JEE Main April 2025

Question Paper With Text Solution

02 April | Shift-2

CHEMISTRY

MATRIX

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

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JEE MAIN APRIL 2025 | 02ND APRIL SHIFT-2

SECTION – A

Question ID : 603421290

1. In 3,3-dimethylhex-1-en-4-yne, there are sp^3, sp^2 and sp hybridised carbon atoms respectively.

(1) 1. 2, 2, 4 (2) 2. 3,3,2 (3) 3. 2,4,2 (4) 4. 4,2,2

Ans. Official answer NTA (4)

Sol.

Question ID : 603421284

2. The nature of oxide (TeO_2) and hydride (TeH_2) formed by Te , respectively are :

(1) Reducing and acidic (2) Oxidising and basic

(3) Oxidising and acidic (4) Reducing and basic

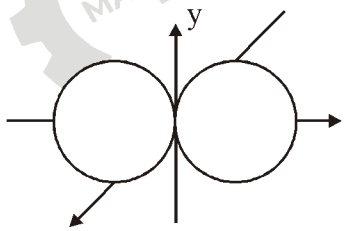
Ans. Official answer NTA (3)

Sol.

Question ID : 603421277

3. Which of the following statements are true ?

(A) The subsidiary quantum number /describes the shape of the orbital occupied by the electron.

(B) 

is the boundary surface diagram of the $2p_x$ orbital.

(C) The + and - signs in the wave function of the $2p_x$ orbital refer to charge.

(D) The wave function of $2p_x$ orbital is zero everywhere in the x y plane.

Choose the correct answer from the options given below :

(1) (C) and (D) only

(2) (B) and (D) only

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

(4) (A) and (B) only

Ans. Official answer NTA (4)

Sol.

Question ID : 603421289

4. In Dumas' method for estimation of nitrogen, 0.5 gram of an organic compound gave 60 mL of nitrogen collected at 300 K temperature and 715 mm Hg pressure. The percentage composition of nitrogen in the compound (Aqueous tension at $300\,K = 15\,mmHg$) is _____\%.

(1) 20.87

(2) 18.67

(3) 12.57

(4) 1.257

Ans. Official answer NTA (3)

Sol.

Question ID : 603421294

5. When a concentrated solution of sulphanilic acid and 1-naphthylamine is treated with nitrous acid (273 K) and acidified with acetic acid, the mass (g) of 0.1 mole of product formed is :

(Given molar mass in $gmol^{-1}$ $H:1, C:12, N:14, O:16, S:32$)

(1) 343 (2) 66 (3) 33 (4) 330

Ans. Official answer NTA (3)

Sol.

Question ID : 603421281

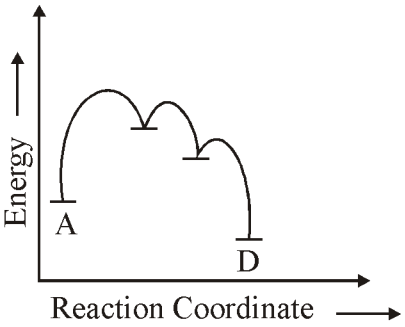
6. Reactant A converts to product D through the given mechanism (with the net evolution of heat) :

$A \rightarrow B$ & slow; & $\Delta H = +ve$

$B \rightarrow C$ & fast; & $\Delta H = -ve$

$C \rightarrow D$ & fast; & $\Delta H = -ve$

Which of the following represents the above reaction mechanism?

(1)


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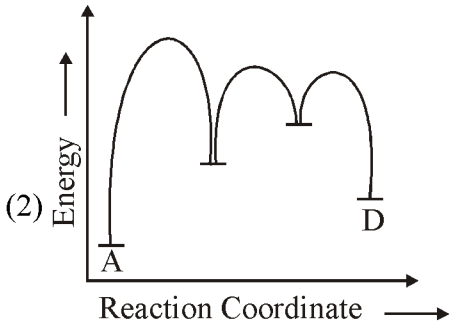

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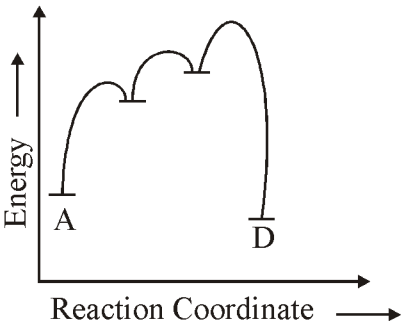

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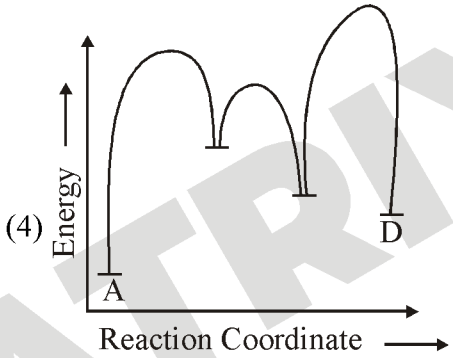
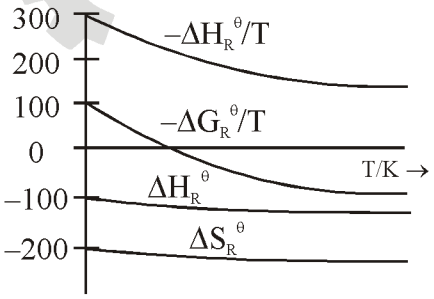


Ans. Official answer NTA (1)

Sol.

Question ID : 603421279

7. Which of the following graphs correctly represents the variation of thermodynamic properties of Haber's process ?

(1)


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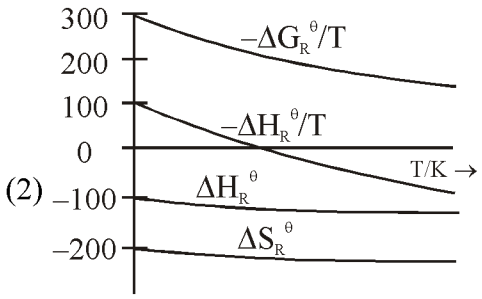
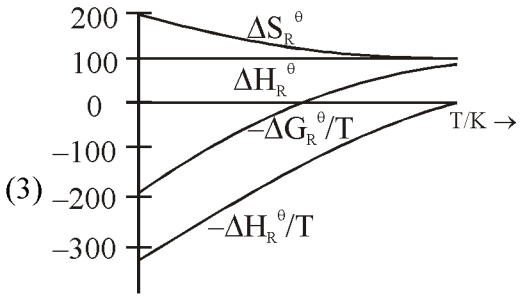
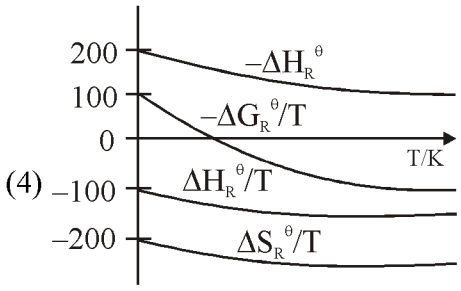


(3) 

(4) 

Ans. Official answer NTA (1)

Sol.

Question ID : 603421293

8. Consider the following reactions. From these reactions which reaction will give carboxylic acid as a major product ?

(A) $R-C\equiv N \xrightarrow[\text{mild condition}]{(i)H^+/H_2O}$

(B) $R-MgX \xrightarrow[(ii)H_3O^+]{(i)CO_2}$

(C) $R-C\equiv N \xrightarrow[(ii)H_3O^+]{(i)SnCl_2/HCl}$

(D) $R\cdot CH_2\cdot OH \xrightarrow{PCC}$

(E)  $\xrightarrow[(ii)Br_2\text{water}]{(i)H_2|Pd-BaSO_4}$

Choose the correct answer from the options given below :

(1) A and D only

(2) B and E only

(3) B, C and E only

(4) A, B and E only

Ans. Official answer NTA (2)

Sol.

Question ID : 603421283

9. Electronic configuration of four elements A, B, C and D are given below :

(A) $1s^2 2s^2 2p^3$

(B) $1s^2 2s^2 2p^4$

(C) $1s^2 2s^2 2p^5$

(D) $1s^2 2s^2 2p^2$

Which of the following is the correct order of increasing electronegativity (Pauling's scale) ?

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

Ans. Official answer NTA (1)

Sol.

Question ID : 603421285

10. The d-orbital electronic configuration of the complex among $\left[Co(en)_3\right]^{3+}$, $\left[CoF_6\right]^{3-}$, $\left[Mn\left(H_2O\right)_6\right]^{2+}$ and $\left[Zn\left(H_2O\right)_6\right]^{2+}$ that has the highest CFSE is :

(1) $t_{2g}^{6} e_g^{4}$

(2) $t_{2g}^{3} e_g^{2}$

(3) $t_{2g}^{6} e_g^{0}$

(4) $t_{2g}^{4} e_g^{2}$

Ans.

Ans. Official answer NTA (3)

Question ID : 603421295

11. A tetrapeptide, "x" on complete hydrolysis produced glycine (Gly), alanine (Ala), valine (Val), leucine (Leu) in equimolar proportion each. The number of tetrapeptides (sequences) possible involving each of these amino acids is :

(1) 24 (2) 8 (3) 16 (4) 32

Ans. Official answer NTA (1)

Sol.

Question ID : 603421280

12. Consider the following chemical equilibrium of the gas phase reaction at a constant temperature :

$A(g) \rightleftharpoons B(g) + C(g)$

If p being the total pressure, K_p is the pressure equilibrium constant and α is the degree of dissociation, then which of the following is true at equilibrium ?

(1) When p increases α increases

(2) If K_p value is extremely high compared to p, α becomes much less than unity

(3) When p increases α decreases

(4) If p value is extremely high compared to $\alpha K_p, \alpha \approx 1$

Ans. Official answer NTA (3)

Sol.

Question ID : 603421288

13. Match List - I with List - II.

List - I (Purification technique)	List - II (Mixture of organic compounds)
(A) Distillation (simple)	(I) Diesel + Petrol
(B) Fractional distillation	(II) Aniline + Water
(C) Distillation under reduced pressure	(III) Chloroform + Aniline
(D) Steam distillation	(IV) Glycerol + Spent-lye

Choose the correct answer from the options given below :

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

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

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

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

Ans. Official answer NTA (1)

Sol.

Question ID : 603421278

14. Arrange the following in order of magnitude of work done by the system/on the system at constant temperature.

(a) $|w_{reversible}|$ for expansion in infinite stages.

(b) $|w_{irreversible}|$ for expansion in single stage.

(c) $|w_{reversible}|$ for compression in infinite stages.

(d) $|w_{irreversible}|$ for compression in single stage.

Choose the correct answer from the options given below :

(1) $d > c = a > b$

(2) $a > b > c > d$

(3) $c = a > d > b$

(4) $a > c > b > d$

Ans. Official answer NTA (1)

Sol.

Question ID : 603421286

15. The type of hybridization and the magnetic property of $[MnCl_6]^{3-}$ are,

(1) sp^3d^2, paramagnetic with two unpaired electrons.

(2) d^2sp^3, paramagnetic with four unpaired electrons.

(3) d^2sp^3, paramagnetic with two unpaired electrons.

(4) sp^3d^2, paramagnetic with four unpaired electrons.

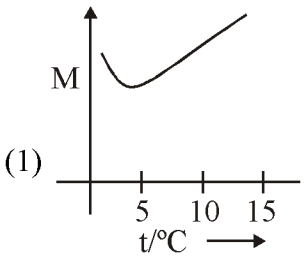
Ans. Official answer NTA (4)

Sol.

Question ID : 603421276

16. 'x' g of NaCl is added to water in a beaker with a lid. The temperature of the system is raised from $1^\circ C$ to $25^\circ C$. Which out of the following plots, is best suited for the change in the molarity (M) of the solution with respect to temperature ?

[Consider the solubility of NaCl remains unchanged over the temperature range]

(1)


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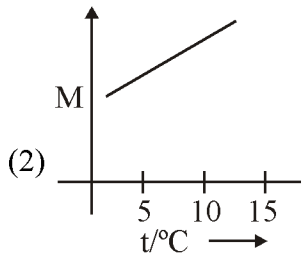

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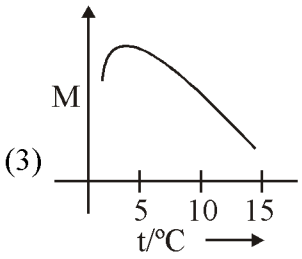

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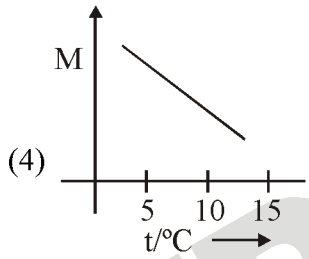


Ans. Official answer NTA (3)

Sol.

Question ID : 603421291

17. Given below are two statements :

Statement (I) : Neopentane forms only one monosubstituted derivative.

Statement (II) : Melting point of neopentane is higher than n-pentane.

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 incorrect

(4) Both Statement I and Statement II are correct

Ans. Official answer NTA (4)

Sol.

Question ID : 603421287

18. Formation of $Na_4[Fe(CN)_5NOS]$, a purple coloured complex formed by addition of sodium nitroprusside in sodium carbonate extract of salt indicates the presence of :

(1) Sulphide ion

(2) Sulphate ion

(3) Sulphite ion

(4) Sodium ion

Ans. Official answer NTA (1)

Sol.

Question ID : 603421282

19. Which among the following molecules is (a) involved in sp^3d hybridization, (b) has different bond lengths and (c) has lone pair of electrons on the central atom?

(1) XeF_2

(2) SF_4

(3) XeF_4

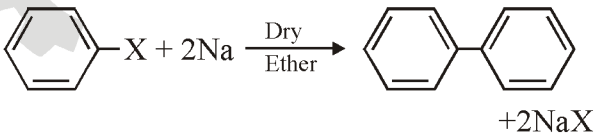
(4) PF_5

Ans. Official answer NTA (2)

Sol.

Question ID : 603421292

20. Match List - I with List - II.

List - I (Reaction)	List-II (Name of reaction)
(A)  +2NaX	(I) Lucas reaction
(B) $ArN_2^+X^- \xrightarrow[HCl]{Cu} ArCl + N_2\uparrow + CuX$	(II) Finkelstein reaction
(C) $C_2H_5Br + NaI \xrightarrow[Acetone]{Dry} C_2H_5I + NaBr$	(III) Fittig reaction
(D) $CH_3C(OH)(CH_3)CH_3 \xrightarrow[ZnCl_2]{HCl} CH_3C(Cl)(CH_3)CH_3$	(IV) Gatterman reaction

Choose the correct answer from the options given below :

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

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

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

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

Ans. Official answer NTA (3)

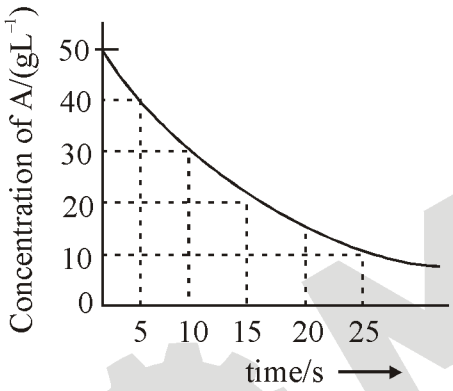
Sol.

SECTION – B

Question ID : 603421296

21. For the reaction $A \rightarrow B$ the following graph was obtained. The time required (in seconds) for the concentration of A to reduce to $2.5\,g\,L^{-1}$ (if the initial concentration of A was $50\,g\,L^{-1}$) is _____ (Nearest integer)

Given : log 2=0.3010 _____.



Ans. Official answer NTA (43)

Answer by Matrix is (Bonus)

Sol.

Question ID : 603421299

22. The spin-only magnetic moment value of M^{n+} ion formed among Ni, Zn, Mn and Cu that has the least enthalpy of atomisation is _____ . (in nearest integer)

Here n is equal to the number of diamagnetic complexes among $K_2[NiCl_4]$, $[Zn(H_2O)_6]Cl_2$, $K_3[Mn(CN)_6]$ and $[Cu(PPh_3)_3I]$

Ans. Official answer NTA (0)

Sol.

Question ID : 603421297

23. 730.2%(w / v) solution of NaOH is measured to have resistivity $870.0\,m\Omega m$. The molar conductivity of the solution will be _____ $\times 10^2\,mSdm^2\,mol^{-1}$. (Nearest integer) _____.

Ans. Official answer NTA (23)

Sol.

Question ID : 603421298

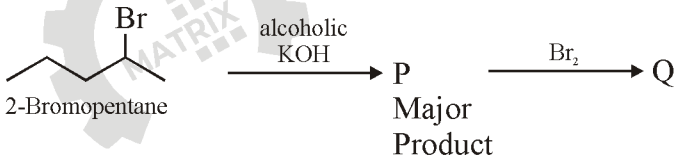
24. When 1 g each of compounds AB and AB_2 are dissolved in 15 g of water separately, they increased the boiling point of water by 2.7 K and 1.5 K respectively. The atomic mass of A (in amu) is _____ $\times 10^{-1}$ (Nearest integer)

(Given : Molal boiling point elevation constant is $0.5\,K\,kg\,mol^{-1}$) _____.

Ans. Official answer NTA (25)

Sol.

Question ID : 603421300

25. 

2-Bromopentane

Consider the above sequence of reactions. 151 g of 2-bromopentane is made to react.

Yield of major product P is 80% whereas Q is 100 %.

Mass of product Q obtained is _____ g.

(Given molar mass in $gmol^{-1}$ H : 1, C : 12, O : 16, Br : 80)

Ans. Official answer NTA (184)

Sol.