JEE Main April 2025

Question Paper With Text Solution

03 April | Shift-2

CHEMISTRY

MATRIX

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

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JEE MAIN APRIL 2025 | 03 APRIL SHIFT-2

SECTION – A

51. Given below are two statements:

Statement I : Wet cotton clothes made of cellulose based carbohydrate takes comparatively longer time to get dried than wet nylon polymer based clothes.

Statement II : Intermolecular hydrogen bonding with water molecule is more in nylon-based clothes than in the case of cotton clothes.

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

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

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

(3) Both Statement I and Statement II are false

(4) Both Statement I and Statement II are true

Question ID : 347577133

Ans. Official answer NTA (2)

Sol.

52. Match the LIST-I with LIST-II

LIST-I (Family)	LIST-II (Symbol of Element)
A. Pnictogen (group 15)	I. Ts
B. Chalcogen	II. Og
C. Halogen	III. Lv
D. Noble gas	IV. Mc

Choose the correct answer from the options given below:

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

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

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

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

Question ID : 347577134

Ans. Official answer NTA (3)

Sol.

53. Given below are two statements:

Statement I : Hyperconjugation is not a permanent effect.

Statement II : In general, greater the number of alkyl groups attached to a positively charged C-atom, greater is the hyperconjugation interaction and stabilization of the cation.

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 true

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

(4) Both Statement I and Statement II are false

Question ID : 347577140

Ans. Official answer NTA (3)

Sol.

54. Given below are two statements.

Statement I : When a system containing ice in equilibrium with water (liquid) is heated, heat is absorbed by the system and there is no change in the temperature of the system until whole ice gets melted.

Statement II : At melting point of ice, there is absorption of heat in order to overcome intermolecular forces of attraction within the molecules of water in ice and kinetic energy of molecules is not increased at melting point.

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

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

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

(3) Both Statement I and Statement II are false

(4) Both Statement I and Statement II are true

Question ID : 347577128

Ans. Official answer NTA (4)

Sol.

55. In Dumas' method for estimation of nitrogen 0.4 g of an organic compound gave 60 mL of nitrogen collected at 300 K temperature and 715 mm Hg pressure. The percentage composition of nitrogen in the compound is

(Given : Aqueous tension at 300 K = 15 mmHg)

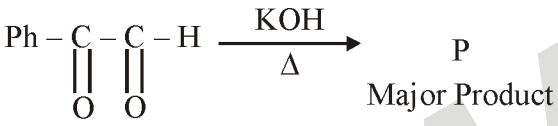
(1) 7.85 % (2) 20.95 % (3) 15.71 % (4) 17.46 %

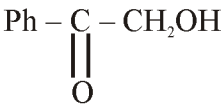
Question ID : 347577139

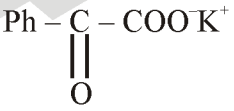
Ans. Official answer NTA (3)

Sol.

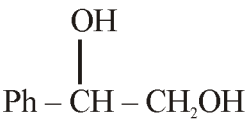
56. The major product (P) in the following reaction is :



(1) 

(2) 

(3) 

(4) 

Question ID : 347577143

Ans. Official answer NTA (3)

Sol.

57. 10 mL of 2 M NaOH solution is added to 20 mL of 1 M HCl solution kept in a beaker. Now, 10 mL of this mixture is poured into a volumetric flask of 100 mL containing 2 moles of HCl and made the volume upto the mark with distilled water. The solution in this flask is :

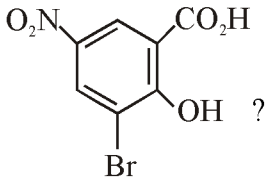
(1) 20 M HCl solution (2) Neutral solution (3) 0.2 M NaCl solution

(4) 10 M HCl solution

Question ID : 347577129

Ans. Official answer NTA (1)

Sol.

58. What is the correct IUPAC name of  ?

(1) 5-Nitro-3-bromo-2-hydroxybenzoic acid

(2) 3-Bromo-4-hydroxy-1-nitrobenzoic acid

(3) 2-Hydroxy-3-bromo-5-nitrobenzoic acid

(4) 3-Bromo-2-hydroxy-5-nitrobenzoic acid

Question ID : 347577141

Ans. Official answer NTA (4)

Sol.

59. Given below are two statements:

Statement I: CrO_3 is a stronger oxidizing agent than MoO_3

Statement II : Cr(VI) is more stable than Mo(VI)

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

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

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

(3) Both Statement I and Statement II are true

(4) Both Statement I and Statement II are false

Question ID : 347577136

Ans. Official answer NTA (2)

Sol.

60. Consider the following statements related to temperature dependence of rate constants.

Identify the correct statements.

A. The Arrhenius equation holds true only for an elementary homogenous reaction.

B. The unit of A is same as that of k in Arrhenius equation.

C. At a given temperature, a low activation energy means a fast reaction.

D. A and Ea as used in Arrhenius equation depend on temperature.

E. When $Ea \gg RT$, A and Ea become interdependent.

Choose the correct answer from the options given below:

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

Question ID : 347577132

Ans. Official answer NTA (1)

61. Mass of magnesium required to produce 220 mL of hydrogen gas at STP on reaction with excess of dil. HCl is

Given: Molar mass of Mg is 24 g mol^{-1}.

(1) 236 mg (2) 0.24 mg (3) 235.7 g (4) 2.444 g

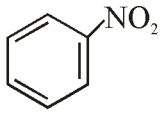
(1) (2) (3) (4)

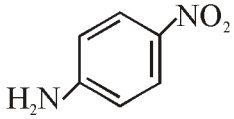
Question ID : 347577126

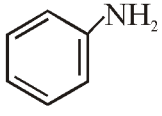
Ans. Official answer NTA (1)

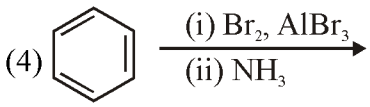
Sol.

62. The sequence from the following that would result in giving predominantly 3, 4, 5Tribromoaniline is

(1)  $\xrightarrow[\text{(ii) Sn, HCl}]{\text{(i) } Br_2\text{, acetic acid}}$

(2)  $\xrightarrow[\text{(ii) } NaNO_2\text{, HCl, CuBr}\\ \text{(iii) Sn, HCl}]{\text{(i) } Br_2\text{(excess), acetic acid}}$

(3)  $\xrightarrow{Br_2\text{, water}}$

(4) 

Question ID : 347577144

Ans. Official answer NTA (2)

Sol.

63. The correct orders among the following are

Atomic radius : B < Al < Ga < In < Tl

Electronegativity : Al < Ga < In < Tl < B

Density: Tl < In < Ga < Al < B

1st Ionisation Energy : In < Al < Ga < Tl < B

Choose the correct answer from the options given below:

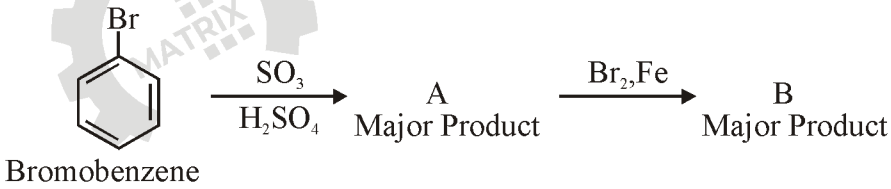
(1) A and C Only (2) B and D Only (3) C and D Only (4) A and B Only

Question ID : 347577135

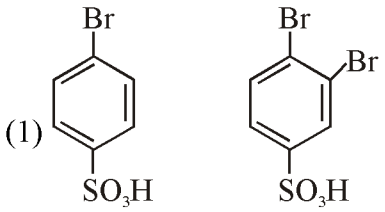
Ans. Official answer NTA (2)

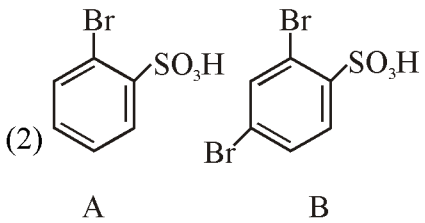
Sol.

64. In the following series of reactions identify the major products A & B respectively



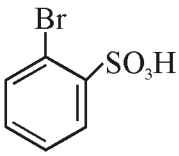
Bromobenzene

(1) 

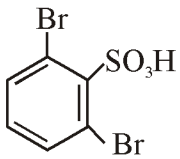
(2) 

A B

(3)

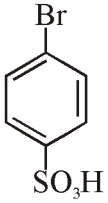


A

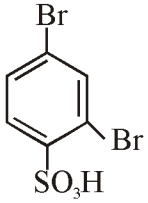


B

(4)



A



B

Question ID : 347577142

Ans. Official answer NTA (1)

Sol.

65. The standard cell potential $\left(E_{cell}^{\ominus}\right)$ of a fuel cell based on the oxidation of methanol in air that has been used to power television relay station is measured as 1.21 V . The standard half cell reduction potential for $O_2\left(E^{\circ}_{O_2/H_2O}\right)$ is 1.229 V .

Choose the correct statement:

(1) Reduction of methanol takes place at the cathode.

(2) The standard half cell reduction potential for the reduction of $CO_2\left(E^{\circ}_{CO_2/CH_3OH}\right)$ is 19 mV

(3) Reactants are fed at one go to each electrode.

(4) Oxygen is formed at the anode.

Question ID : 347577131

Ans. Official answer NTA (2)

Sol.

66. Compounds that should not be used as primary standards in titrimetric analysis are :

A. $Na_2Cr_2O_7$

B. Oxalic acid

C. NaOH

D. $FeSO_4 \cdot 6H_2O$

E. Sodium tetraborate

Choose the most appropriate answer from the options given below:

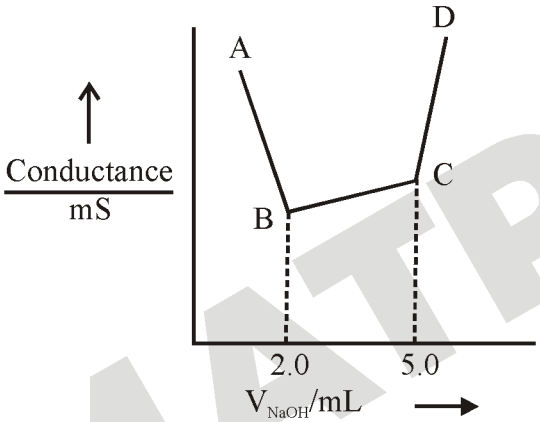
(1) B and D Only (2) C, D and E Only (3) D and E Only (4) A, C and D Only

Question ID : 347577138

Ans. Official answer NTA (4)

Sol.

67. 40 mL of a mixture of CH_3COOH and HCl (aqueous solution) is titrated against 0.1 M NaOH solution conductometrically. Which of the following statement is correct?



(1) CH_3COOH is neutralised first followed by neutralisation of HCl

(2) The concentration of HCl in the original mixture is 0.005 M

(3) Point 'C' indicates the complete neutralisation of HCl

(4) The concentration of CH_3COOH in the original mixture is 0.005 M

Question ID : 347577130

Ans. Official answer NTA (2)

Sol.

68. Fat soluble vitamins are:

A. Vitamin B_1

B. Vitamin C

C. Vitamin E

D. Vitamin B_{12}

E. Vitamin K

Choose the correct answer from the options given below:

(1) A & B Only

(2) C & E Only

(3) C & D Only

(4) B & C Only

Question ID : 347577145

Ans. Official answer NTA (2)

Sol.

69. For electrons in '2 s' and '2 p' orbitals, the orbital angular momentum values, respectively are :

(1) 0 and $\sqrt{2}\frac{h}{2\pi}$

(2) $\frac{h}{2\pi}$ and $\sqrt{2}\frac{h}{2\pi}$

(3) $\sqrt{2}\frac{h}{2\pi}$ and 0

(4) 0 and $\sqrt{6}\frac{h}{2\pi}$

Question ID : 347577127

Ans. Official answer NTA (1)

Sol.

70. Identify the diamagnetic octahedral complex ions from below ;

A. $[Mn(CN)_6]^{3-}$

B. $[Co(NH_3)_6]^{3+}$

C. $[Fe(CN)_6]^{4-}$

D. $[Co(H_2O)_3F_3]$

Choose the correct answer from the options given below:

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

Question ID : 347577137

Ans. Official answer NTA (4)

Sol.

SECTION – B

71. The total number of structural isomers possible for the substituted benzene derivatives with the molecular formula C_9H_{12} is _____.

Question ID : 347577150

Ans. Official answer NTA (8)

Sol.

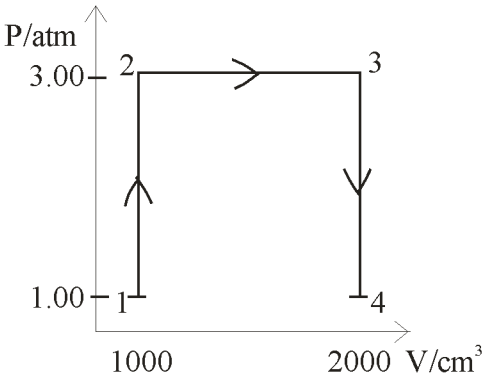
72. A sample of n -octane (1.14 g) was completely burnt in excess of oxygen in a bomb calorimeter, whose heat capacity is $5 kJK^{-1}$. As a result of combustion reaction, the temperature of the calorimeter is increased by 5 K . The magnitude of the heat of combustion of octane at constant volume is _____ $kJmol^{-1}$ (nearest integer).

Question ID : 347577147

Ans. Official answer NTA (2500)

Sol.

73.



A perfect gas (0.1 mol) having $\overline{C}_v = 1.50R$ (independent of temperature) undergoes the above transformation from point 1 to point 4. If each step is reversible, the total work done (w) while going from point 1 to point 4 is (-) _____ J (nearest integer)

[Given: $R = 0.082\,L\,atm\,K^{-1}\,mol^{-1}$]

Question ID : 347577146

Ans. Official answer NTA (304)

Sol.

74. Among, Sc, Mn, Co and Cu , identify the element with highest enthalpy of atomisation. The spin only magnetic moment value of that element in its +2 oxidation state is _____ BM (in nearest integer).

Question ID : 347577148

Ans. Official answer NTA (4)

Sol.

75. Xg of nitrobenzene on nitration gave 4.2 g of m -dinitrobenzene. X = _____ g. (nearest integer)

[Given : molar mass (in $gmol^{-1}$) $C : 12, H : 1, O : 16, N : 14$]

Question ID : 347577149

Ans. Official answer NTA (3)

Sol.