

**JEE Main April 2024**  
**Question Paper With Text Solution**  
**04 April | Shift-1**

**CHEMISTRY**



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

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61. Given below are two statements :

**Statements I :** Acidity of  $\alpha$ -hydrogens of aldehydes and ketones is responsible of Aldol reaction.

**Statements II :** Reaction between benzaldehyde and ethanal will NOT give Cross - Aldol product.

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

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

Question ID: 87827055505

Ans. Official Answer by NTA (1)

Sol.

62. Which of the following nitrogen containing compound does not give Lassaigne's test ?

- (1) Urea
- (2) Phenyl hydrazine
- (3) Glycine
- (4) Hydrazine

Question ID: 87827055500

Ans. Official Answer by NTA (4)

Sol.

63. Number of molecules / ions from the following in which the central atom is involved in  $sp^3$  hybridization is .....

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

Question ID: 87827055495

Ans. Official Answer by NTA (1)

Sol.

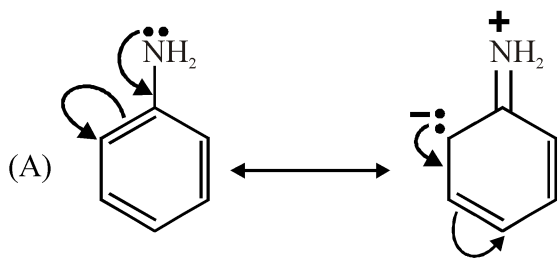
64. Match List I with List II :

**List - I**

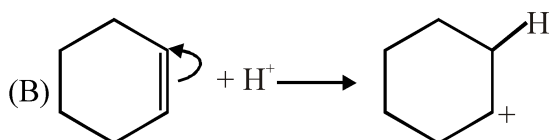
**Mechanism steps**

**List - II**

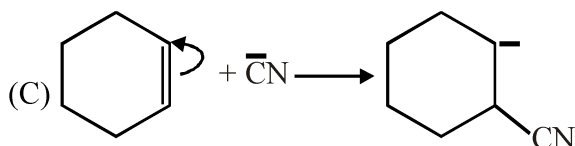
**Effect**



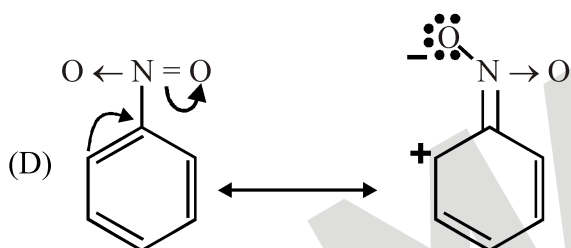
(I) – E effect



(II) – R effect



(III) + E effect



(IV) + R effect

Choose the correct answer from the options given below :

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

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

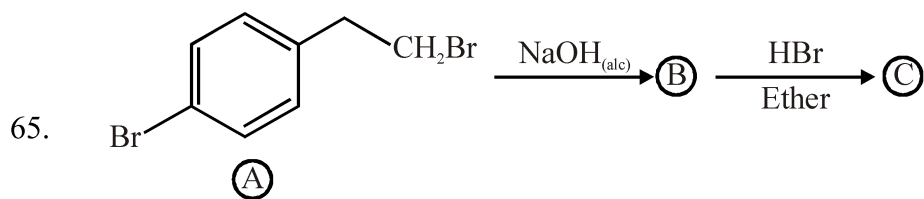
(3) A-IV, B-III, C-I, D-II

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

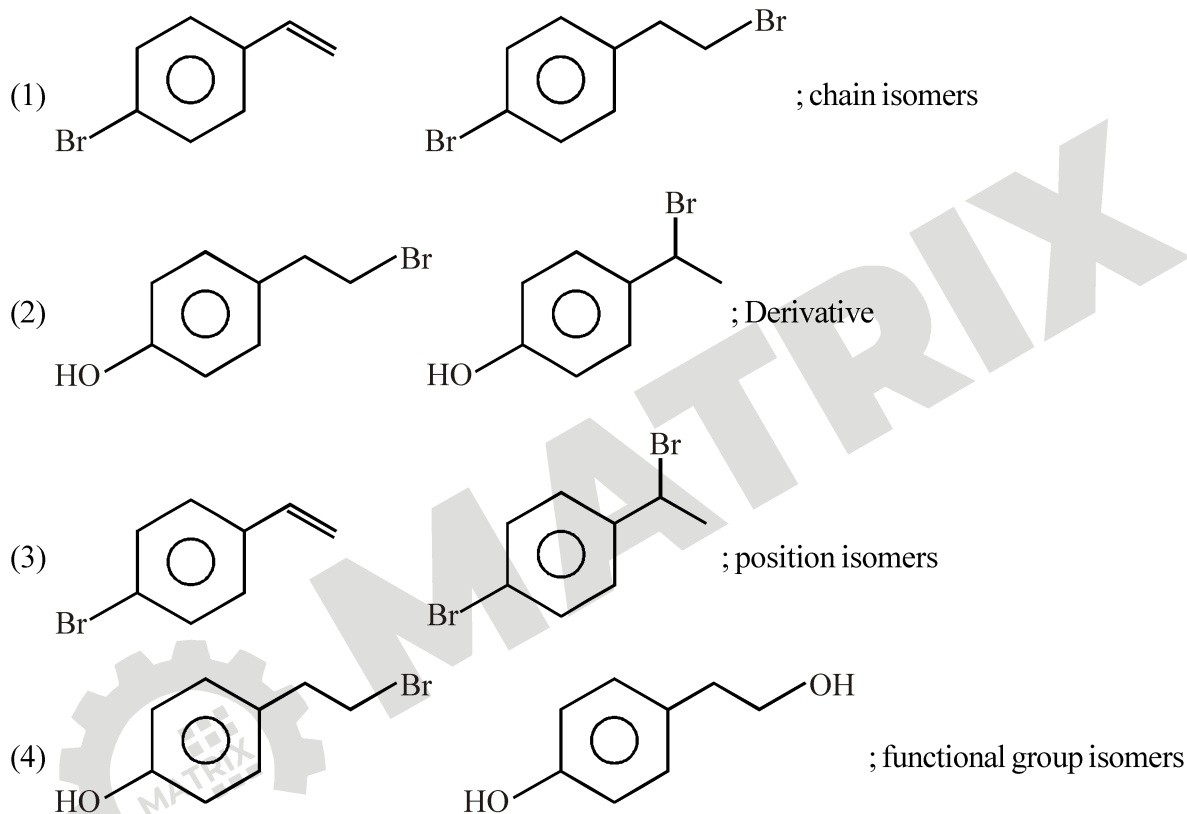
Question ID: 87827055501

Ans. Official Answer by NTA(3)

Sol.



Identify B and C and how are A and C related ?



Question ID: 87827055503

Ans. Official Answer by NTA(3)

Sol.

66. Which one of the following molecules has maximum dipole moment ?

- (1)  $\text{NF}_3$                       (2)  $\text{NH}_3$                       (3)  $\text{PF}_5$                       (4)  $\text{CH}_4$

Question ID: 87827055489

Ans. Official Answer by NTA(2)

Sol.

67. The correct order of first ionization enthalpy values of the following elements is :

- (A) O

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- (B) N  
 (C) Be  
 (D) F  
 (E) B

Choose the correct answer from the options given below :

- (1)  $B < D < C < E < A$  (2)  $E < C < A < B < D$  (3)  $C < E < A < B < D$  (4)  $A < B < D < C < E$

Question ID: 87827055493

Ans. Official Answer by NTA (2)

Sol.

68. The Molarity (M) of an aqueous solution containing 5.85 g of NaCl in 500 mL water is :

(Given : Molar Mass Na : 23 and Cl : 35.5  $\text{gmol}^{-1}$ )

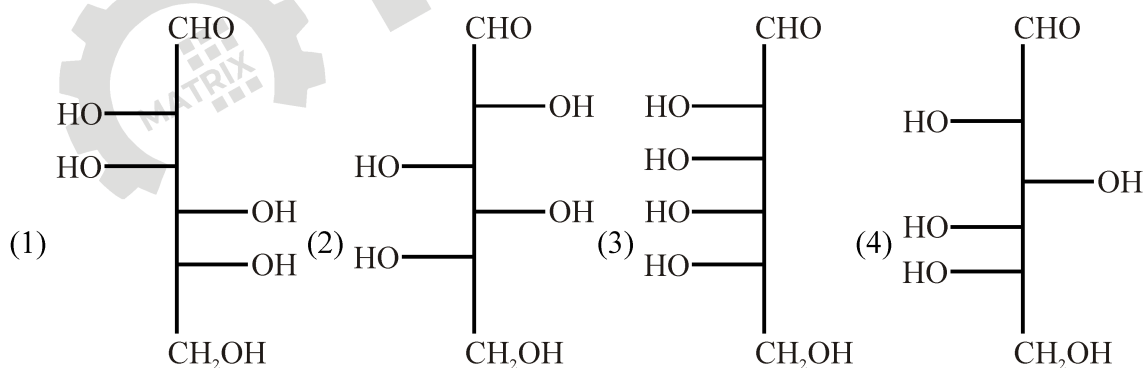
- (1) 4 (2) 20 (3) 2 (4) 0.2

Question ID: 87827055488

Ans. Official Answer by NTA (4)

Sol.

69. Which of the following is the correct structure of L-Glucose ?



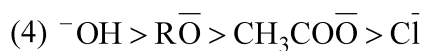
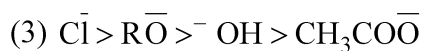
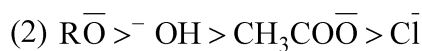
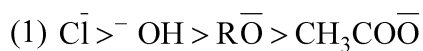
Question ID: 87827055507



Ans. Official Answer by NTA (4)

Sol.

70. What will be the decreasing order of basic strength of the following conjugate bases ?



Question ID: 87827055490

Ans. Official Answer by NTA (2)

Sol.

71. Number of elements from the following that CANNOT form compounds with valencies which match with their respective group valencies is \_\_\_\_\_.

B, C, N, S, O, F, P, Al, Si

(1) 5

(2) 6

(3) 7

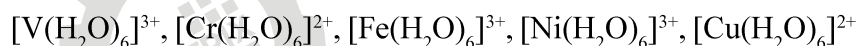
(4) 3

Question ID: 87827055494

Ans. Official Answer by NTA (4)

Sol.

72. Number of complexes from the following with even number of unpaired "d" electrons is \_\_\_\_\_.



[Given atomic number : V = 23, Cr = 24, Fe = 26, Ni = 28, Cu = 29]

(1) 2

(2) 4

(3) 1

(4) 5

Question ID: 87827055498

Ans. Official Answer by NTA (1)

Sol.

73. Which among the following is incorrect statement ?

(1) Electromeric effect dominates over inductive effect

(2) The electromeric effect is, temporary effect

(3) Hydrogen ion ( $\text{H}^+$ ) shows negative electromeric effect

(4) The organic compound shows electromeric effect in the presence of the reagent only.

Question ID: 87827055502



Ans. Official Answer by NTA(3)

Sol.

74. One of the commonly used electrode is calomel electrode. Under which of the following categories, calomel electrode comes ?

- (1) Metal ion - Metal electrodes                      (2) Metal - Insoluble Salt - Anion electrodes  
(3) Gas - Ion electrodes                                  (4) Oxidation - Reduction electrodes

Question ID: 87827055491

Ans. Official Answer by NTA(2)

Sol.

75. What pressure (bar) of  $H_2$  would be required to make emf of hydrogen electrode zero in pure water at  $25^\circ C$ ?

- (1)  $10^{-7}$                       (2) 1                      (3) 0.5                      (4)  $10^{-14}$

Question ID: 87827055492

Ans. Official Answer by NTA(2)

Answer by Matrix is (4)

Sol.

76. In the precipitation of the iron group (III) in qualitative analysis, ammonium chloride is added before adding ammonium hydroxide to :

- (1) increase concentration of  $Cl^-$  ions                      (2) decrease concentration of  $OH^-$  ions  
(3) prevent interference by phosphate ions                      (4) increase concentration of  $NH_4^+$  ions

Question ID: 87827055499

Ans. Official Answer by NTA(2)

Sol.

77. The element which shows only one oxidation state other than its elemental form is :

- (1) Titanium                      (2) Scandium                      (3) Cobalt                      (4) Nickel

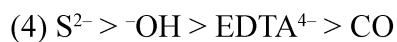
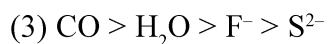
Question ID: 87827055496

Ans. Official Answer by NTA(2)

Sol.

78. The correct sequence of ligands in the order of decreasing field strength is :

- (1)  $NCS^- > EDTA^{4-} > CN^- > CO$                       (2)  $OH^- > F^- > NH_3 > CN^-$

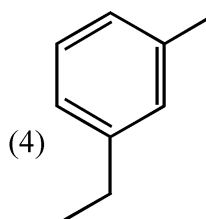
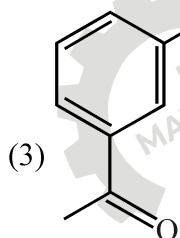
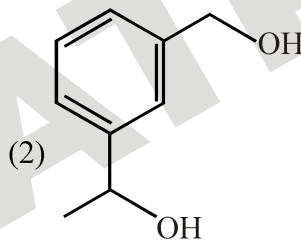
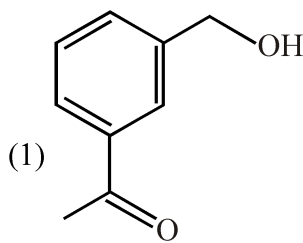
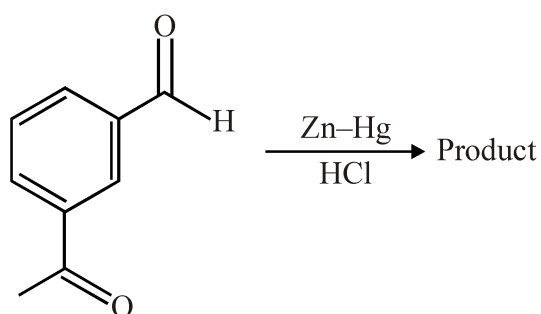


Question ID: 87827055497

Ans. Official Answer by NTA(3)

Sol.

79. Identify the product in the following reaction :



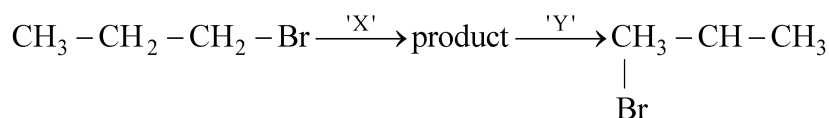
Question ID: 87827055506

Ans. Official Answer by NTA(4)

Sol.

80. Identify the correct set of reagents or reaction conditions 'X' and 'Y' in the following set of transformation.





- (1) X = conc. alc. NaOH, 80°C, Y = HBr / acetic acid  
 (2) X = dil. aq. NaOH, 20°C, Y = Br<sub>2</sub> / CHCl<sub>3</sub>  
 (3) X = conc. alc. NaOH, 80°C, Y = Br<sub>2</sub> / CHCl<sub>3</sub>  
 (4) X = dil. aq. NaOH, 20°C, Y = HBr / acetic acid

Question ID: 87827055504

Ans. Official Answer by NTA (1)

Sol.

81. X g of ethylamine is subjected to reaction with NaNO<sub>2</sub>/HCl followed by water; evolved dinitrogen gas which occupied 2.24 L volume at STP. X is \_\_\_\_\_ × 10<sup>-1</sup> g.

Question ID: 87827055517

Ans. Official Answer by NTA (45)

Sol.

82. The enthalpy of formation of ethane (C<sub>2</sub>H<sub>6</sub>) from ethylene by addition of hydrogen where the bond-energies of C-H, C-C, C=C, H-H are 414 kJ, 347 kJ, 615 kJ and 435 kJ respectively is - \_\_\_\_\_ kJ

Question ID: 87827055510

Ans. Official Answer by NTA (125)

Sol.

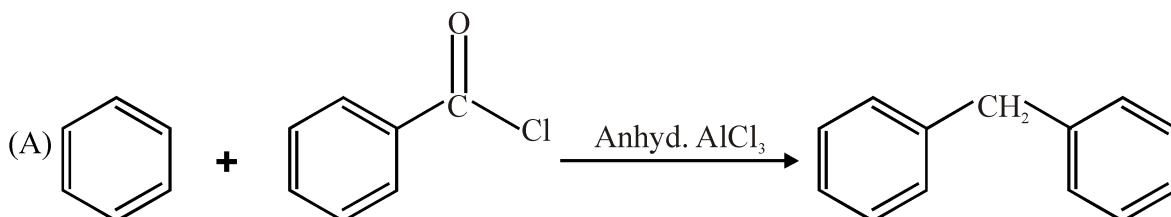
83. The de-Broglie's wavelength of an electron in the 4<sup>th</sup> orbit is \_\_\_\_\_ πa<sub>0</sub>. (a<sub>0</sub> = Bohr's radius)

Question ID: 0

Ans. Official Answer by NTA (8)

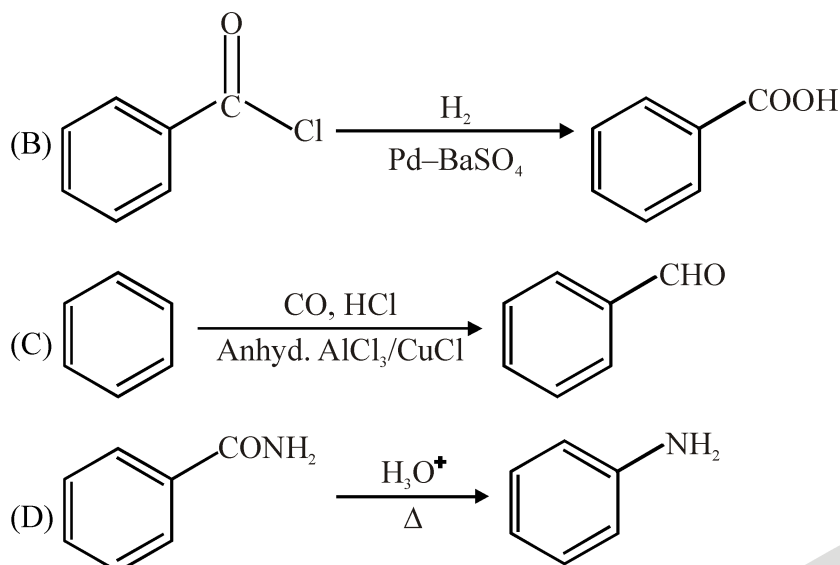
Sol.

84. The number of the correct reaction(s) among the following is \_\_\_\_\_.


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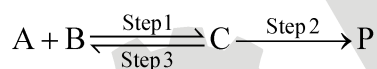


Question ID: 8782705516

Ans. Official Answer by NTA(1)

Sol.

85. Consider the following transformation involving first order elementary reaction in each step at constant temperature as shown below.



Some details of the above reactions are listed below.

Step	Rate constant (sec <sup>-1</sup> )	Activation energy (kJ mol <sup>-1</sup> )
1	$k_1$	300
2	$k_2$	200
3	$k_3$	$E_{a_3}$

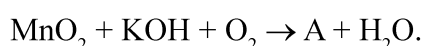
If the overall rate constant of the above transformation ( $k$ ) is given as  $k = \frac{k_1 k_2}{k_3}$  and the overall activation energy ( $E_a$ ) is 400 kJ mol<sup>-1</sup>, then the value of  $E_{a_3}$  is \_\_\_\_\_ kJ mol<sup>-1</sup> (nearest integer)

Question ID: 8782705512

Ans. Official Answer by NTA(100)

Sol.

86. Consider the following reaction



Product 'A' in neutral or acidic medium disproportionate to give products 'B' and 'C' along with water. The

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sum of spin-only magnetic moment values of B and C is \_\_\_\_\_ BM. (nearest integer) (Given atomic number of Mn is 25)

Question ID: 8782705513

Ans. Official Answer by NTA (4)

Sol.

87. 2.5 g of a non-volatile, non-electrolyte is dissolved in 100 g of water at 25°C. The solution showed a boiling point elevation by 2°C. Assuming the solute concentration is negligible with respect to the solvent concentration, the vapor pressure of the resulting aqueous solution is \_\_\_\_\_ mm of Hg (nearest integer)  
(Given : Molal boiling point elevation constant of water ( $K_b$ ) = 0.52 K. kg mol<sup>-1</sup>, 1 atm pressure = 760 mm of Hg, molar of water = 18 g mol<sup>-1</sup>)

Question ID: 8782705511

Ans. Official Answer by NTA (707)

Sol.

88. The number of different chain isomers for C<sub>7</sub>H<sub>16</sub> is \_\_\_\_\_.

Question ID: 8782705515

Ans. Official Answer by NTA (9)

Sol.

89. Number of molecules / species from the following having one unpaired electron is \_\_\_\_\_.  
O<sub>2</sub>, O<sub>2</sub><sup>-1</sup>, NO, CH<sup>-1</sup>, O<sub>2</sub><sup>2-</sup>

Question ID: 8782705509

Ans. Official Answer by NTA (2)

Sol.

90. Only 2 mL of KMnO<sub>4</sub> solution of unknown molarity is required to reach the end point of a titration of 20 mL of oxalic acid (2 M) in acidic medium. The molarity of KMnO<sub>4</sub> solution should be \_\_\_\_\_ M.

Question ID: 8782705514

Ans. Official Answer by NTA (50)

Answer by Matrix is (8)

Sol.