JEE Main April 2025

Question Paper With Text Solution

07 April | Shift-2

CHEMISTRY

MATRIX

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

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JEE MAIN APRIL 2025 | 07TH APRIL SHIFT-2

SECTION – A

51. Choose the incorrect trend in the atomic radii (r) of the elements.

(1) $r_{Mg} < r_{Al}$

(2) $r_{Rb} < r_{Cs}$

(3) $r_{At} < r_{CS}$

(4) $r_{Br} < r_{K}$

6034212267

Ans. Official answer NTA (1)

Sol.

52. Given below are two statements :

Statement (I) : On hydrolysis, oligo peptides give rise to fewer number of α-amino acids while proteins give rise to a large number of β-amino acids.

Statement (II) : Natural proteins are denatured by acids which convert the water soluble form of fibrous proteins to their water insoluble form.

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) Statement I is incorrect but Statement II is correct

(3) Both Statement I and Statement II are correct

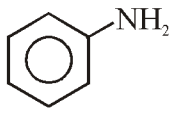
(4) Both Statement I and Statement II are incorrect

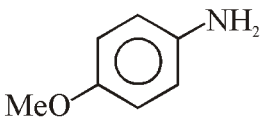
6034212278

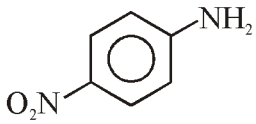
Ans. Official answer NTA (4)

Sol.

53. The descending order of basicity of following amines is :

(A) 

(B) 

(C) 

(D) CH_3NH_2

(E) $(CH_3)_2NH$

Choose the correct answer from the options given below:

(1) E > D > B > A > C (2) E > D > A > B > C (3) E > A > D > C > B (4) B > E > D > A > C

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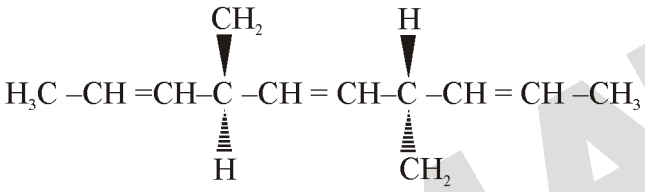
Ans. Official answer NTA (1)

Sol.

54. The number of optically active products obtained from the complete ozonolysis of the given compound is :



(1) 0 (2) 4 (3) 2 (4) 1

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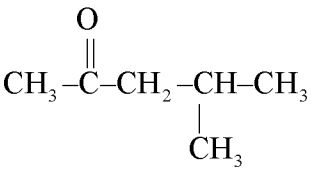
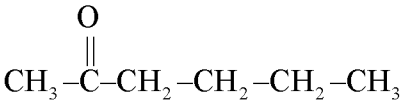
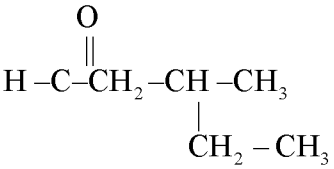
Ans. Official answer NTA (1)

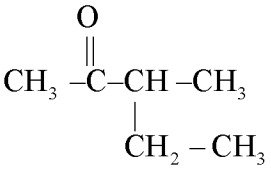
Sol.

55. P " is an optically active compound with molecular formula $C_6H_{12}O$. When ' P ' is treated with 2, 4-dinitrophenylhydrazine, it gives a positive test. However, in presence of Tollens reagent, " P " gives a negative test."Predict the structure of " P ".

(1) 

(2) 

(3) 

(4) 

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Ans. Official answer NTA (4)

Sol.

56. Match List - I with List - II.

List - I	List - II	
Complex	Primary valency and Secondary valency	
(A) $[Co(en)_2Cl_2]Cl$	(I) 3	6
(B) $[Pt(NH_3)_2Cl(NO_2)]$	(II) 3	4
(C) $Hg[Co(SCN)_4]$	(III) 2	6
(D) $[Mg(EDTA)]^{2-}$	(IV) 2	4

Choose the correct answer from the options given below :

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

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

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

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

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Ans. Official answer NTA (1)

Sol.

57. The number of unpaired electrons responsible for the paramagnetic nature of the following complex species are respectively :

$[Fe(CN)_6]^{3-}, [FeF_6]^{3-}, [CoF_6]^{3-}, [Mn(CN)_6]^{3-}$

(1) 1,5,4,2

(2) 1,5,5,2

(3) 1,1,4,2

(4) 1,4,4,2

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Ans. Official answer NTA (1)

Sol.

58. The correct statements from the following are :

(A) Tl^{3+} is a powerful oxidising agent

(B) Al^{3+} does not get reduced easily

(C) Both Al^{3+} and Tl^{3+} are very stable in solution

(D) Tl^{+} is more stable than Tl^{3+}

(E) Al^{3+} and Tl^{+} are highly stable

Choose the correct answer from the options given below :

(1) (B), (D) and (E) only

(2) (A), (B), (C), (D) and (E)

(3) (A), (C) and (D) only

(4) (A), (B), (D) and (E) only

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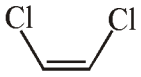
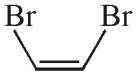
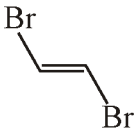
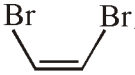
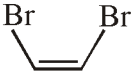
Ans. Official answer NTA (4)

Sol.

59. Given below are two statements :

Statement (I) :  is more polar than 

Statement (II): Boiling point of  is lower than  but it is more polar than  .

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

(1) Statement I is incorrect but Statement II is correct

(2) Statement I is correct but Statement II is incorrect

(3) Both Statement I and Statement II are correct

(4) Both Statement I and Statement II are incorrect

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Ans. Official answer NTA (2)

Sol.

60. The hydration energies of K^+ and Cl^- are $-x$ and $-y$ kJ / mol respectively. If lattice energy of KCl is $-z$ kJ / mol, then the heat of solution of KCl is :

(1) x+y+z

(2) -z-(x+y)

(3) z-(x+y)

(4) +x-y-z

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Ans. Official answer NTA (3)

61. Mixture of 1 g each of chlorobenzene, aniline and benzoic acid is dissolved in 50 mL ethyl acetate and placed in a separating funnel. 5MNaOH(30 mL) was added in the same funnel. The funnel was shaken vigorously and then kept aside. The ethyl acetate layer in the funnel contains :

(1) benzoic acid and aniline

(2) benzoic acid and chlorobenzene

(3) benzoic acid

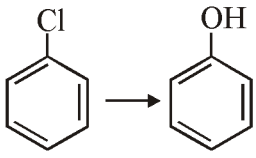
(4) chlorobenzene and aniline

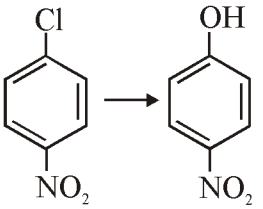
6034212272

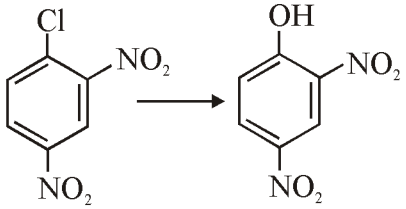
Ans. Official answer NTA (4)

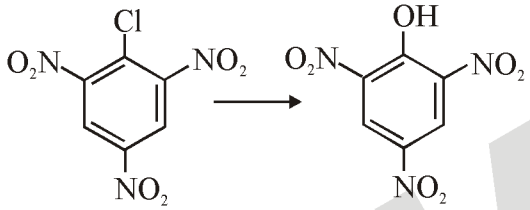
Sol.

62. Match List - I with List - II.

List - I Conversion	List-II Reagents, Conditions used
(A) 	(I) Warm, H_2O

(B)  (II) (a) NaOH, 368K; (b)H_3O^+

(C)  (III) (a) NaOH, 443K; (b)H_3O^+

(D)  (IV) (a) NaOH, 623K, 300 atm; (b) H_3O^+

Choose the correct answer from the options given below :

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

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

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

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

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Ans. Official answer NTA (4)

Sol.

63. 'X' is the number of acidic oxides among $VO_2, V_2O_3, CrO_3, V_2O_5$ and Mn_2O_7. The primary valency of cobalt in $\left[Co\left(H_2NCH_2CH_2NH_2\right)_3\right]_2\left(SO_4\right)_3$ is Y. The value of $X+Y$ is _____.

(1) 3 (2) 5 (3) 2 (4) 4

6034212269

Ans. Official answer NTA (2)

Sol.

64. The extra stability of half-filled subshell is due to :

(A) Symmetrical distribution of electrons

(B) Smaller coulombic repulsion energy

(C) The presence of electrons with the same spin in non-degenerate orbitals

(D) Larger exchange energy

(E) Relatively smaller shielding of electrons by one another

Indentify the correct statements :

(1) (B), (C) and (D) only

(2) (A), (B) and (D) only

(3) (B), (D) and (E) only

(4) (A), (B), (D) and (E) only

6034212259

Ans. Official answer NTA (4)

Sol.

65. Match List - I with List - II.

List - I	List - II
(A) Solution of chloroform and acetone	(I) Minimum boiling azeotrope
(B) Solution of ethanol and water	(II) Dimerizes
(C) Solution of benzene and toluene	(III) Maximum boiling azeotrope
(D) Solution of acetic acid in benzene	(IV) $\Delta V_{mix} = 0$

Choose the correct answer from the options given below :

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

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

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

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

6034212262

Ans. Official answer NTA (2)

Sol.

66. Liquid A and B form an ideal solution. The vapour pressures of pure liquids A and B are 350 and 750 mmHg

respectively at the same temperature. If x_A and x_B are the mole fraction of A and B in solution while y_A and y_B are the mole fraction of A and B in vapour phase then,

(1) $\frac{x_A}{x_B}=\frac{y_A}{y_B}$

(2) $\frac{x_A}{x_B}<\frac{y_A}{y_B}$

(3) $\frac{x_A}{x_B}>\frac{y_A}{y_B}$

(4) $(x_A-y_A)<(x_B-y_B)$

6034212263

Ans. Official answer NTA (3)

Sol.

67. Given below are two statements :

1 M aqueous solutions of each of $Cu(NO_3)_2$, $AgNO_3$, $Hg_2(NO_3)_2$; $Mg(NO_3)_2$ are electrolysed using inert electrodes. Given : $E^{\theta}_{Ag^+/Ag}=0.80\,V, E^{\theta}_{Hg_2^{2+}/Hg}=0.79\,V, E^{\theta}_{Cu^{2+}/Cu}=0.24\,V$ and $E^{\theta}_{Mg^{2+}/Mg}=-2.37\,V$.

Statement (I): With increasing voltage, the sequence of deposition of metals on the cathode will be Ag, Hg and Cu.

Statement (II) : Magnesium will not be deposited at cathode instead oxygen gas will be evolved at the cathode.

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

(1) Both Statement I and Statement II are incorrect

(2) Statement I is correct but Statement II is incorrect

(3) Statement I is incorrect but Statement II is correct

(4) Both Statement I and Statement II are correct

6034212264

Ans. Official answer NTA (2)

Sol.

68. The correct statement amongst the following is :

(1) The term 'standard state' implies that the temperature is $0^{\circ}C$.

(2) The standard state of a pure gas is the pure gas at a pressure of 1 bar and temperature 273 K.

(3) $\Delta_f H^{\theta}_{298}$ is zero for $O(g)$

(4) $\Delta_f H^{\theta}_{500}$ is zero for $O_2(g)$

6034212260

Ans. Official answer NTA (4)

Sol.

69. In SO_2, NO_2^- and N_3^- the hybridizations at the central atom are respectively :

(1) sp^2, sp^2 and sp^2

(2) sp, sp^2 and sp

(3) sp^2, sp and sp

(4) sp^2, sp^2 and sp

6034212266

Ans. Official answer NTA (4)

Sol.

70. $A(g) \rightarrow B(g) + C(g)$ is a first order reaction.

Time	t	∞
p_{system}	p_t	p_∞

The reaction was started with reactant A only. Which of the following expression is correct for rate constant k ?

(1) $k = \frac{1}{t} \ln \frac{p_\infty}{p_t}$

(2) $k = \frac{1}{t} \ln \frac{2(p_\infty - p_t)}{p_t}$

(3) $k = \frac{1}{t}\ln\frac{p_\infty}{2(p_\infty - p_t)}$

(4) $k = \frac{1}{t}\ln\frac{p_\infty}{(p_\infty - p_t)}$

6034212265

Ans. Official answer NTA (3)

Sol.

SECTION – B

71. One litre buffer solution was prepared by adding 0.10 mol each of NH_3 and NH_4Cl in deionised water. The change in pH on addition of 0.05 mol of HCl to the above solution is $\times 10^{-2}$. (Nearest integer)

Given : pK_b of $NH_3 = 4.745$ and $\log_{10} 3 = 0.477$ _____.

6034212280

Ans. Official answer NTA (48)

Sol.

72. In Dumas' method 292 mg of an organic compound released 50 mL of nitrogen gas (N_2) at 300 K temperature and 715 mm Hg pressure. The percentage composition of 'N' in the organic compound is _____% (Nearest integer)

(Aqueous tension at 300 K = 15 mmHg)

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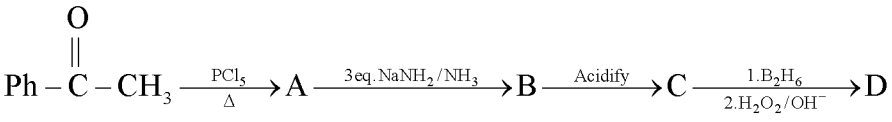
Ans. Official answer NTA (18)

Sol.

73. Identify the structure of the final product (D) in the following sequence of the reactions :



Total number of sp^2 hybridised carbon atoms in product D is _____.

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Ans. Official answer NTA (7)

Sol.

74. Butane reacts with oxygen to produce carbon dioxide and water following the equation given below.

$$C_4H_{10}(g)+\frac{13}{2}O_2(g)\rightarrow 4CO_2(g)+5H_2O(l)$$

If 174.0 kg of butane is mixed with 320.0 kg of O_2, the volume of water formed in liters is - (Nearest integer) _____.

[Given : (a) Molar mass of C, H, O are $12,1,16\,g\,mol^{-1}$ respectively, (b) Density of water $=1\,g\,mL^{-1}$]

6034212279

Ans. Official answer NTA (138)

Sol.

75. The number of paramagnetic metal complex species among $\left[Co(NH_3)_6\right]^{3+}$, $\left[Co(C_2O_4)_3\right]^{3-}$, $[MnCl_6]^{3-}$, $[Mn(CN)_6]^{3-}$, $[CoF_6]^{3-}$, $[Fe(CN)_6]^{3-}$ and $[FeF_6]^{3-}$ with same number of unpaired electrons is _____.

6034212281

Ans. Official answer NTA (2)

Sol.