

JEE Main April 2024
Question Paper With Text Solution
05 April | Shift-2

CHEMISTRY

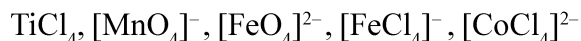


JEE Main & Advanced | XI-XII Foundation | VI-X Pre-Foundation

Office : Piprali Road, Sikar (Raj.) | Ph. 01572-241911
Website : www.matrixedu.in ; Email : smd@matrixacademy.co.in



61. The number of complexes from the following with no electrons in the t_2 orbital is _____.



(1) 4

(2) 2

(3) 3

(4) 1

Question ID: 87827055768

Ans. Official Answer by NTA(3)

Sol.

62. The correct statements from the following are :

(A) The decreasing order of atomic radii of group 13 elements is $\text{Tl} > \text{In} > \text{Ga} > \text{Al} > \text{B}$.

(B) Down the group 13 electronegativity decreases from top to bottom.

(C) Al dissolves in dil. HCl and liberates H_2 but conc. HNO_3 renders Al passive by forming a protective oxide layer on the surface.

(D) All elements of group 13 exhibits highly stable + 1 oxidation state.

(E) Hybridisation of Al in $[\text{Al}(\text{H}_2\text{O})_6]^{3+}$ ion is sp^3d^2 .

Choose the correct answer from the options given below :

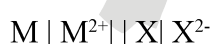
(1) (A) and (C) only (2) (C) and (E) only (3) (A), (B), (C) and (E) only (4) (A), (C) and (E) only

Question ID: 87827055765

Ans. Official Answer by NTA(2)

Sol.

63. For the electro chemical cell



If $E^0_{(\text{M}^{2+}/\text{M})} = 0.46 \text{ V}$ and $E^0_{(\text{X}/\text{X}^{2-})} = 0.34 \text{ V}$.

Which of the following is correct ?

(1) $\text{M} + \text{X} \rightarrow \text{M}^{2+} + \text{X}^{2-}$ is a spontaneous reaction

(2) $E_{\text{cell}} = -0.80 \text{ V}$

(3) $E_{\text{cell}} = 0.80 \text{ V}$

(4) $\text{M}^{2+} + \text{X}^{2-} \rightarrow \text{M} + \text{X}$ is a spontaneous reaction

Question ID: 87827055761

Ans. Official Answer by NTA(4)

Sol.

MATRIX JEE ACADEMY**Office : Piprali Road, Sikar (Raj.) | Ph. 01572-241911****Website : www.matrixedu.in ; Email : smd@matrixacademy.co.in**

64. Match **List - I** with **List - II**.

List - I**(Pair of Compounds)**

- (A) n- propanol and Isopropanol
- (B) Methoxypropane and ethoxyethane
- (C) Propanone and Isopentane
- (D) Neopentane and Isopentane

List - II**(Isomerism)**

- (I) Metamerism
- (II) Chain Isomerism
- (III) Position Isomerism
- (IV) Functional Isomerism

Choose the correct answer from the options given below :

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

Question ID: 87827055771

Ans. Official Answer by NTA (4)

Sol.

65. Given below are two statements :

Statements I : The metallic radius of Na is 1.86 \AA and the ionic radius of Na^+ is lesser than 1.86 \AA

Statements II : Ions are always smaller in size than the corresponding elements. In the light of the above statements, choose answer from the options given below :

- (1) Both **Statement I** and **Statements II** are true
- (2) **Statement I** is correct but **Statement II** is false
- (3) **Statement I** is incorrect but **Statement II** is true
- (4) Both **Statement I** and **Statement II** are false

Question ID: 87827055763

Ans. Official Answer by NTA (2)

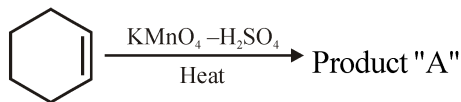
Sol.

66. Consider the given chemical reaction :

MATRIX JEE ACADEMY

Office : Piprali Road, Sikar (Raj.) | Ph. 01572-241911

Website : www.matrixedu.in ; Email : smd@matrixacademy.co.in



Product "A" is :

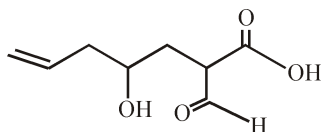
- (1) adipic acid (2) acetic acid (3) oxalic acid (4) picric acid

Question ID: 87827055776

Ans. Official Answer by NTA (1)

Sol.

67. The correct nomenclature for the following compound is ::



- (1) 2-carboxy-4-hydroxyhept-7-enal
(2) 2-carboxy-4-hydroxyhept-6-enal
(3) 2-formyl-4-hydroxyhept-7-enoic acid
(4) 2-formyl-4-hydroxyhept-6-enoic acid

Question ID: 87827055770

Ans. Official Answer by NTA (4)

Sol.

68. Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**
Assertion (A) : NH_3 and NF_3 molecule have pyramidal shape with a lone pair of electrons on nitrogen atom.
The resultant dipole moment of NH_3 is greater than that of NF_3 .

Reason (R) : In NH_3 , the orbital dipole due to lone pair is in the same direction as the resultant dipole moment of the N–H bonds. F is the most electronegative element.

In the light of the above statements, choose the correct answer from the option given below :

- (1) (A) is true but (R) is false
(2) (A) is false but (R) is true
(3) Both (A) and (R) are true and (R) is the correct explanation of (A)
(4) Both (A) and (R) are true but (R) is NOT the correct explanation of (A)

Question ID: 87827055759

Ans. Official Answer by NTA (3)

MATRIX JEE ACADEMY

Office : Piprali Road, Sikar (Raj.) | Ph. 01572-241911

Website : www.matrixedu.in ; Email : smd@matrixacademy.co.in

Sol.

69. Given below are two statements :

Statements I : On passing $\text{HCl}_{(g)}$ through a saturated solution of BaCl_2 at room temperature white turbidity appears.

Statements II : When HCl gas is passed through a saturated solution of NaCl , sodium chloride is precipitated due to common ion effect.

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

- (1) Both **Statement I** and **Statement II** are incorrect
- (2) **Statement I** is incorrect but **Statement II** is correct
- (3) **Statement I** is correct but **Statement II** is incorrect
- (4) Both **Statement I** and **Statement II** are correct

Question ID: 87827055760

Ans. Official Answer by NTA (3)

Sol.

70. The metal atom present in the complex MABXL (where A, B, X and L are unidentate ligands and M is metal) involves sp^3 hybridization. The number of geometrical isomers exhibited by the complex is :

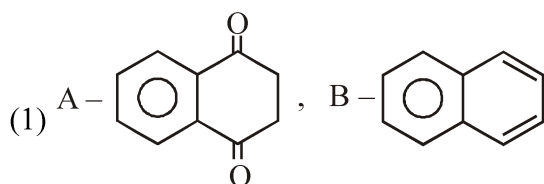
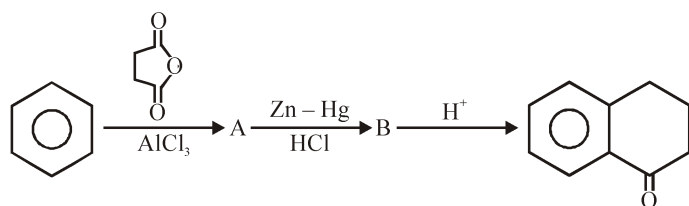
- (1) 4
- (2) 0
- (3) 3
- (4) 2

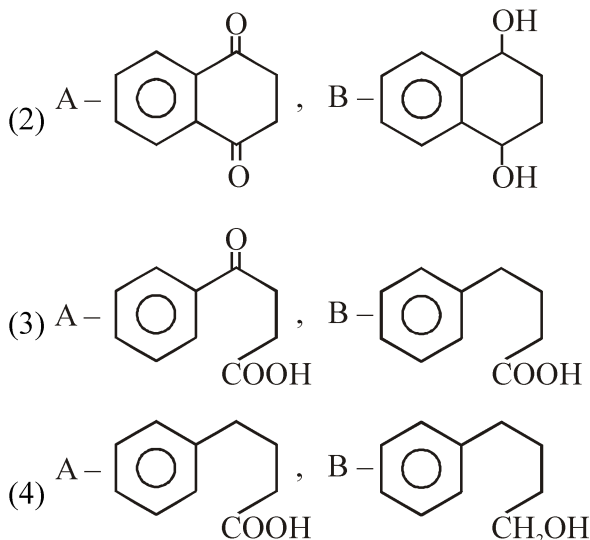
Question ID: 87827055767

Ans. Official Answer by NTA (2)

Sol.

71. Identify A and B in the given chemical reaction sequence :





Question ID: 87827055772

Ans. Official Answer by NTA (3)

Sol.

72. The number of ions form the following that have ability to liberate hydrogen form a dilute acid is _____.

Ti^{2+} , Cr^{2+} and V^{2+}

(1) 3

(2) 0

(3) 1

(4) 2

Question ID: 87827055766

Ans. Official Answer by NTA (1)

Sol.

73. While preparing crystals of Mohr's salt, dil H_2SO_4 is added to a mixture of ferrous sulphate and ammonium sulphate, before dissolving this mixture in water, dil H_2SO_4 is added here to :

(1) prevent the hydrolysis of ammonium sulphate

(2) prevent the hydrolysis of ferrous sulphate

(3) increase the rate of formation of crystals

(4) make the medium strongly acidic

Question ID: 87827055769

Ans. Official Answer by NTA (2)

Sol.

74. The number of moles of methane required to produce 11 g $CO_2(g)$ after complex combustion is :

MATRIX JEE ACADEMY

Office : Piprali Road, Sikar (Raj.) | Ph. 01572-241911

Website : www.matrixedu.in ; Email : smd@matrixacademy.co.in



(1) 0.25

(2) 0.35

(3) 0.75

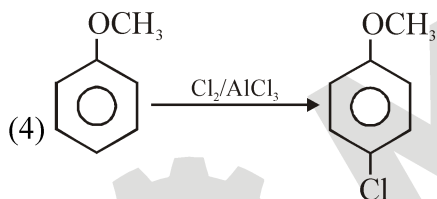
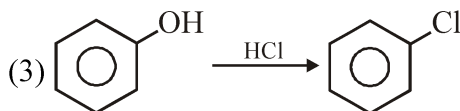
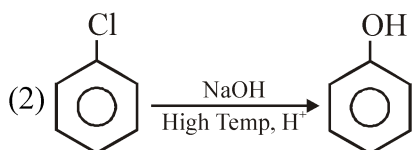
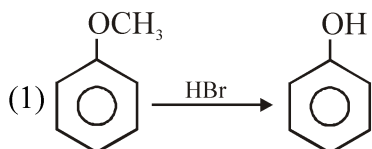
(4) 0.5

Question ID: 87827055758

Ans. Official Answer by NTA (1)

Sol.

75. Which one of the following reactions is NOT possible ?



Question ID: 87827055773

Ans. Official Answer by NTA (3)

Sol.

76. The quantity of silver deposited when one coulomb charge is passed through AgNO_3 solution :

(1) 1g of silver

(2) 1 chemical equivalent of silver

(3) 1 electrochemical equivalent of silver

(4) 0.1g atom of silver

Question ID: 87827055762

Ans. Official Answer by NTA (3)

Sol.

77. Coagulation of egg, on heating is because of :

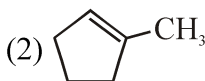
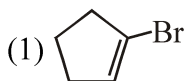
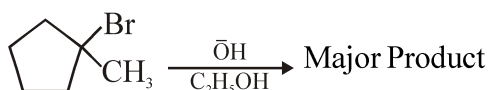
- (1) The secondary structure of protein remains unchanged
- (2) Breaking of the peptide linkage in the primary structure of protein occurs
- (3) Denaturation of protein occurs
- (4) Biological property of protein remains unchanged

Question ID: 87827055777

Ans. Official Answer by NTA (3)

Sol.

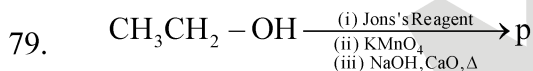
78. Identify the major product in the following reaction.



Question ID: 87827055774

Ans. Official Answer by NTA (2)

Sol.



Consider the above reaction sequence and identify the major product P.

- (1) Methane
- (2) Methoxymethane
- (3) Methanal
- (4) Methanoic acid

Question ID: 87827055775

Ans. Official Answer by NTA (1)

Sol.

80. Match List - I with List - II.

List - I
List - II

(A) ICl

(I) T - shape

 (B) ICl₃

(II) square pyramidal

 (C) ClF₅

(III) Pentagonal bipyramidal

 (D) IF₇

(IV) Linear

Choose the correct answer from the options given below :

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

MATRIX JEE ACADEMY

Office : Piprali Road, Sikar (Raj.) | Ph. 01572-241911

Website : www.matrixedu.in ; Email : smd@matrixacademy.co.in



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

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

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

Question ID: 87827055764

Ans. Official Answer by NTA (3)

Sol.

81. Considering acetic acid dissociates in water, its dissociation constant is 6.25×10^{-5} ml of acetic acid is dissolved in 1 litre water, the solution will freeze at $-x \times 10^{-2} \text{ }^\circ\text{C}$, provided pure water freezes at $0 \text{ }^\circ\text{C}$.

$x =$ _____ . (Nearest integer)

Given : $(K_f)_{\text{water}} = 1.86 \text{ K kg mol}^{-1}$

density of acetic acid is 1.2 g mol^{-1}

molar mass of water = 18 g mol^{-1}

Molar mass of acetic acid = 60 g mol^{-1}

density of water = 1 g cm^{-3}

Acetic acid dissociates as $\text{CH}_3\text{COOH} \rightleftharpoons \text{CH}_3\text{COO}^\ominus + \text{H}^\oplus$

Question ID: 87827055781

Ans. Official Answer by NTA (19)

Sol.

82. Using the given figure, the ratio of R_f value of sample A and sample C is $x \times 10^{-2}$ Value of x is _____.

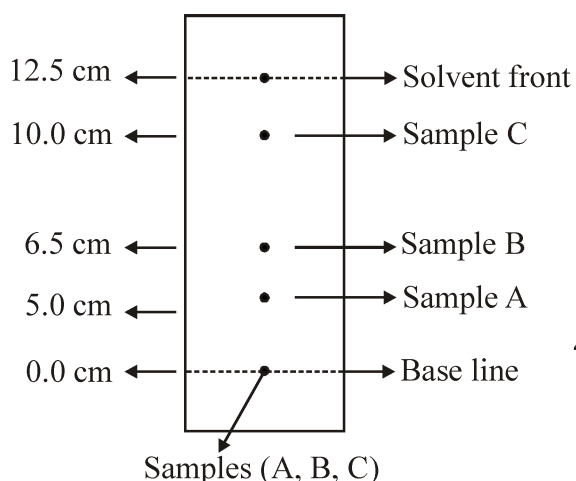


Fig : Paper chromatography of samples

4

Question ID: 87827055785

Ans. Official Answer by NTA (50)

Sol.

83. Number of compounds from the following with zero dipole moment is _____.

 $\text{HF}, \text{H}_2, \text{H}_2\text{S}, \text{CO}_2, \text{NH}_2, \text{BF}_3, \text{CH}_4, \text{CHCl}_3, \text{SiF}_4, \text{H}_2\text{O}, \text{BeF}_2$

Question ID: 87827055779

Ans. Official Answer by NTA (6)

Sol.

 84. The fusion of chromite ore with sodium carbonate in the presence of air leads to the formation of products A and B along with the evolution of CO_2 . The sum of spin-only magnetic values of A and B is _____ B.M. (Nearest integer)

[Given atomic number : C : 6, Na : 11, O : 8, Fe : 26, Cr : 24]

Question ID: 87827055783

Ans. Official Answer by NTA (6)

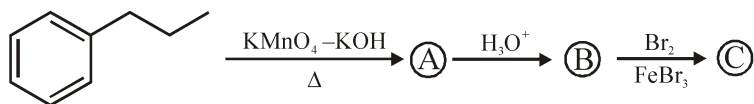
Sol.

 85. The product (C) in the following sequence of reaction has _____ π bonds.

MATRIX JEE ACADEMY

Office : Piprali Road, Sikar (Raj.) | Ph. 01572-241911

Website : www.matrixedu.in ; Email : smd@matrixacademy.co.in

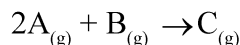


Question ID: 87827055786

Ans. Official Answer by NTA (4)

Sol.

86. Consider the following single step reaction in gas phase at constant temperature.



The initial rate of the reaction is recorded as r_1 when the reaction starts with 1.5 atm pressure of A and 0.7 atm pressure of B. After some time, the rate r_2 is recorded when the pressure of C become 0.5 atm. The ratio $r_1 : r_2$ is _____ $\times 10^{-1}$. (Nearest integer)

Question ID: 87827055782

Ans. Official Answer by NTA (315)

Sol.

87. In an atom total number of electrons having quantum numbers $n = 4$, $|m_l| = 1$ and $m_s = -\frac{1}{2}$ is _____.

Question ID: 87827055778

Ans. Official Answer by NTA (6)

Sol.

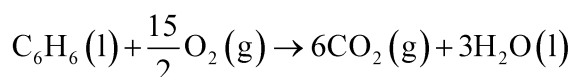
88. In the Claisen-Schmidt reaction to prepare 351 g of dibenzalacetone using 87 g of acetone, the amount of benzaldehyde required is _____ g. (Nearest integer)

Question ID: 87827055784

Ans. Official Answer by NTA (318)

Sol.

89. Combustion of 1 mole of benzene is expressed at

The standard enthalpy of combustion of 2 mol of benzene is $-x$ kJ. $x =$ _____.

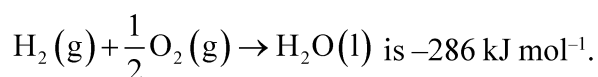
Given :

- standard Enthalpy of formation of 1 mol of $\text{C}_6\text{H}_6(l)$, for the reaction $6\text{C}(\text{graphite}) + 3\text{H}_2(g) \rightarrow \text{C}_6\text{H}_6(l)$ is 48.5 kJ mol^{-1} .
- Standard Enthalpy of formation of 1 mol of $\text{CO}_2(g)$, for the reaction $\text{C}(\text{graphite}) + \text{O}_2(g) \rightarrow \text{CO}_2(g)$ is $-393.5 \text{ kJ mol}^{-1}$.

MATRIX JEE ACADEMY**Office : Piprali Road, Sikar (Raj.) | Ph. 01572-241911****Website :** www.matrixedu.in ; Email : smd@matrixacademy.co.in



3. Standard and Enthalpy of formation of 1 mol of $\text{H}_2\text{O}(\text{l})$, for the reaction



Question ID: 87827055780

Ans. Official Answer by NTA (6535)

Sol.

90. X g of ethanamine was subjected to reaction with NaNO_2/HCl followed by hydrolysis to liberate N_2 and HCl .

The HCl generated was completely neutralised by 0.2 moles of NaOH . X is _____ g.

Question ID: 87827055787

Ans. Official Answer by NTA (9)

Sol.

