

FINAL JEE-MAIN EXAMINATION – APRIL, 2023

(Held On Tuesday 11th April, 2023)

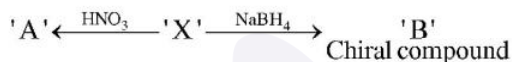
TIME : 9 : 00 AM to 12 : 00 NOON

CHEMISTRY

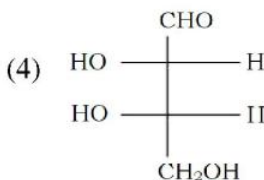
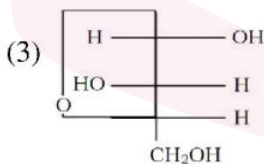
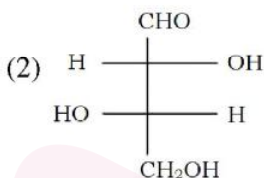
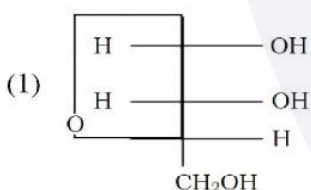
TEST PAPER WITH ANSWER

SECTION-A

61. L –isomer of tetrose X ($C_4H_8O_4$) gives positive Schiff's test and has two chiral carbons. On acetylation, 'X' yields triacetate. 'X' also undergoes following reactions



'X' is



Official Ans. by NTA (2)

Ans. (2)

62. The polymer X – consists of linear molecules and is closely packed. It is prepared in the presence of triethylaluminium and titanium tetrachloride under low pressure. The polymer X is –

- (1) Polyacrylonitrile
- (2) Low density polythene
- (3) Polytetrafluoroethane
- (4) High density polythene

Official Ans. by NTA (4)

Ans. (4)

63. When a solution of mixture having two inorganic salts was treated with freshly prepared ferrous sulphate in acidic medium, a dark brown ring was formed whereas on treatment with neutral $FeCl_3$, it gave deep red colour which disappeared on boiling and a brown red ppt was formed. The mixture contains

- (1) CH_3COO^- & NO_3^-
- (2) $C_2O_4^{2-}$ & NO_3^-
- (3) SO_3^{2-} & CH_3COO^-
- (4) SO_3^{2-} & $C_2O_4^{2-}$

Official Ans. by NTA (1)

Ans. (1)

64. Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R :

Assertion A : In the photoelectric effect, the electrons are ejected from the metal surface as soon as the beam of light of frequency greater than threshold frequency strikes the surface.

Reason R : When the photon of any energy strikes an electron in the atom, transfer of energy from the photon to the electron takes place.

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

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

Official Ans. by NTA (2)

Ans. (2)

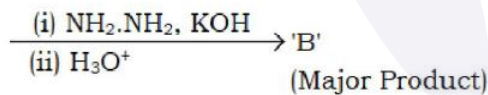
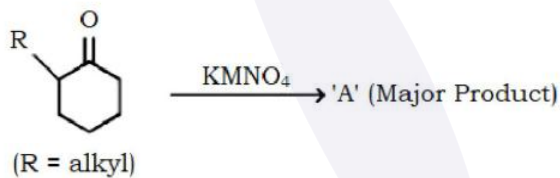
65. 25 mL of silver nitrate solution (1 M) is added dropwise to 25 mL of potassium iodide (1.05 M) solution. The ion(s) present in very small quantity in the solution is/are

- (1) NO_3^- only
- (2) K^+ only
- (3) Ag^+ and I^- both
- (4) I^- only

Official Ans. by NTA (3)

Ans. (3)

66. 'A' and 'B' in the below reactions are :



- (1) $\text{R}-\text{CH}(\text{CO}_2\text{H})-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CHO} = \text{A},$
 $\text{B} = \text{R}-\text{CH}(\text{CO}_2\text{H})-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_3$
- (2) $\text{R}-\text{C}(=\text{O})-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CHO} = \text{A},$
 $\text{B} = \text{R}-\text{C}(=\text{O})-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_3$
- (3) $\text{R}-\text{CH}(\text{CO}_2\text{H})-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CO}_2\text{H} = \text{A},$
 $\text{B} = \text{R}-\text{CH}(\text{C}(=\text{O})\text{NHNH}_2)-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{C}(=\text{O})\text{NH-NH}_2$
- (4) $\text{R}-\text{C}(=\text{O})-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CO}_2\text{H} = \text{A},$
 $\text{B} = \text{R}-\text{C}(=\text{O})-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CO}_2\text{H}$

Official Ans. by NTA (4)

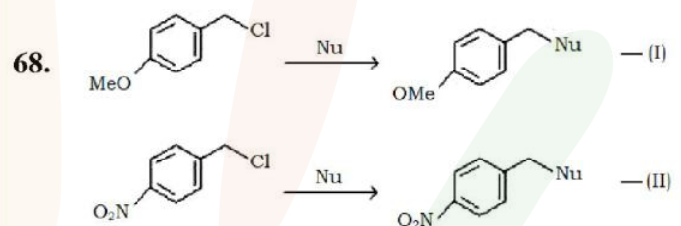
Ans. (4)

67. The set which does not have ambidentate ligand(s) is

- (1) $\text{C}_2\text{O}_4^{2-}$, ethylene diammine, H_2O
- (2) EDTA^{4-} , NCS^- , $\text{C}_2\text{O}_4^{2-}$
- (3) NO_2^- , $\text{C}_2\text{O}_4^{2-}$, EDTA^{4-}
- (4) $\text{C}_2\text{O}_4^{2-}$, NO_2^- , NCS^-

Official Ans. by NTA (1)

Ans. (1)



Where Nu = Nucleophile

Find out the correct statement from the options given below for the above 2 reactions.

- (1) Reaction (I) is of 2nd order and reaction (II) is of 1st order
- (2) Reaction (I) and (II) both are of 2nd order
- (3) Reaction (I) is of 1st order and reaction (II) is of 2nd order
- (4) Reactions (I) and (II) both are of 1st order

Official Ans. by NTA (3)

Ans. (3)

69. For elements B, C, N, Li, Be, O and F the correct order of first ionization enthalpy is

- (1) $\text{Li} < \text{Be} < \text{B} < \text{C} < \text{N} < \text{O} < \text{F}$
- (2) $\text{B} > \text{Li} > \text{Be} > \text{C} > \text{N} > \text{O} > \text{F}$
- (3) $\text{Li} < \text{B} < \text{Be} < \text{C} < \text{O} < \text{N} < \text{F}$
- (4) $\text{Li} < \text{Be} < \text{B} < \text{C} < \text{O} < \text{N} < \text{F}$

Official Ans. by NTA (3)

Ans. (3)

70. Match List-I with List-II :

List-I Species	List-II Geometry/Shape
A. H_3O^+	I. Tetrahedral
B. Acetylide anion	II. Linear
C. NH_4^+	III. Pyramidal
D. ClO_2^-	IV. Bent

Choose the correct answer from the options given below :

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

Official Ans. by NTA (1)**Ans. (1)**71. For compound having the formula GaAlCl_4 , the correct option from the following is

- (1) Ga is more electronegative than Al and is present as a cationic part of the salt GaAlCl_4
- (2) Oxidation state of Ga in the salt GaAlCl_4 is +3.
- (3) Cl forms bond with both Al and Ga in GaAlCl_4
- (4) Ga is coordinated with Cl in GaAlCl_4

Official Ans. by NTA (1)**Ans. (1)**

72. In the extraction process of copper, the product obtained after carrying out the reactions

- (i) $2\text{Cu}_2\text{S} + 3\text{O}_2 \rightarrow 2\text{Cu}_2\text{O} + 2\text{SO}_2$
 - (ii) $2\text{Cu}_2\text{O} + \text{Cu}_2\text{S} \rightarrow 6\text{Cu} + \text{SO}_2$ is called
- (1) Blister copper
 - (2) Copper scrap
 - (3) Reduced copper
 - (4) Copper matte

Official Ans. by NTA (1)**Ans. (1)**

73. Match List-I with List-II :

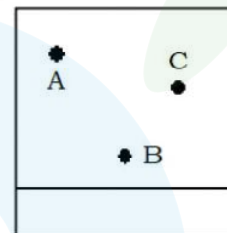
List-I	List-II
A. K	I. Thermonuclear reactions
B. KCl	II. Fertilizer
C. KOH	III. Sodium potassium pump
D. Li	IV. Absorbent of CO_2

Choose the correct answer from the options given below :

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

Official Ans. by NTA (1)**Ans. (1)**

74. Thin layer chromatography of a mixture shows the following observation :



The correct order of elution in the silica gel column chromatography is

- (1) A, C, B
- (2) B, C, A
- (3) C, A, B
- (4) B, A, C

Official Ans. by NTA (1)**Ans. (1)**

75. Which of the following complex has a possibility to exist as meridional isomer?

- (1) $[\text{Co}(\text{NH}_3)_3(\text{NO}_2)_3]$
- (2) $[\text{Co}(\text{en})_3]$
- (3) $[\text{Co}(\text{en})_2\text{Cl}_2]$
- (4) $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$

Official Ans. by NTA (1)**Ans. (1)**

76. Given below are two statements :

Statement-I : Methane and steam passed over a heated Ni catalyst produces hydrogen gas.

Statement-II : Sodium nitrite reacts with NH_4Cl to give H_2O , N_2 and NaCl .

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

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

Official Ans. by NTA (1)

Ans. (1)

77. Given below are two statements :

Statement I : If BOD is 4 ppm and dissolved oxygen is 8 ppm, then it is a good quality water.

Statement II : If the concentration of zinc and nitrate salts are 5 ppm each, then it can be a good quality water.

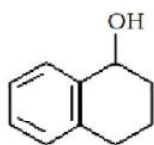
In the light of the above statements, choose the most appropriate answer from the options given below :

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

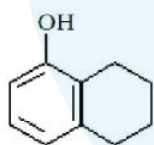
Official Ans. by NTA (3)

Ans. (3)

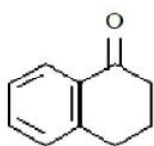
78. Arrange the following compounds in increasing order of rate of aromatic electrophilic substitution reaction



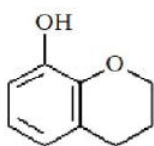
(a)



(b)



(c)



(d)

- (1) d, b, c, a
- (2) b, c, a, d
- (3) c, a, b, d
- (4) d, b, a, c

Official Ans. by NTA (3)

Ans. (3)

79. The complex that dissolves in water is

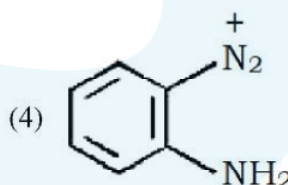
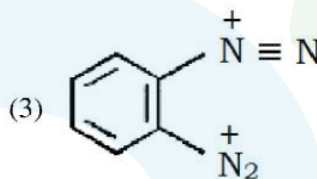
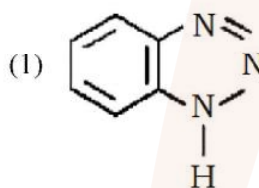
- (1) $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$
- (2) $[\text{Fe}_3(\text{OH})_2(\text{OAc})_6]\text{Cl}$
- (3) $\text{K}_3[\text{Co}(\text{NO}_2)_6]$
- (4) $(\text{NH}_4)_3[\text{As}(\text{Mo}_3\text{O}_{10})_4]$

Official Ans. by NTA (2)

Ans. (2)

80. o-Phenylenediamine $\xrightarrow{\text{HNO}_2}$ 'X'
Major Product

'X' is

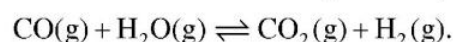


Official Ans. by NTA (1)

Ans. (1)

SECTION-B

81. A mixture of 1 mole of H_2O and 1 mole of CO is taken in a 10 litre container and heated to 725 K. At equilibrium 40% of water by mass reacts with carbon monoxide according to the equation :



The equilibrium constant $K_C \times 10^2$ for the reaction is _____. (Nearest integer)

Official Ans. by NTA (44)

Ans. (44)

82. The ratio of spin-only magnetic moment values $\mu_{\text{eff}}[\text{Cr}(\text{CN})_6]^{3-} / \mu_{\text{eff}}[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ is _____.

Official Ans. by NTA (1)

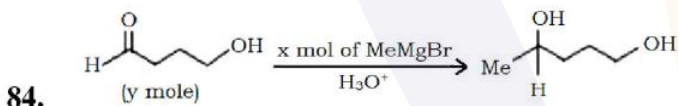
Ans. (1)

83. An atomic substance A of molar mass 12 g mol^{-1} has a cubic crystal structure with edge length of 300 pm. The no. of atoms present in one unit cell of A is _____. (Nearest integer)

Given the density of A is 3.0 g mL^{-1} and $N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$

Official Ans. by NTA (4)

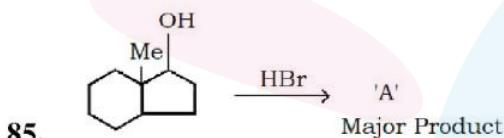
Ans. (4)



The ratio x/y on completion of the above reaction is _____.

Official Ans. by NTA (2)

Ans. (2)



The number of hyperconjugation structures involved to stabilize carbocation formed in the above reaction is _____.

Official Ans. by NTA (7)

Ans. (7)

86. Solid fuel used in rocket is a mixture of Fe_2O_3 and Al (in ratio 1 : 2). The heat evolved (kJ) per gram of the mixture is _____ (Neatest integer)

Given : $\Delta H_f^\ominus(\text{Al}_2\text{O}_3) = -1700 \text{ kJ mol}^{-1}$

$\Delta H_f^\ominus(\text{Fe}_2\text{O}_3) = -840 \text{ kJ mol}^{-1}$

Molar mass of Fe, Al and O are 56, 27 and 16 g mol^{-1} respectively.

Official Ans. by NTA (4)

Ans. (4)

87. A solution of sugar is obtained by mixing 200 g of its 25% solution and 500 g of its 40% solution (both by mass). The mass percentage of the resulting sugar solution is _____. (Nearest integer)

Official Ans. by NTA (36)

Ans. (36)

88. $\text{KClO}_3 + 6\text{FeSO}_4 + 3\text{H}_2\text{SO}_4 \rightarrow$



The above reaction was studied at 300 K by monitoring the concentration of FeSO_4 in which initial concentration was 10 M and after half an hour became 8.8 M. The rate of production of $\text{Fe}_2(\text{SO}_4)_3$ is _____ $\times 10^{-6} \text{ mol L}^{-1} \text{ s}^{-1}$.

(Nearest integer)

Official Ans. by NTA (333)

Ans. (333)

89. 0.004 M K_2SO_4 solution is isotonic with 0.01 M glucose solution. Percentage dissociation of K_2SO_4 is _____ (Nearest integer)

Official Ans. by NTA (75)

Ans. (75)

90. In an electrochemical reaction of lead, at standard temperature, if $E_{(\text{Pb}^{2+}/\text{Pb})}^0 = m \text{ Volt}$ and

$E_{(\text{Pb}^{4+}/\text{Pb})}^0 = n \text{ Volt}$, then the value of $E_{(\text{Pb}^{2+}/\text{Pb}^{4+})}^0$ is

given by $m - xn$. The value of x is _____.

(Nearest integer)

Official Ans. by NTA (2)

Ans. (2)