JEE Main April 2025

Question Paper With Text Solution

02 April | Shift-1

CHEMISTRY

MATRIX

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

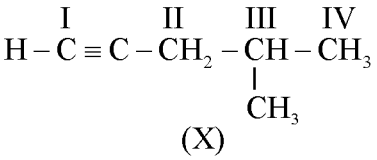
Office : Piprali Road, Sikar (Raj.) | Ph. 01572-241911
Website : www.matrixedu.in ; Email : smd@matrixacademy.co.in

JEE MAIN APRIL 2025 | 02ND APRIL SHIFT-1

SECTION – A

Question ID : 603421964

1. Consider the following compound (X)



(X)

The most stable and least stable carbon radicals, respectively, produced by homolytic cleavage of corresponding C – H bond are :

(1) II, IV (2) II, I (3) III, II (4) I, IV

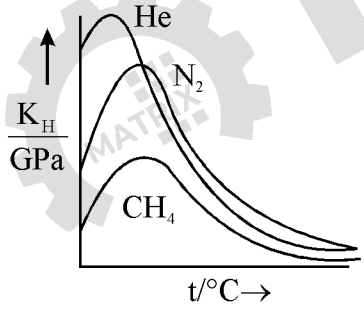
Ans. Official answer NTA (2)

Sol.

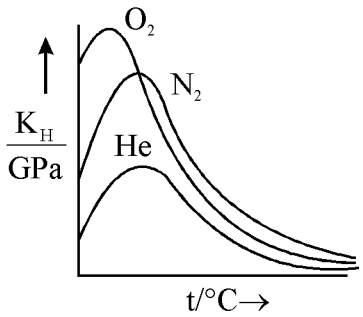
Question ID : 603421954

2. Which of the following graph correctly represents the plots of K_H at 1 bar for gases in water versus temperature ?

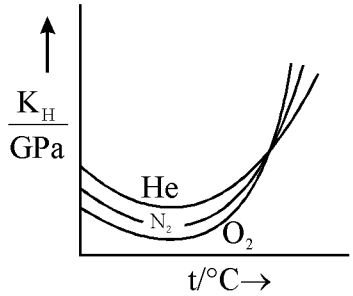
(1)



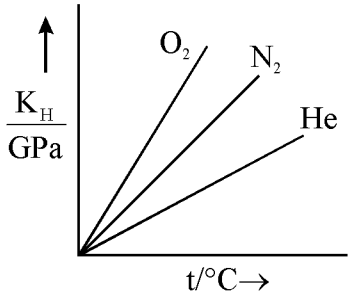
(2)



(3)



(4)



Ans. Official answer NTA (1)

Sol.

Question ID : 603421955

3. A solution is made by mixing one mole of volatile liquid A with 3 moles of volatile liquid B. The vapour pressure of pure A is 200 mm Hg and that of the solution is 500 mm Hg . The vapour pressure of pure B and the least volatile component of the solution, respectively, are :

(1) 1400 mm Hg , A (2) 600 mm Hg , A (3) 1400 mm Hg , B (4) 600 mm Hg, B

Ans. Official answer NTA (2)

Sol.

Question ID : 603421956

4. If equal volumes of AB_2 and XY (both are salts) aqueous solutions are mixed, which of the following combination will give a precipitate of AY_2 at 300 K?

(Given K_{sp} (at 300 K) for $AY_2 = 5.2 \times 10^{-7}$)

(1) $2.0\times10^{-4}\,MAB_2, 0.8\times10^{-3}\,MXY$

(2) $2.0\times10^{-2}\,MAB_2, 2.0\times10^{-2}\,MXY$

(3) $1.5\times10^{-4}\,MAB_2, 1.5\times10^{-3}\,MXY$

(4) $3.6\times10^{-3}\,MAB_2, 5.0\times10^{-4}\,MXY$

Ans. Official answer NTA (2)

Sol.

Question ID : 603421970

5. Identify the correct statement among the following :

(1) Glutamic acid is the only amino acid theat contains a –COOH group at the side chain.

(2) All naturally occurring amino acids except glycine contain one chiral centre.

(3) All naturally occurring amino acids are optically active.

(4) Amino acid, cysteine can easily undergo dimerisation due to the presence of free SH group.

Ans. Official answer NTA (4)

Sol.

Question ID : 603421959

6. Given below are two statements :

Statement (I) : The metallic radius of Al is less than that of Ga .

Statement (II) : The ionic radius of Al^{3+} is less than that of Ga^{3+}.

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 incorrect but Statement II is correct

(3) Both Statement I and Statement II are correct

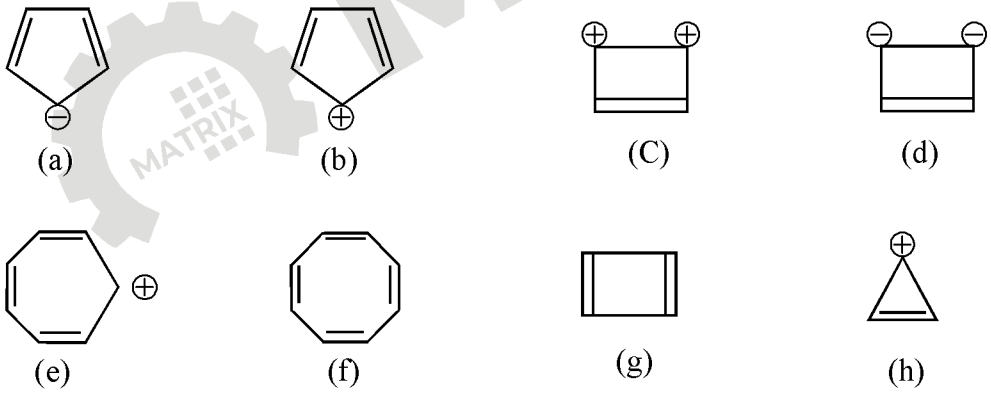
(4) Statement I is correct but Statement II is incorrect

Ans. Official answer NTA (2)

Sol.

Question ID : 603421965

7. Designate whether each of the following compounds is aromatic or not aromatic.



(1) b, e, f, g aromatic and a, c, d, h not aromatic

(2) a, c, d, e, h aromatic and b, f, g not aromatic

(3) ,b,c,d aromatic and e,f,g,h not aromatic

(4) e, g aromatic and a,b,c,d,f,h not aromatic

Ans. Official answer NTA (2)

Sol.

Question ID : 603421957

8. Among SO^2, NF^3, NH^3, XeF^2, ClF^3 and SF^4, the hybridization of the molecule with nonzero dipole moment and highest number of lone-pairs of electrons on the central atom is :

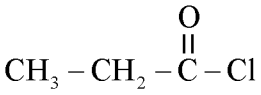
(1) sp^3 (2) dsp^2 (3) sp^3d (4) sp^3d^2

Ans. Official answer NTA (3)

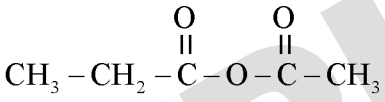
Sol.

Question ID : 603421967

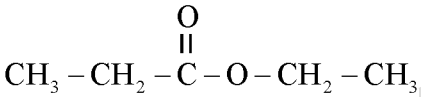
9. Consider the following molecules :



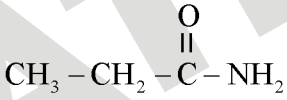
(P)



(q)



(r)



(S)

The correct order of rate of hydrolysis is :

(1) p > r > q > s (2) p > q > r > s (3) r > q > p > s (4) q > p > r > s

Ans. Official answer NTA (2)

Sol.

Question ID : 603421966

10. An optically active alkyl halide C_4H_9Br [A] reacts with hot KOH dissolved in ethanol and forms alkene [B] as major product which reacts with bromine to give dibromide [C]. The compound [C] is converted into a gas [D] upon reacting with alcoholic $NaNH_2$. During hydration 18 gram of water is added to 1 mole of gas [D] on warming with mercuric sulphate and dilute acid at 333 K to form compound [E]. The IUPAC name of compound [E] is :

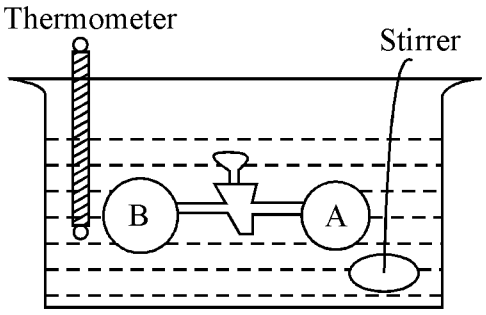
(1) Butan-2-ol (2) Butan-2-one (3) But-2-yne (4) Butan-1-al

Ans.

Ans. Official answer NTA (2)

Question ID : 603421953

11.



Two vessels A and B are connected via stopcock. The vessel A is filled with a gas at a certain pressure. The entire assembly is immersed in water and is allowed to come to thermal equilibrium with water. After opening the stopcock the gas from vessel A expands into vessel B and no change in temperature is observed in the thermometer. Which of the following statement is true ?

(1) The pressure in the vessel B before opening the stopcock is zero

(2) $dq \neq 0$

(3) $dU \neq 0$

(4) $dw \neq 0$

Ans. Official answer NTA (1)

Sol.

Question ID : 603421958

12. The property/properties that show irregularity in first four elements of group-17 is/are :

(A) Covalent radius

(B) Electron affinity

(C) Ionic radius

(D) First ionization energy

Choose the correct answer from the options given below :

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

Ans. Official answer NTA (3)

Sol.

Question ID : 603421960

13. Given below are two statements :

Statement (I) : In octahedral complexes, when $\Delta_o < P$ high spin complexes are formed. When $\Delta_o > P$ low spin complexes are formed.

Statement (II) : In tetrahedral complexes because of $\Delta_t < P$, low spin complexes are rarely formed.

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 correct

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

(4) Both Statement I and Statement II are incorrect

Ans. Official answer NTA (2)

Sol.

Question ID : 603421962

14. Choose the correct tests with respective observations.

(A) $CuSO_4$ (acidified with acetic acid) $+K_4[Fe(CN)_6] \rightarrow$ Chocolate brown precipitate.

(B) $FeCl_3 + K_4[Fe(CN)_6] \rightarrow$ Prussian blue precipitate.

(C) $ZnCl_2 + K_4[Fe(CN)_6]$, neutralised with $NH_4OH \rightarrow$ White or bluish white precipitate.

(D) $MgCl_2 + K_4[Fe(CN)_6] \rightarrow$ Blue precipitate.

(E) $BaCl_2 + K_4[Fe(CN)_6]$, neutralised with $NaOH \rightarrow$ White precipitate.

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

Ans. Official answer NTA (4)

Sol.

Question ID : 603421961

15. A molecule with the formula AX_4Y has all it's elements from p-block. Element A is rarest, monoatomic, non-radioactive from its group and has the lowest ionization enthalpy value among A, X and Y. Elements X and Y have first and second highest electronegativity values respectively among all the known elements. The shape of the molecule is:

(1) Octahedral (2) Pentagonal planar (3) Square pyramidal (4) Trigonal bipyramidal

Ans. Official answer NTA (3)

Sol.

Question ID : 603421951

16. $CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + CO_2(g) + H_2O(l)$

Consider the above reaction, what mass of $CaCl_2$ will be formed if 250 mL of 0.76 M HCl reacts with 1000 g of $CaCO_3$?

(Given : Molar mass of Ca,C,O,H and Cl are 40,12,16,1 and 35.5 g mol^{-1}, respectively)

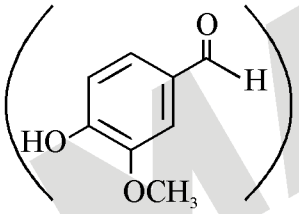
(1) 3.908 g (2) 5.272 g (3) 10.545 g (4) 2.636 g

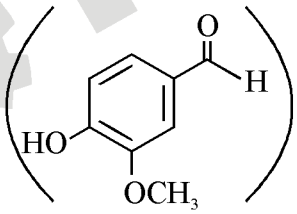
Ans. Official answer NTA (3)

Sol.

Question ID 603421968

17. Given below are two statements :

Statement (I): Vanillin  will react with NaOH and also with Tollen's reagent.

Statement (II) : Vanillin  will undergo self aldol condensation very easily.

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 correct

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

(3) Both Statement I and Statement II are incorrect

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

Ans. Official answer NTA (4)

Sol.

Question ID : 603421952

18. According to Bohr's model of hydrogen atom, which of the following statement is incorrect?

(1) Radius of 6^{th} orbit is three times larger than that of 4^{th} orbit

(2) Radius of 8^{th} orbit is four times larger than that of 4^{th} orbit

(3) Radius of 4^{th} orbit is four times larger than that of 2^{nd} orbit

(4) Radius of 3^{rd} orbit is nine times larger than that of 1^{th} orbit

Ans. Official answer NTA (1)

Sol.

Question ID : 603421963

19. On complete combustion 1.0 g of an organic compound (X) gave 1.46 g of CO_2 and 0.567 g of H_2O. The empirical formula mass of compound (X) is _____ g.

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

(1) 45 (2) 15 (3) 60 (4) 30

Ans. Official answer NTA (4)

Sol.

Question ID : 603421969

20. The correct order of basic nature in aqueous solution for the bases

$NH_3, H_2N-NH_2, CH_3CH_2NH_2, (CH_3CH_2)_2NH$ and $(CH_3CH_2)_3N$ is

(1) $NH_2-NH_2 < NH_3 < CH_3CH_2NH_2 < (CH_3CH_2)_3N < (CH_3CH_2)_2NH$

(2) $H_2N-NH_2 < NH_3 < (CH_3CH_2)_3N < CH_3CH_2NH_2 < (CH_3CH_2)_2NH$

(3) $NH_3 < H_2N-NH_2 < (CH_3CH_2)_3N < CH_3CH_2NH_2 < (CH_3CH_2)_2NH$

(4) $NH_3 < H_2N-NH_2 < CH_3CH_2NH_2 < (CH_3CH_2)_2NH < (CH_3CH_2)_3N$

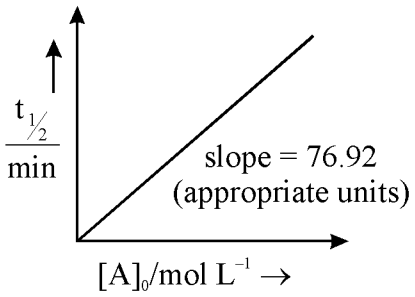
Ans. Official answer NTA (1)

Sol.

SECTION – B

Question ID : 603421972

21. For the reaction A → products.



The concentration of A at 10 minutes is _____ $\times 10^{-3}$ mol L^{-1} (nearest integer). The reaction was started with 2.5 mol L^{-1} of A.

Ans. Official answer NTA (2435)

Sol.

Question ID : 603421973

22. Consider the following equilibrium,

$$CO(g)+2H_2(g) \rightleftharpoons CH_3OH(g)$$

0.1 mol of CO along with a catalyst is present in a 2 dm^3 flask maintained at 500 K. Hydrogen is introduced into the flask until the pressure is 5 bar and 0.04 mol of CH_3OH is formed. The $K_p^\theta \times 10^{-3}$ (nearest integer).

Given : R = 0.08 dm^3 bar K^{-1} mol^{-1}

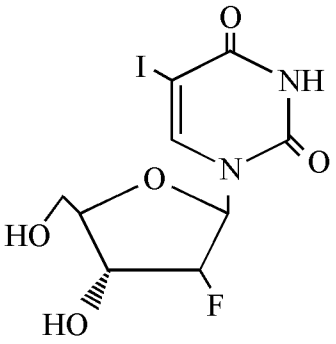
Assume only methanol is formed as the product and the system follows ideal gas behaviour.

Ans. Official answer NTA (74)

Sol.

Question ID : 603421975

23. 0.1 mol of the following given antiviral compound (P) will weigh _____ $\times 10^{-1}$ g (nearest integer).



(P)

(Given : molar mass in g mol^{-1} H:1,C:12, N : 14, O : 16, F : 19, I : 127)

Ans. Official answer NTA (372)

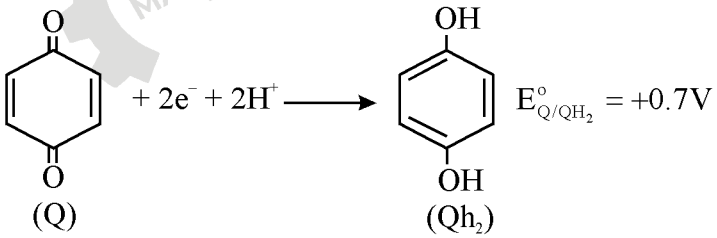
Sol.

Question ID : 603421971

24. Consider the following electrochemical cell at standard condition.

$$Au(s)\,|\,QH_2, Q\,|\,NH_4X(0.01M)\,||\,Ag^+(1M)\,|\,Ag(s) \quad E_{cell} = +0.4\,V$$

The couple QH_2/Q represents quinhydrone electrode, the half cell reaction is given below :



(Q) (Qh$_2$)

$$E^{\circ}_{Q/QH_2} = +0.7V$$

[Given : $E^{\circ}_{Ag^+/Ag} = +0.8V$ and $\frac{2.303RT}{F} = 0.06V$]

The pK_b value of the ammonium halide salt (NH_4X) used here is _____.(nearest integer)

Ans. Official answer NTA (6)

Sol.

Question ID : 603421974

25. A transition metal (M) among Mn, Cr, Co and Fe has the highest standard electrode potential (M^{3+}/M^{2+}). It forms a metal complex of the type $[M(CN)_6]^{4-}$. The number of electrons present in the e_g orbital of the complex is _____.

Ans. Official answer NTA (1)

Sol.