

JEE MAINS 2023 Chemistry 13 APRIL Shift 2 Question Paper with Solutions

Time Allowed :1 Hours

Maximum Marks :120

Total Questions :30

General Instructions

Read the following instructions very carefully and strictly follow them:

1. This question paper contains 30 questions. All questions are compulsory.
2. This question paper contains only one section - Chemistry
3. In all sections, Questions are multiple choice questions (MCQs) and questions carry 4 mark each.

61. Which of the following are the Green house gases ?

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

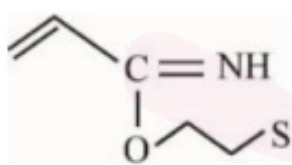
62. The major product for the following reaction is :



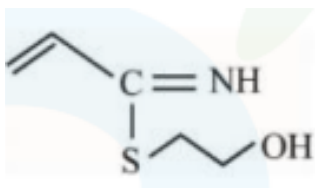
(1) (A)

(2) (B)

(3) (C)



(4) (D)

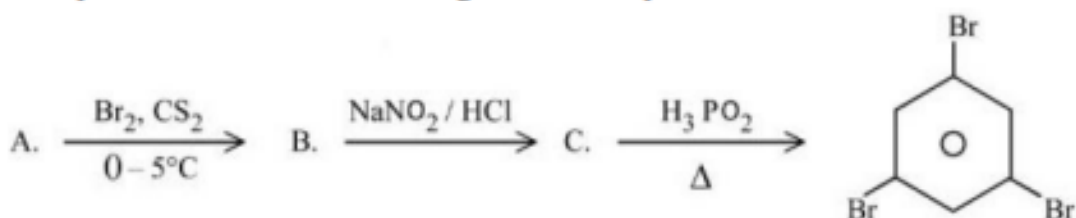


63. In the wet tests for detection of various cations by precipitation, Ba^{2+} cations are detected by obtaining precipitate of :

- (1) $\text{Ba}(\text{OAc})_2$
- (2) BaCO_3
- (3) BaSO_4
- (4) $\text{Ba}(\text{ox})$: Barium oxalate

64. Compound A from the following reaction sequence is:

The reaction sequence:



- (1) Phenol
- (2) Benzoic Acid
- (3) Aniline
- (4) Salicylic Acid

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

Assertion A: Isotopes of hydrogen have almost same chemical properties, but difference in

their rates of reaction.

Reason R: Isotopes of hydrogen have different enthalpy of bond dissociation.

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

66. Given below are statements related to Ellingham diagram:

Statement I: Ellingham diagram can be constructed for oxides, sulphides and halides of metals.

Statement II: It consists of plots of ΔH_f° vs formation of oxides of elements.

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

67. Better method for preparation of BeF_2 , among the following is:

- (1) $BeH_4 + F_2 \rightarrow BeF_2$
 - (2) $Be + F_2 \rightarrow BeF_2$
 - (3) $(NH_3)_2BeF_4 \rightarrow BeF_2$
 - (4) $BeO + C + F_2 \rightarrow BeF_2$
-

68. Identify the correct order of standard enthalpy of formation of sodium halides.

- (1) NaCl ; NaBr ; NaI ; NaCl
 - (2) NaF ; NaCl ; NaBr ; NaI
 - (3) NaCl ; NaF ; NaBr ; NaI
 - (4) NaI ; NaBr ; NaCl ; NaF
-

69. Which of the following complexes will exhibit maximum attraction to an applied

magnetic field? (1) $[\text{Zn}(\text{H}_2\text{O})_6]^{2+}$

(2) $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$

(3) $[\text{Co}(\text{en})_3]^{3+}$

(4) $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$

70. The correct group of halide ions which can be oxidized by oxygen in acidic medium is (1) Cl^- , Br^- and I^- only

(2) Br^- only

(3) Br^- and I^- only

(4) I^- only

71. The total number of stereoisomers for the complex $[\text{Cr}(\text{ox})_3]^{3+}$ (where ox = oxalate) is: (1) 3

(2) 1

(3) 4

(4) 2

72. Match List I with List II I - Bromo propene is reacted with reagents in List I to give product in List II.

LIST I - Reagent LIST II - Product

(1) KOH (alc) Nitrite

(2) KCN (alc) Ester

(3) AgNO_3 Alkene

(4) H_2CO_3 Nitroalkane

73. The covalency and oxidation state respectively of boron in $[\text{BF}_3]$ are: (1) 3 and 5

(2) 4 and 3

(3) 4 and 4

(4) 3 and 4

74. What happens when methane undergoes combustion in systems A and B respectively?

- (1) System A: Temperature remains same System B: Temperature rises
- (2) System A: Temperature falls System B: Temperature rises
- (3) System A: Temperature falls System B: Temperature remains same
- (4) System A: Temperature rises System B: Temperature remains same

75. The naturally occurring amino acid that contains only one basic functional group in its chemical structure is:

- (1) Histidine
- (2) Lysine
- (3) Aspartic acid
- (4) Arginine

76. Given below are two statements: Statement I: SO_2 and H_2O both possess V-shaped structure. **Statement II:** The bond angle of SO_2 is less than that of H_2O

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

77. Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R. Assertion A: The diameter of colloidal particles in solution should not be much smaller than wavelength of light to show Tyndall effect. **Reason R:** The light scatters in all direction when the size of particles is large enough.

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

(4) A is correct but R is false

78. Match List I with List II

List I	List II
(A) Weak intermolecular forces of attraction	(I) Hexamethylenediamine + adipic acid
(B) Hydrogen bonding	(II) $\text{AlEt}_3 + \text{TiCl}_4$
(C) Heavily branched polymer	(III) 2-chloro-1, 3-butadiene
(D) High density polymer	(IV) Phenol + formaldehyde

Choose the correct answer from the options given below:

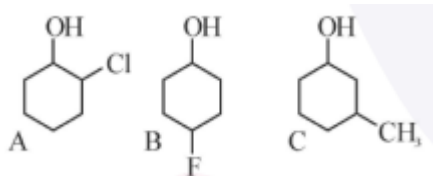
- (1) A-IV, B-I, C-III, D-II
- (2) A-III, B-I, C-IV, D-II
- (3) A-II, B-IV, C-I, D-III
- (4) A-IV, B-II, C-III, D-I

79. Given below are two statements: Statement I: Tropolone is an aromatic compound and has 8π electrons. **Statement II:** The bond angle of $\text{C}=\text{O}$ group in tropolone is involved in aromaticity.

- (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

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

Assertion A: Order of acidic nature of the following compounds is $\text{A} > \text{B} > \text{C}$.



Reason R: Fluoro is a stronger electron withdrawing group than Chloro group.

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

(1) Both A and R are correct and R is the correct explanation of A

(2) A is false but R is true

(3) Both A and R are correct but R is NOT the correct explanation of A

(4) A is true but R is false

Section - B

81. If the formula of Borax is $\text{Na}_2\text{B}_4\text{O}_7 \cdot (\text{OH})_2$, then $x + y + z = ?$

The formula of borax is $\text{Na}_2\text{B}_4\text{O}_7 \cdot (\text{OH})_2$

82. Sea water contains 29.29% NaCl and 19% MgCl_2 by weight of solution. The normal boiling point of the sea water is:

83. 20 mL of 0.1 M NaOH is added to 50 mL of 0.1 M acetic acid solution. The pH of the resulting solution is:

84. At 298 K, the standard reduction potential for Cu^{2+}/Cu electrode is 0.034 V. Given: K_a , $\text{Cu}(\text{OH})_2 = 1 \times 10^{-9}$. The reduction potential at pH = 14 for the above couple is $(X) \times 10^{-7}$. The value of X is:

85. Sodium metal crystallizes in a body centred cubic lattice with unit cell edge length of 4 Å. The radius of sodium atom is _____ $\times 10^{-10}$ Å (Nearest integer)

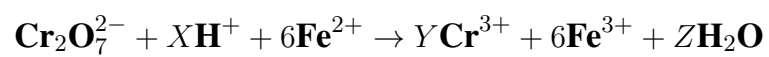
86. $\text{A (g)} \rightarrow 2\text{B (g)} + \text{C (g)}$ is first order reaction. The initial pressure of the system was found to be 800 mm Hg which increased to 1600 mm Hg after 10 min. The total pressure of the system after 30 min will be _____ mm Hg.

87. 1g of a carbonate (M_2CO_3) on treatment with excess HCl produces 0.01 mol of CO_2 . The molar mass of M_2CO_3 is _____ g/mol (Nearest integer).

88. 0.400 g of an organic compound (X) gave 0.376 g of AgBr in Carius method for estimation of bromine. % of bromine in the compound (X) is:

89. The orbital angular momentum of an electron in a 3s orbital is $\frac{xh}{2\pi}$. The value of x is ___ (nearest integer).

90. See the following chemical reaction:



The sum of X , Y and Z is ___ .
