$

$Gd - [Xe]4f^7 5d^1 6s^2$

$Eu - [Xe]4f^7 6s^2$

$Tm - [Xe]4f^{13}6s^2$

$Dy - [Xe]4f^{10}6s^2$

$H_0 - [Xe]4f^{11}6s^2$

Question ID : 695278435

60. Consider the metal complexes $[Ni(en)_3]^{2+}$ (A), $[NiCl_4]^{2-}$ (B) and $[Ni(NH_3)_6]^{2+}$ (C). Choose the **CORRECT** option by considering the number of unpaired electrons present in (A), (B) and (C) respectively and the order of frequency of absorption.

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(1) 2, 2, 2 and (A) > (C) > (B) (2) 0,2,0 and (A) > (C) > (B)

(3) 2,2,0 and (B) > (C) > (A) (4) 2,2,2 and (C) > (A) > (B)

Ans. (1)

Sol. (A) $\left[Ni\left(en_3\right)_3\right]^{2+}$

$Ni^{2+} = 3d^8$

en = SFL

$t_{2g}^{2,2,2}\ eg^{1,1}$ n =2

(B) $[NiCl_4]^{2-}$

$Ni^{2+} = 3d^d$ Cl = WFL n = 2

(C) $\left[Ni(NH_3)_6\right]^{2+}$

$Ni^{2+} = 3d^8$ n = 2

NH_3 = SFL

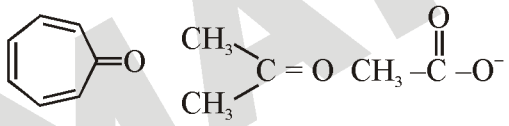
Ligand stregth : en > NH_3 > Cl

$\Delta_0 \propto$ Ligand stregth $\propto h\nu$

A > C > B

Question ID : 695278436

61. Consider the following molecules/species :



(x) (y) (z)

The correct order of carbon–oxygen double bond length is :

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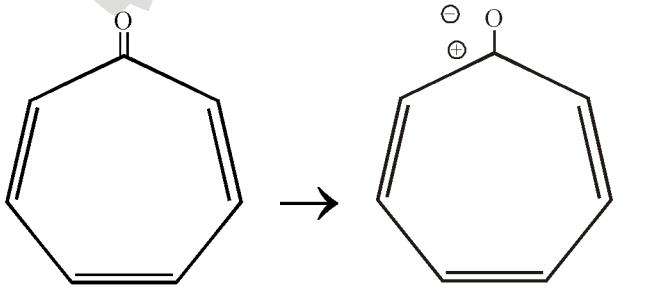
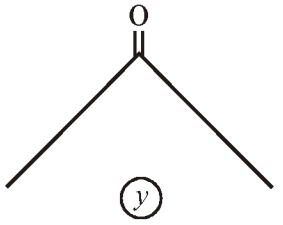
(1) x > y > z (2) y > z > x (3) z > x > y (4) x > z > y

Ans. (4)

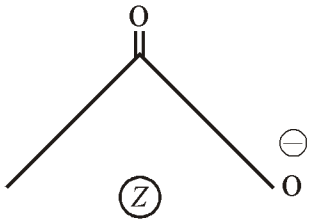
Sol.



(x) Quasi Aromatic



→ More double bond character



Equivalent resonationg strecture partial double bond character

B.L. $X > Z > Y$

Question ID : 695278437

62. Consider |x| is the difference in oxidation states of Mn in highest manganese fluoride and highest manganese oxide. The ions with |x| number of unpaired electrons from the following are :

A. Sc^{3+} B. Zn^{2+}

C. V^{2+} D. Fe^{2+}

E. Co^{2+}

Choose the correct answer from the options given below :

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(1) A and B only (2) C, D and E only

(3) C and E only (4) B and E only

Ans. (3)

Sol. Oxide of Mn in highest O.S. $= Mn_2O_7 \left[Mn^{+7}\right]$

Fluoride of Mn in highest O.S. $= MnF_4 \left[Mn^{+4}\right]$

$\Rightarrow$ Difference in O.S. $= |x| = 3$

Zn^{2+} & $Sc^{+3} \Rightarrow 0$ unpaired e^-

$Fe^{+2} \Rightarrow 4$ unpaired e^-

$Co^{+2} \Rightarrow 3$ unpaired e^-

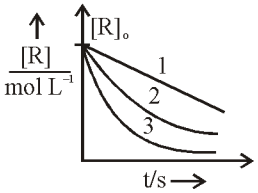
$V^{+2} \Rightarrow 3$ unpaired e^-

C and E only

Question ID : 695278438

63. Consider the given graph showing variation of reactant concentration with time.

Three different reactions were started with identical initial concentration of reactants. Which of the following statement is correct ?



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(1) The order of all the three reactions is same.

(2) The rate constant of reaction 3 is larger than the rate constant of reaction 2 if the order of reaction is same for both.

(3) The SI unit of rate constant of reaction 1 is s^{-1}.

(4) Thermal decomposition of HI on gold surface is an example of reaction 2.

Ans. (2)

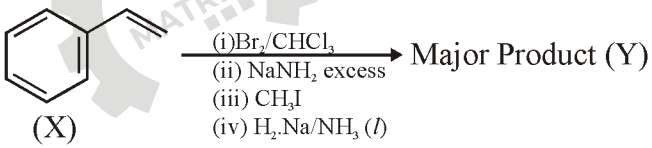
Sol. (I) curve (1) will be for zero order reaction

(II) $K_3 > K_2$

(III) Zero order

(IV) Decomposition of HI on gold surface represent curve (1)

Question ID : 695278439

64. 

Compound (X) is subjected to the sequence of reactions as shown above. Molar mass of the major product (Y) formed is _____ g mol^{-1}.

(Given molar mass in $gmol^{-1}$ C : 12, H : 1, O : 16)

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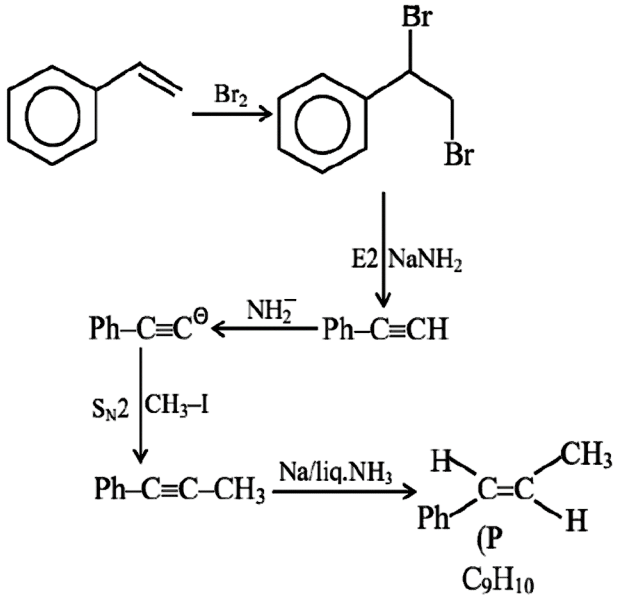
(1) 90 (2) 118

(3) 160 (4) 125

Ans. (2)

Sol.



Molar mass of P = 118 gm

Question ID : 695278440

65. The following structures are

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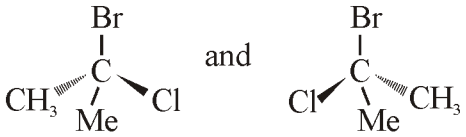
(1) enantiomers
(2) identical molecules
(3) diastereomers
(4) meso compounds

Ans. (2)

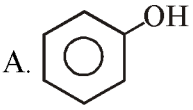
Sol.

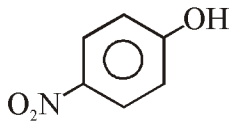


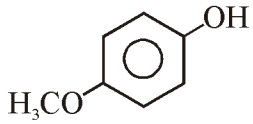
There is no chiral centre Both are optically inactive identical molecules

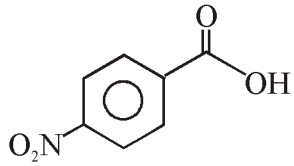
Question ID : 695278441

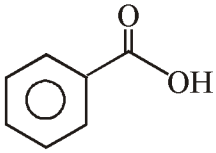
66. The descending order of acidity among the following compounds is :

A. 

B. 

C. 

D. 

E. 

Choose the correct answer from the options given below :

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(1) B > D > E > A > C

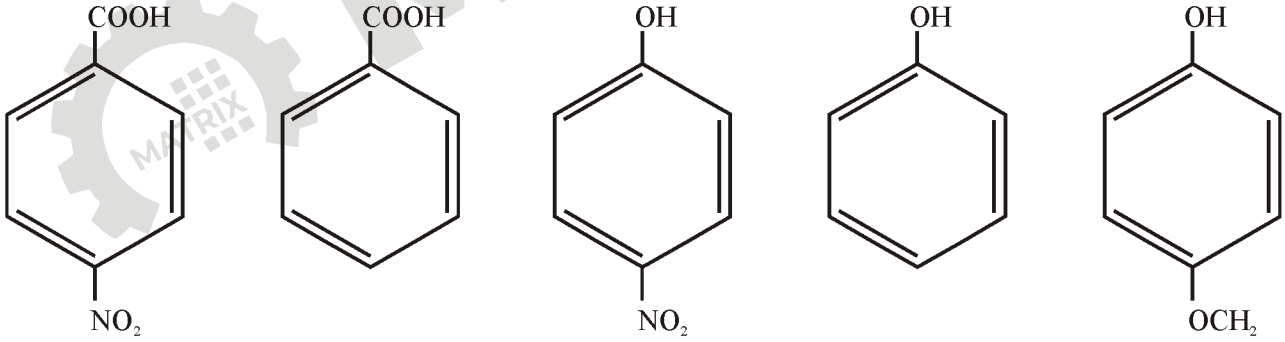
(2) D > B > E > A > C

(3) C > A > B > D > E

(4) D > E > B > A > C

Ans. (4)

Sol. Order of acidic strength



D **E** **B** **A** **C**

Question ID : 695278442

67. The strongest conjugate acid will result from :

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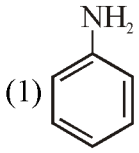
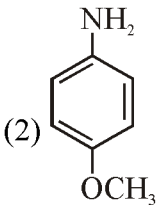
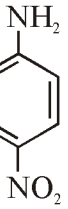
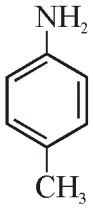
(1) 

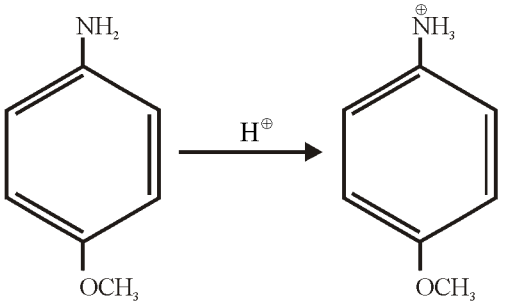
(2) 

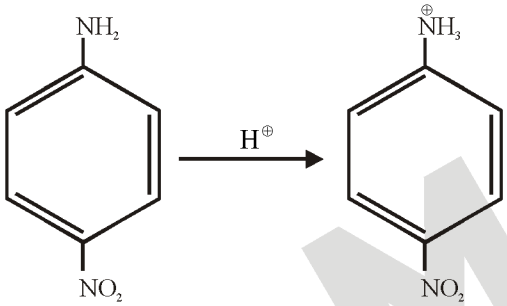
(3) 

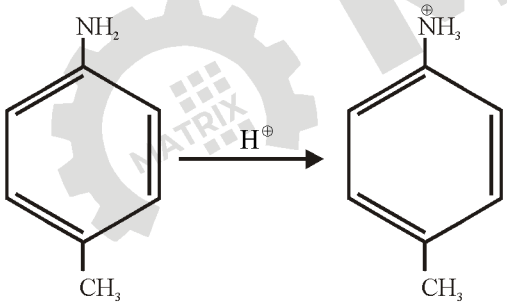
(4) 

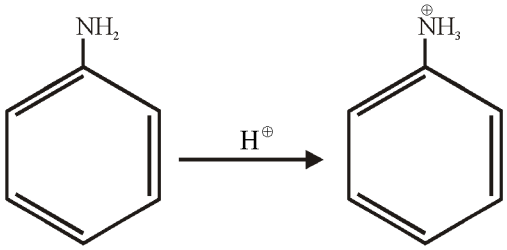
Ans. (3)

Sol.

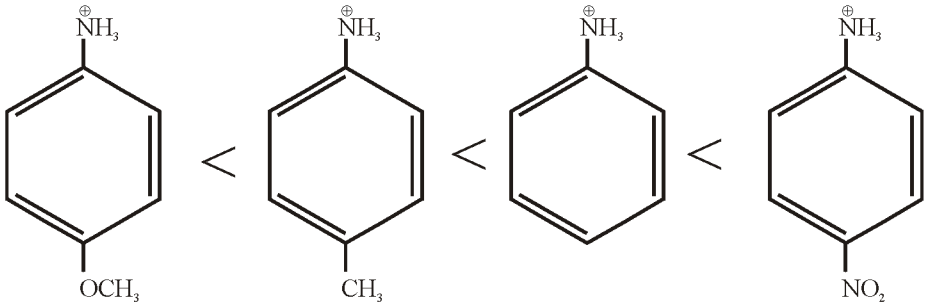








Conjugated acid strength order



Question ID : 695278443

68. A D-aldotetrose on oxidation with concentrated HNO_3 resulted in optically inactive dicarboxylic acid. The structure of the D-aldotetrose is :

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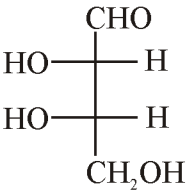
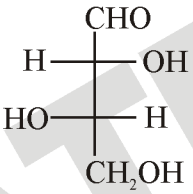
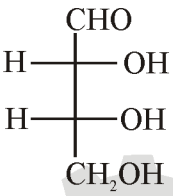
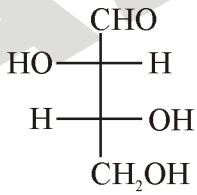
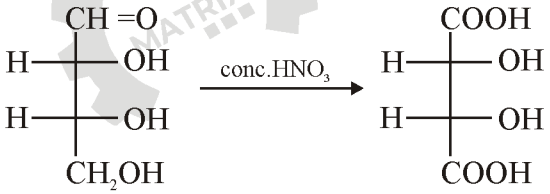
(1) 

(2) 

(3) 

(4) 

Ans. (3)

Sol. 

D-Aldotetrose

Optically inactive Dicarboxylic acid

Question ID : 695278444

69. Among Fe^{3+}, Pb^{2+}, Cu^{2+} and Mn^{2+}, identify the one that gets precipitated out while passing H_2S in presence of NH_4OH as group reagent. The highest possible oxidation state of the corresponding metal is

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(1) +3 (2) +4 (3) +2 (4) +7

Ans. (4)

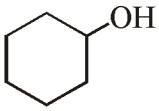
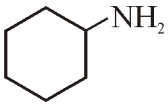
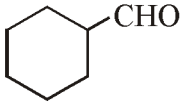
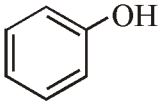
Sol. H_2S in NH_4OH is a group reagent of Group IV cations

So, Mn^{2+} gets precipitated out.

Mn $\rightarrow$ +7 highest possible oxd No.

Question ID : 695278445

70. Match the List-I with List-II.

List-I **Compound**	**List-II** **Test**
A. 	I. Hinsberg's reagent test
B. 	II. Phthalein dye test
C. 	III. Lucas test
D. 	IV. Tollen's test

Choose the correct answer from the options given below :

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

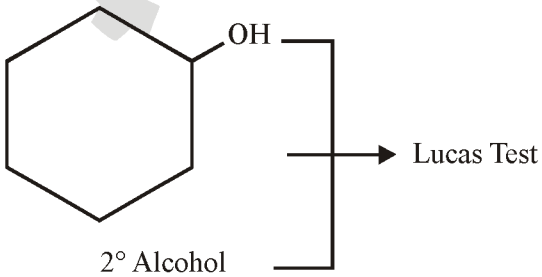
(2) A-III, B-IV, C-I, D-II

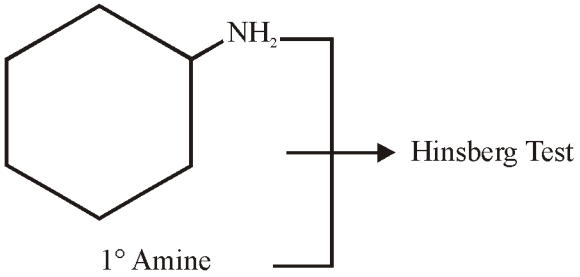
(3) A-I, B-III, C-II, D-IV

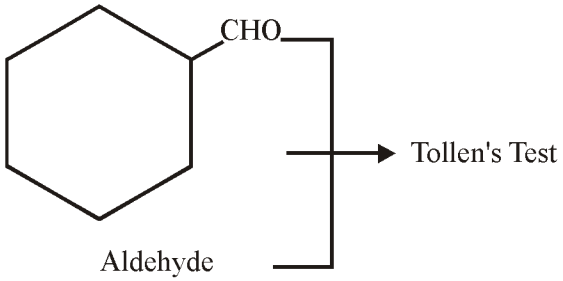
(4) A-I, B-II, C-III, D-IV

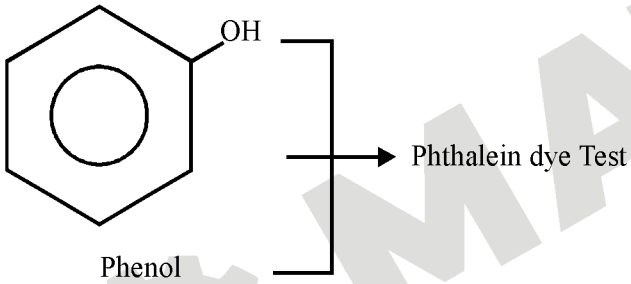
Ans. (1)

Sol.









SECTION – B

Question ID : 695278446

71. If 3.365g of ehtanol (l) is burnt completely in a bomb calorimeter at 298.15 K, the heat produced is 99.472 kJ. The $|\Delta H_f^\circ|$ of ethanol at 298.15 K is _____ $\times 10^2$ kJ mol^{-1}. (Nearest integer)
Given : Standard enthalpy of combustion of graphite = –393.5 kJ mol^{-1}.
Standard enthalpy of formation of water (l) = –285.8 kJ mol^{-1}
Molar mass in g mol^{-1} of C, H, O are 12, 1 and 16 respectively.
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Ans. (3)

Sol. $C_2H_5OH(l) + 3O_2(g) \rightarrow 2CO_2(g) + 3HO(l)$

$\frac{3.365}{46} = 0.073$

Heat liberated by combustion of 1 mole C_2H_5OH

$= \frac{99.472}{0.073} = 1362.63\,kJ/mol$

$\Delta H^0_{rx^n} = -1362.63\,kJ/mol$

$(\Delta H_c)^0_{Graphite} = (\Delta H_f)^\circ \cdot f\,CO_2$

$\Delta H^0_{R_{x^n}} = 2\left[\Delta H_{f_{CO_2}}\right] + 3(\Delta H_f)_{H_2O} - (\Delta H^0_f)_{CH_2OH}$

$-1362.63 = 2(-393.5) + 3(-285.8) - \Delta H^0_f$

$(\Delta H^\circ_f)C_2H_5OH = 281.77\,kJ/mol$

$= 2.81 \times 10^2\,kJ/mol$

$= 3 \times 10^2\,kJ/mol$

Question ID : 695278447

72. For the following reaction at 50°C and at 2 atm pressure.

$2N_2O_5(g) \rightleftharpoons 2N_2O_4(g) + O_2(g)$

N_2O_5 is 50% dissociated.

The magnitude of standard free energy change at this temperature is x.

x = _____ $J\,mol^{-1}$ [Nearest integer]

Given : R = 8.314 $J\,mol^{-1}\,K^{-1}$, log 2 = 0.30, log 3 = 0.48, ln10 = 2.303,

°C + 273 = K

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Ans. (2474)

Sol. $2N_2O_5(g) \rightleftharpoons 2N_2O_4(g) + O_2(g)$

Let 1 mole

$1-\alpha$	α	$\alpha/2$
$\because \alpha$ 0.5		
0.5	0.5	0.25

$K_P = \frac{(0.5)^2(0.25)}{(0.5)^2}\left[\frac{2}{1.25}\right] = 0.4$

$\Delta G^0 = -RT \ln k_p$

$= -8.314(323)\,In\,(0.4) = 2474\,J/mol$

Question ID : 695278448

73. An electrochemical cell, consist of the following two redox couples, $M^{x+}(aq)/M(s)$ [$E^\ominus_{red} = +0.15V$] and $Fe^{3+}(aq)/Fe(s)$ [$E^\ominus_{red} = -0.036$ V]. The cell EMF (E_{cell}) is recorded to be 0.2057 V. If the reaction quotient of

the electrochemical reaction is found to be 10^{-2}, then the value of x is _____. (Nearest integer)

[Given : M is a p-block metal and $\frac{2.303RT}{F} = 0.059V$]

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Ans. (2)

Sol. Anode : $Fe(s) \rightarrow Fe^{+3}(aq) + 3e^-$

Cathode : $M^{+x}(aq) + xe^- \rightarrow M(s)$

$3M^{+x} + xFe(s) \rightarrow 3M(s) + xFe^{+3}$

$E^\circ_{cell} = 0.15 + 0.036 = 0.186\,V$

$E_{cell} = E^\circ_{cell} - \frac{0.059}{3x}\log 10^{-2}$, $0.2057 = 0.186 - \frac{0.059}{3x}(-2)$

$0.0197 = +\frac{0.118}{3x}$

$X = 2$

Question ID : 695278449

74. For a first order reaction $A \rightarrow B$

$\frac{t}{min}$	$\frac{[A]}{M}$
0	0.6500
x	0.0650
20	0.00065

x = _____ min. (Nearest integer)

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Ans. (7)

Sol. 1st order rx^n

$\ln\frac{A_0}{A_t} = kt$

$\ln\left(\frac{0.6500}{0.00065}\right) = k \times 20$

$k = \frac{3\ln 10}{20}$

use data at time x

$\ln\left(\frac{0.6500}{0.065}\right) = kx$

$$\ln 10 = \left(\frac{3\ln 10}{20}\right)x$$

$$x = \frac{20}{3} = 6.67 = 7\,\text{min}$$

Question ID : 695278450

75. In sulphur estimation, 2.0×10^{-3} mol of an organic compound (X) (molar mass 76 g mol^{-1}) gave 0.4813 g of barium sulphate (molar mass 233 g mol^{-1}). The percentage of sulphur in the compound (X) is _____ $\times 10^{-1}$ % (Nearest integer)

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Ans. (435)

Sol. $$\%\text{ of S} = \frac{\text{Mass of S}}{\text{Mass of BaSO}_4} \times \frac{m}{w} \times 100$$

m = gm of BaSO4 ppt

w= gm of Organic compound

$$w = 2 \times 10^{-3} \times 76 = 0.152\text{gm}$$

$$\%\text{of S} = \frac{32}{233} \times \frac{0.4813}{0.152} \times 100 = 43.487$$

In form of 10^{-1}

$=43.487 \times 10^{-1} = 434.87 \approx 435$