JEE Main April 2025

Question Paper With Text Solution

08 April | Shift-2

CHEMISTRY

MATRIX

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

JEE MAIN APRIL 2025 | 08TH APRIL SHIFT-2

SECTION – A

51. $HA(aq) \rightleftharpoons H^+(aq) + A^-(aq)$

The freezing point depression of a 0.1 m aqueous solution of a monobasic weak acid HA is 0.20 °C. The dissociation constant for the acid is

Given : $K_f(H_2O) = 1.8 K\,kg\,mol^{-1}$, molality ≡ molarity

(1) 1.1×10^{-2} (2) 1.38×10^{-3} (3) 1.89×10^{-1} (4) 1.90×10^{-3}

Question ID : 3475772540

Ans. Official answer NTA (2)

Sol.

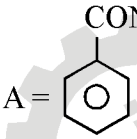
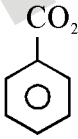
52. $A \xrightarrow[(ii)H_3O^+]{(i)NaOH} B \xrightarrow[(ii)H_2SO_4,\Delta]{(i)EtOH} C$

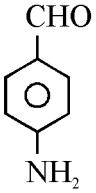
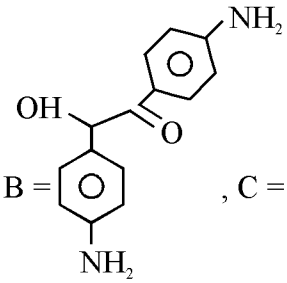
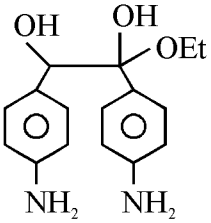
' A ' shows positive Lassaign's test for N and its molar mass is 121 .

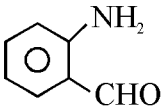
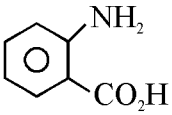
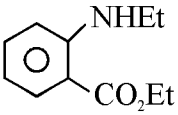
' B ' gives effervescence with aq $NaHCO_3$.

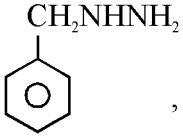
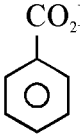
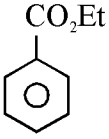
' C ' gives fruity smell.

Identify A,B and C from the following.

(1) A =  , B =  , C = 

(2) A =  , B =  , C = 

(3) A =  , B =  , C = 

(4) A =  , B =  , C = 

Question ID : 3475772556

Ans. Official answer NTA (1)

Sol.

53. Correct statements for an element with atomic number 9 are

A. There can be 5 electrons for which $m_s = +\frac{1}{2}$ and 4 electrons for which $m_s = -\frac{1}{2}$

B. There is only one electron in p_z orbital.

C. The last electron goes to orbital with n = 2 and $l = 1$.

D. The sum of angular nodes of all the atomic orbitals is 1 .

Choose the correct answer from the options given below:

(1) A, C and D Only (2) A and B Only (3) C and D Only (4) A and C Only

Question ID : 3475772538

Ans. Official answer NTA (4)

Sol.

54. The number of species from the following that are involved in sp^3d^2 hybridization is

$\left[Co(NH_3)_6\right]^{3+}, SF_6, \left[CrF_6\right]^{3-}, \left[CoF_6\right]^{3-}, \left[Mn(CN)_6\right]^{3-}$ and $\left[MnCl_6\right]^{3-}$

(1) 6 (2) 5 (3) 4 (4) 3

Question ID : 3475772542

Ans. Official answer NTA (3)

Sol.

55. In a first order decomposition reaction, the time taken for the decomposition of reactant to one fourth and one eighth of its initial concentration are t_1 and t_2 (s), respectively. The ratio t_1/t_2 will be:

(1) $\frac{3}{2}$ (2) $\frac{3}{4}$ (3) $\frac{2}{3}$ (4) $\frac{4}{3}$

Question ID : 3475772541

Ans. Official answer NTA (3)

Sol.

56. Match the LIST-I with LIST-II

LIST-I (Reagent)	LIST-II (Functional Group detected)
A. Sodium bicarbonate solution	I. double bond unsaturation
B. Neutral ferric chloride	II. carboxylic acid
C. ceric ammonium nitrate	III. phenolic - OH
D. alkaline $KMnO_4$	IV. alcoholic - OH

Choose the correct answer from the options given below:

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

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

Question ID : 3475772548

Ans. Official answer NTA (4)

Sol.

57. The atomic number of the element from the following with lowest 1st ionisation enthalpy is :

(1) 32 (2) 35 (3) 87 (4) 19

Question ID : 3475772543

Ans. Official answer NTA (3)

Sol.

58. The correct decreasing order of spin only magnetic moment values (BM) of Cu^+, Cu^{2+}, Cr^{2+} and Cr^{3+} ions is :

(1) $Cr^{3+} > Cr^{2+} > Cu^+ > Cu^{2+}$ (2) $Cu^+ > Cu^{2+} > Cr^{3+} > Cr^{2+}$

(3) $Cr^{2+} > Cr^{3+} > Cu^{2+} > Cu^+$ (4) $Cu^{2+} > Cu^+ > Cr^{2+} > Cr^{3+}$

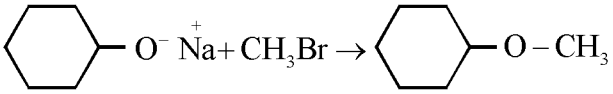
Question ID : 3475772545

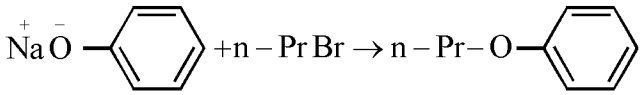
Ans. Official answer NTA (3)

Sol.

59. Which one of the following reactions will not lead to the desired ether formation in major proportion?

(iso – Bu ⇒ isobutyl, sec – Bu ⇒ sec-butyl, n Pr ⇒ n – propyl, ^{t}Bu ⇒ tert-butyl, Et ⇒ ethyl)

(1)  $+ CH_3Br \rightarrow$

(2) 

(3) $iso-Bu\,\bar{O}\,\overset{+}{Na} + sec-BuBr \rightarrow sec-Bu-O-iso-Bu$

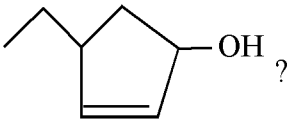
(4) $^{t}Bu\,\bar{O}\,\overset{+}{Na} + EtBr \rightarrow {}^{t}Bu-O-Et$

Question ID : 3475772554

Ans. Official answer NTA (3)

Sol.

60. What is the correct IUPAC name of



(1) 4-Ethylcyclopent-2-en-1-ol

(2) 1-Ethylcyclopent-2-en-3-ol

(3) 1-Ethyl-3-hydroxycyclopent-2-ene

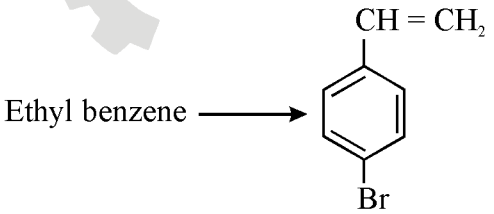
(4) 4-Ethyl-1-hydroxycyclopent-2-ene

Question ID : 3475772550

Ans. Official answer NTA (1)

Sol.

61. Choose the correct set of reagents for the following conversion.



(1) Cl_2 / Fe; Br_2 / anhy.$AlCl_3$; aq.KOH

(2) Br_2 / anhy.$AlCl_3$; Cl_2, Δ; aq.KOH

(3) Cl_2 / anhy.$AlCl_3$; Br_2 / Fe; alc.KOH

(4) Br_2 / Fe; Cl_2, Δ; alc.KOH

Question ID : 3475772553

Ans. Official answer NTA (4)

Sol.

62. Match the LIST-I with LIST-II

LIST-I	LIST-II
A. Carbocation	I. Species that can supply a pair of electrons.
B. C-Free radical	II. Species that can receive a pair of electrons.
C. Nucleophile	III. sp^2 hybridized carbon with empty p-orbital.
D. Electrophile	IV. sp^2/sp^3 hybridized carbon with one unpaired electron.

Choose the correct answer from the options given below:

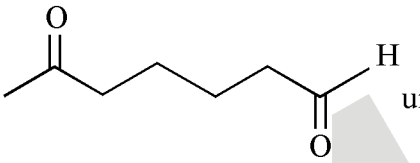
(1) A-III, B-IV, C-II, D-I (2) A-III, B-IV, C-I, D-II

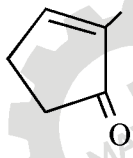
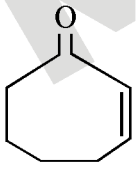
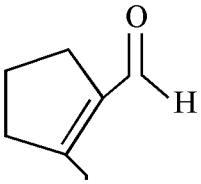
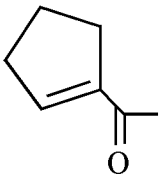
(3) A-II, B-III, C-I, D-IV (4) A-IV, B-II, C-III, D-I

Question ID : 3475772551

Ans. Official answer NTA (2)

Sol.

63. When  undergoes intramolecular aldol condensation, the major product formed is :

(1)  (2)  (3)  (4) 

Question ID : 3475772555

Ans. Official answer NTA (4)

Sol.

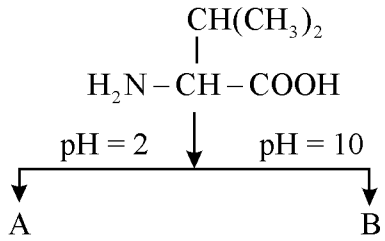
64. On combustion 0.210 g of an organic compound containing C,H and O gave 0.127 gH_2O and 0.307 g CO_2. The percentages of hydrogen and oxygen in the given organic compound respectively are:

(1) 6.72, 39.87 (2) 7.55,43.85 (3) 53.41,39.6 (4) 6.72,53.41

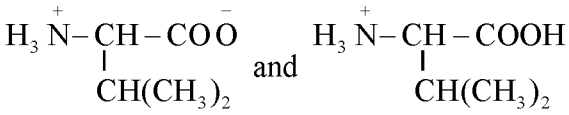
Question ID : 3475772549

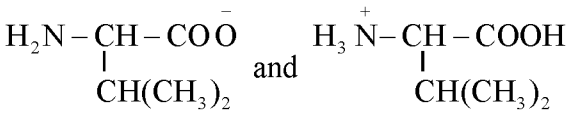
Ans. Official answer NTA (4)

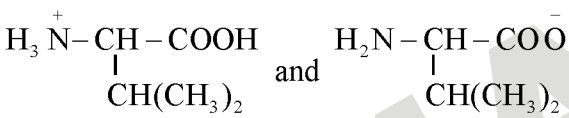
Sol.

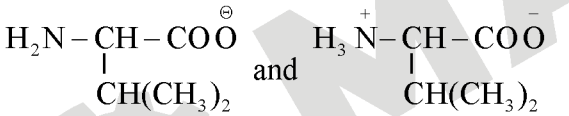
65. 

Choose the correct option for structures of A and B , respectively

(1)  and

(2)  and

(3)  and

(4)  and

Question ID : 3475772557

Ans. Official answer NTA (3)

Sol.

66. Given below are two statements:

Statement I : H_2Se is more acidic than H_2Te

Statement II : H_2Se has higher bond enthalpy for dissociation than H_2Te

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

(1) Statement I is true but Statement II is false

(2) Both Statement I and Statement II are false

(3) Statement I is false but Statement II is true

(4) Both Statement I and Statement II are true

Question ID : 3475772544

Ans. Official answer NTA (3)

Sol.

67. Match the LIST-I with LIST-II

LIST-I (Complex/ Species)	LIST-II (Shape & magnetic moment)
A. $[Ni(CO)_4]$	I. Tetrahedral, 2.8 BM
B. $[Ni(CN)_4]^{2-}$	II. Square planar, 0 BM
C. $[NiCl_4]^{2-}$	III. Tetrahedral, 0 BM
D. $[MnBr_4]^{2-}$	IV. Tetrahedral, 5.9 BM

Choose the correct answer from the options given below:

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

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

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

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

Question ID : 3475772547

Ans. Official answer NTA (4)

Sol.

68. Which of the following binary mixture does not show the behaviour of minimum boiling azeotropes?

(1) $CS_2 + CH_3COCH_3$

(2) $CH_3OH + CHCl_3$

(3) $C_6H_5OH + C_6H_5NH_2$

(4) $H_2O + CH_3COC_2H_5$

Question ID : 3475772539

Ans. Official answer NTA (3)

Sol.

69. Given below are two statements:

Statement I : A homoleptic octahedral complex, formed using monodentate ligands, will not show stereoisomerism

Statement II : cis- and trans - platin are heteroleptic complexes of Pd.

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

(1) Statement I is true but Statement II is false

(2) Both Statement I and Statement II are false

(3) Statement I is false but Statement II is true

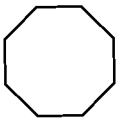
(4) Both Statement I and Statement II are true

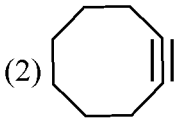
Question ID : 3475772546

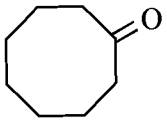
Ans. Official answer NTA (1)

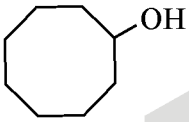
Sol.

70. 1,2-dibromocyclooctane $\xrightarrow[\text{(ii) } NaNH_2 \\ \text{(iii) } Hg^{2+}/H^+ \\ \text{(iv) } Zn\text{–}Hg/H^+]{\text{(i) KOH(alc.)}}$ P 'p' is major product

(1) 

(2) 

(3) 

(4) 

Question ID : 3475772552

Ans. Official answer NTA (1)

Sol.

SECTION – B

71. 20 mL of sodium iodide solution gave 4.74 g silver iodide when treated with excess of silver nitrate solution. The molarity of the sodium iodide solution is _____ M. (Nearest Integer value)

(Given : Na = 23, I = 127, Ag = 108, N = 14, O = 16 g mol^{-1})

Question ID : 3475772558

Ans. Official answer NTA (1)

Sol.

72. The energy of an electron in first Bohr orbit of H-atom is –13.6 eV . The magnitude of energy value of electron in the first excited state of Be^{3+} is _____ eV (nearest integer value)

Question ID : 3475772559

Ans. Official answer NTA (54)

Sol.

73. Resonance in X_2Y can be represented as

$$\ddot{\underset{\cdot\cdot}{X}}^{-} = \overset{+}{X} = \ddot{\underset{\cdot\cdot}{Y}} \leftrightarrow : X \equiv \overset{+}{X} - \ddot{\underset{\cdot\cdot}{Y}}^{-} :$$

The enthalpy of formation of $X_2Y\left(X \equiv X(g) + \frac{1}{2}Y = Y(g) \rightarrow X_2Y(g)\right)$ is 80 kJ mol^{-1}. The magnitude of resonance energy of X_2Y is _____ kJ mol^{-1} (nearest integer value)

Given : Bond energies of $X \equiv X, X = X, Y = Y$ and X=Y are 940, 410, 500 and 602 kJ mol^{-1} respectively.

valence X:3, Y:2

Question ID : 3475772560

Ans. Official answer NTA (98)

Sol.

74. The equilibrium constant for decomposition of $H_2O(g)$

$$H_2O(g) \rightleftharpoons H_2(g) + \frac{1}{2}O_2(g)(\Delta G^\circ = 92.34 kJ\,mol^{-1})$$

is 8.0×10^{-3} at 2300 K and total pressure at equilibrium is 1 bar. Under this condition, the degree of dissociation (α) of water is_____ $\times 10^{-2}$ (nearest integer value).

[Assume α is negligible with respect to 1]

Question ID : 3475772561

Ans. Official answer NTA (5)

Sol.

75. Consider the following half cell reaction

$$Cr_2O_7^{2-}(aq) + 6e^- + 14H^+(aq) \rightarrow 2Cr^{3+}(aq) + 7H_2O(l)$$

The reaction was conducted with the ratio of $\frac{\left[Cr^{3+}\right]^2}{\left[Cr_2O_7^{2-}\right]} = 10^{-6}$. The pH value at which the EMF of the half cell will become zero is_____. (nearest integer value)

[Given : standard half cell reduction potential $E^0_{Cr_2O_7^{2-}\cdot H^+/Cr^{3+}} = 1.33\,V, \frac{2.303RT}{F} = 0.059\,V.$]

Question ID : 3475772562

Ans. Official answer NTA (10)

Sol.