JEE Main April 2024

Question Paper With Text Solution

09 April | Shift-2

CHEMISTRY

61. The coordination environment of Ca^{2+} ion in its complex with $EDTA^{4-}$ is :

    (1) Trigonal prismatic   (2) Octahedral   (3) Tetrahedral   (4) Square planar

Question ID: 68019114673

Ans.   Official Answer by NTA (2)

Sol.

62. Which of the following compounds will give silver mirror with ammoniacal silver nitrate?

    A. Formic acid

    B. Formaldehyde

    C. Benzaldehyde

    D. Acetone

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

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

Question ID: 68019114680

Ans.   Official Answer by NTA (4)

Sol.

63. The incorrect statement regarding ethyne is

    (1) The carbhon - carbon bonds in ethyne is weaker than that in ethene

    (2) The C – C bonds in ethyne is shorter than that in ethene

    (3) Both carbons are sp hybridised

    (4) Ethyne is linear

Question ID: 68019114677

Ans.   Official Answer by NTA (1)

Sol.

64. For a sparingly soluble salt AB_2, the equilibrium concentrations of A^{2+} ions and B^- ions are 1.2×10^{-4} M and 0.24×10^{-3} M, respectively. The solubility product of AB_2 is :

    (1) 27.65×10^{-12} (2) 6.91×10^{-12} (3) 0.069×10^{-12} (4) 0.276×10^{-12}

Question ID: 68019114666

Ans.   Official Answer by NTA (2)

Sol.

65.   Match List-I with List-II

List-I   List-II

(Cell)   (Use/Property/Reaction)

(A) Leclanche cell   (I) Converts energy of combustion into electrical energy
(B) Ni -Cd cell   (II) Does not involve any ion in solution and is used in hearing aids
(C) Fuel cell   (III) Rechargeable
(D) Mercury cell   (IV) Reaction at anode $Zn \rightarrow Zn^{2+}+2e^{-}$

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

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

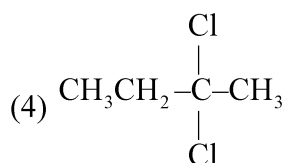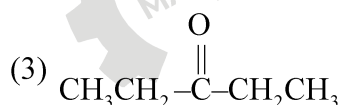(2) A-III, B-I, C-IV, D-II

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

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

Question ID: 68019114667

Official Answer by NTA (4)

Sol.

66.   Which of the following compound can give positive iodoform test when treated with aqueous KOH solution followed by potassium hypoiodite.

(1) $CH_3CH_2- \overset{\overset{\displaystyle O}{\diagup \; \diagdown}}{CH - CH_2}$

(2) $CH_3CH_2CH_2CHO$

(3) $CH_3CH_2 - \overset{\overset{\displaystyle O}{\parallel}}{C} - CH_2CH_3$

(4) $CH_3CH_2 - \overset{\overset{\displaystyle Cl}{|}}{\underset{\underset{\displaystyle Cl}{|}}{C}} - CH_3$

Question ID: 68019114681

Ans.   Official Answer by NTA (4)

Sol.

67.   The electronic configuration of Einsteinium is :

(Given atomic number of Einsteinium = 99)

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(1) [Rn] $5f^{11}$ $6d^0$ $7s^2$ (2) [Rn] $5f^{12}$ $6d^0$ $7s^2$ (3) [Rn] $5f^{10}$ $6d^0$ $7s^2$ (4) [Rn] $5f^{13}$ $6d^0$ $7s^2$

Question ID: 68019114669

Ans.   Official Answer by NTA (1)

Sol.

68.   The incorrect statement about Glucose is :

(1) Glucose is soluble in water because of having aldehyde functional group

(2) Glucose remains in multiple isomeric form in its aqueous solution

(3) Glucose is an aldohexose

(4) Glucose is one of the monomer unit in sucrose

Question ID: 68019114683

Ans.   Official Answer by NTA (1)

Sol.

69.   Which out of the following is a correct equation to show change in molar conductivity with respect to concentration for a weak electrolyte, if the symbols carry their usual meaning :

(1) $\Lambda_m - \Lambda^o_m - AC^{1/2} = 0$

(2) $\Lambda_m - \Lambda^o_m + AC^{1/2} = 0$

(3) $\Lambda^2_m C - K_a \Lambda^{o2}_m + K_a \Lambda_m \Lambda^o_m = 0$

(4) $\Lambda^2_m C + K_a \Lambda^{o2}_m - K_a \Lambda_m \Lambda^o_m = 0$

Question ID: 68019114668

Ans.   Official Answer by NTA (3)

Sol.

70.   Match List-I with List-II

List-I	List-II
(A) Melting Point [K]	(I) Tl > In > Ga > Al > B
(B) Ionic Radius [M^{+3}/pm]	(II) B > Tl > Al $\approx$ Ga > In
(C) $\Delta_i H_1$ [kJ mol^{-1}]	(III) Tl > In > Al > Ga > B
(D) Atomic Radius [pm]	(IV) B > Al > Tl > In > Ga

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

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

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

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

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

Question ID: 68019114671

Ans. Official Answer by NTA (1)

Sol.

71. Match List-I with List-II

List-I   List-II

(A) $K_2[Ni(CN)_4]$ (I) sp^3
(B) $[Ni(CO)_4]$ (II) sp^3d^2
(C) $[Co(NH_3)_6]Cl_3$ (III) dsp^2
(D) $Na_3[CoF_6]$ (IV) d^2sp^3

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

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

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

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

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

Question ID: 68019114674

Ans. Official Answer by NTA (3)

Sol.

72. Give below are two statements :

Statement-I : The higher oxidation states are more stable down the group among transition elements unlike p-block elements.

Statement-II : Copper can not liberate hydrogen from weak acids.

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 is false
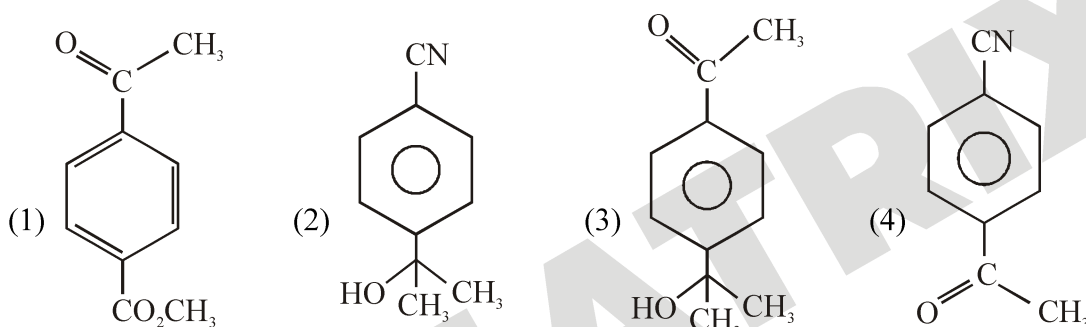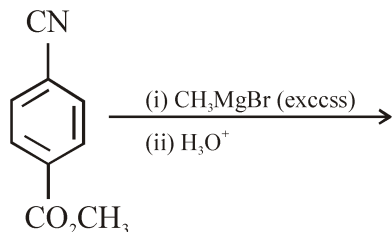
(4) Both Statement I and Statement II is true

Question ID: 68019114672

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Ans.   Official Answer by NTA (4)

Sol.

73.   Major product of the following reaction is

$$\xrightarrow[\text{(ii) } H_3O^+]{\text{(i) } CH_3MgBr \text{ (exccss)}}$$

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

Question ID: 68019114682

Ans.   Official Answer by NTA (3)

Sol.

74.   The candela is the luminous intensity, in a given direction, of a source that emits monochromatic radiation of frequency 'A' x 10^{12} hertz and that has a radiant

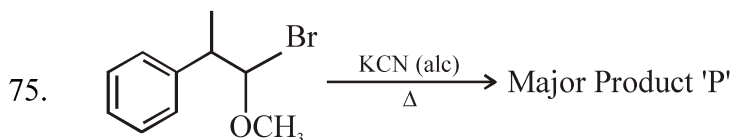intensity in that direction of $\dfrac{1}{B}$ watt per steradian.

'A' and 'B' are respectively

(1) 450 and $\dfrac{1}{683}$ (2) 540 and 683   (3) 540 and $\dfrac{1}{683}$ (4) 450 and 683
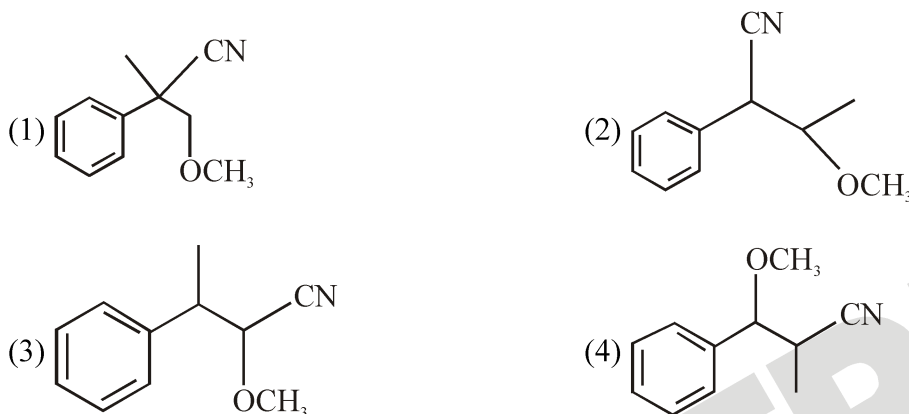
Question ID: 68019114664

Ans.   Official Answer by NTA (2)

Sol.

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75.

In the above reaction product 'P' is

(1)

(2)

(3)

(4)
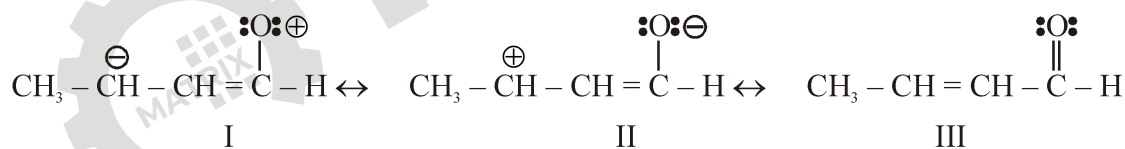
Question ID: 68019114678

Ans. Official Answer by NTA (3)

Sol.

76. The correct stability order of the following resonance structures of

CH$_3$–CH=CH–CHO is

(1) I > II > III   (2) II > III > I   (3) III > II > I   (4) II > I > III

Question ID: 68019114676

Ans. Official Answer by NTA (3)

Sol.

77. Match List-I with List-II

List-I (Test)	List-II (Observation)
(A) Br$_2$ water test	(I) Yellow orange or orange red precipitate formed
(B) Ceric ammonium nitrate test	(II) Reddish orange colour disappears
(C) Ferric chloride test	(III) Red colour appears
(D) 2, 4 - DNP test	(IV) Blue, Green, Violet or Red colour appear

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Choose the **correct** answer from the options given below :
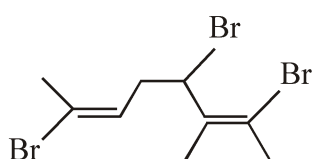
(1) A-III, B-IV, C-I, D-II

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

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

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

Question ID: 68019114675

Ans.   Official Answer by NTA (2)

Sol.

78.   Total number of stereo isomers possible for the given structure :

(1) 2   (2) 3   (3) 8   (4) 4

Question ID: 68019114679

Ans.   Official Answer by NTA (3)

Sol.

79.   Match List-I with List-II

List-I (Element)	List-II (Electronic Configuration)
(A) N	(I) $[Ar]3d^{10}4s^2 4p^5$
(B) S	(II) $[Ne]\ 3s^2\ 3p^4$
(C) Br	(III) $[He]\ 2s^2\ 2p^3$
(D) Kr	(IV) $[Ar]\ 3d^{10}\ 4s^2\ 4p^6$

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

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

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

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

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

Question ID: 68019114670

Ans.   Official Answer by NTA (3)

Sol.

80. The correct increasing order for bond angles among BF_3, PF_3 and ClF_3 is ;

    (1) $BF_3 < PF_3 < ClF_3$ (2) $ClF_3 < PF_3 < BF_3$ (3) $PF_3 < BF_3 < ClF_3$ (4) $BF_3 = PF_3 < ClF_3$

Question ID: 68019114665

Ans. Official Answer by NTA (2)

Sol. 0

81.
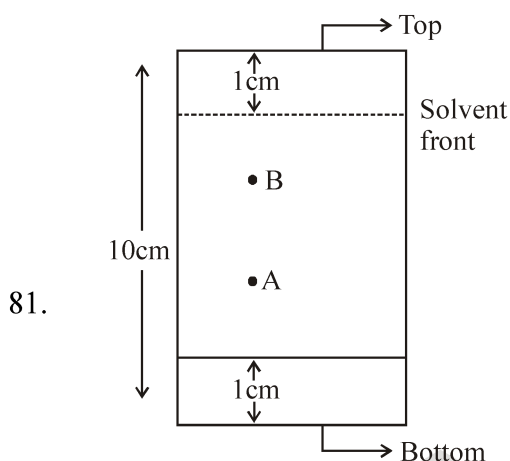
In the given TLC, the distance of spot A & B are 5 cm & 7 cm, from the bottom of TLC plate, respectively.

R_f value of B is $x \times 10^{-1}$ times more than A. The value of x is _____.

Question ID: 68019114691

Ans. Official Answer by NTA (15)

Sol.

82. Number of compounds from the following which **cannot** undergo Friedel-Crafts reactions is: _____

    toluene, nitrobenzene, xylene, cumene, aniline, chlorobenzene, m -nitroaniline, m -dinitrobenzene

Question ID: 68019114693

Ans. Official Answer by NTA (4)

Sol.

83. Consider the following first order gas phase reaction at constant temperature

    $A(g) \rightarrow 2B(g) + C(g)$

    If the total pressure of the gases is found to be 200 torr after 23 sec. and 300 torr upon the complete decomposition of A after a very long time, then the rate constant of the given reaction is _____ $\times 10^{-2}$ s^{-1}

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(nearest integer)

[Given: $\log_{10}(2) = 0.301$]

Question ID: 68019114688

Ans.   Official Answer by NTA (3)

Sol.

84.   The vapor pressure of pure benzene and methyl benzene at 27°C is given as 80 Torr and 24 Torr, respectively. The mole fraction of methyl benzene in vapor phase, in equilibrium with an equimolar mixture of those two liquids (ideal solution) at the same temperature is _____ $\times 10^{-2}$ (nearest integer)

Question ID: 68019114687

Ans.   Official Answer by NTA (23)

Sol.

85.   Number of oxygen atoms present in chemical formula of fuming sulphuric acid is _____.

Question ID: 68019114692

Ans.   Official Answer by NTA (7)

Sol.

86.   A transition metal 'M' among Sc, Ti, V, Cr, Mn and Fe has the highest second ionisation enthalpy. The spin-only magnetic moment value of M^+ ion is _____ BM (Near integer)

(Given atomic number Sc : 21, Ti : 22, V : 23, Cr : 24, Mn : 25, Fe : 26)

Question ID: 68019114689

Ans.   Official Answer by NTA (6)

Sol.

87.   Total number of electrons present in (π^*) molecular orbitals of O_2, O_2^+ is and O_2^- is _____.

Question ID: 68019114685

Ans.   Official Answer by NTA (6)

Sol.

88.   When $\Delta H_{vap} = 30$ kJ/mol and $\Delta S_{vap} = 75$ J mol^{-1} K^{-1}, then the temperature of vapour, at one atmosphere is _____ K.

Question ID: 68019114686

Ans.   Official Answer by NTA (400)

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Sol.

89. Based on Heisenberg's uncertainty principle, the uncertainty in the velocity of the electron to be found within an atomic mucleus of diameter 10^{-15}m is _____ $\times 10^9$ ms^{-1} (nearest integer)

[Given : mass of electron = 9.1×10^{-31} kg, Plank's constant (h) = 6.626×10^{-34}Js]

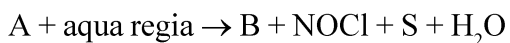(Value of π = 3.14)

Question ID: 68019114684

Ans. Official Answer by NTA (58)

Sol.

90. Consider the following test for a group-IV cation.

$M^{2+} + H_2S \rightarrow A$ (Block precipitate) + byproduct

$A +$ aqua regia $\rightarrow B + NOCl + S + H_2O$

$B + KNO_2 + CH_3COOH \rightarrow C +$ byproduct

The spin-only magnetic moment value of the metal complex C is _____ BM

(Nearest integer)

Question ID: 68019114690

Ans. Official Answer by NTA (0)

Sol.

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