CHEMISTRY

BOOKS - KVPY PREVIOUS YEAR
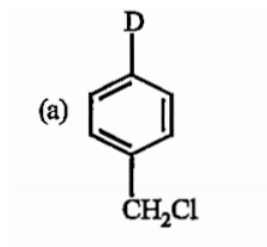
MOCK TEST 9

Exercise

1. The final product obtained in the reaction
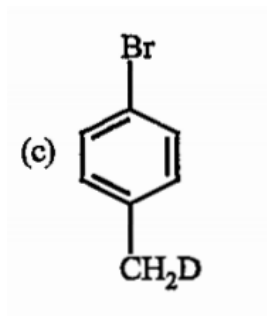

Br

Mg / ether → A Heavy water →

CH₂Cl

A.

(a)

D

CH₂Cl
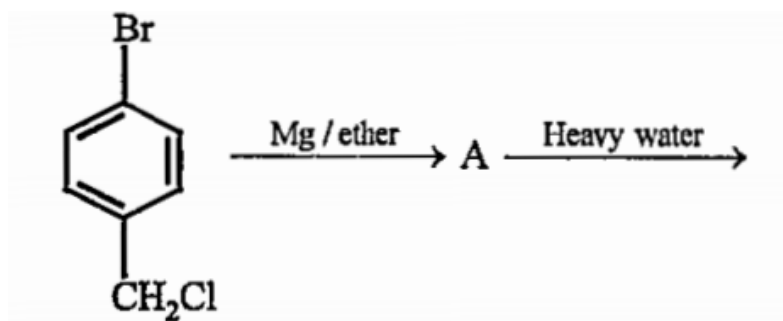
B.

C.

D.

Answer:

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2. A detergent $(C_{12}H_{25}SO_4{}^{\wedge}(-)Na^+)$ solution becomes colloidal sol at a concentration of $10^{-3}M$. On an average 10^{13} colloidal partcles are present in $1mm^3$. What is the average number of ions which are contained by one colloidal particle (micelle)?
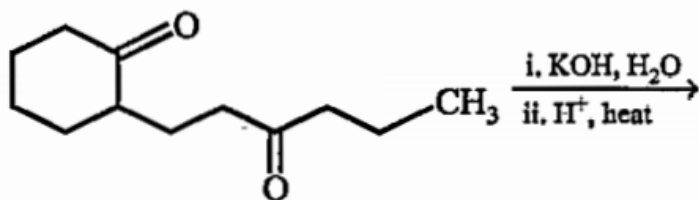
A. 6×10^7

B. 10

C. 60

D. 6

Answer:

3. The major product of the following reaction is

$$\xrightarrow[\text{ii. H}^+,\text{ heat}]{\text{i. KOH, H}_2\text{O}}$$

A.

B.

C.

D.
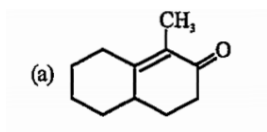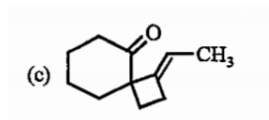
Answer:

4. The densities of graphite and diamond at $298K$

are 2.25 and $3.31 gcm^{-3}$, respectively. If the

standard free energy difference (ΔG^0) is equal to

$1895 Jmol^{-1}$, the pressure at which graphite will be transformed into diamond at $298K$ is

A. $9.920 \times 10^5 Pa$

B. $11.094 \times 10^8 Pa$

C. $10.952 \times 10^7 Pa$

D. $9.920 \times 10^6 Pa$

Answer:

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5. A radioavtive source in the form of a metal sphere of daimeter 10^{-3} m emits β-particles at a constant rate of 6.25×10^{10} particles per second. If the source is electrically insulated, how long will it take for its potential to rise by $1.0V$, assuming that 80% of the emitted β-particles escape the socurce?

    A. 6.95 μ sec

    B. 0.95 μ sec

    C. 1.95 μ sec

    D. 2.15 μ sec

Answer:

6. Consider the following three compounds $(i) AX_{2n}^{n-}$, (ii) AX_{3n} and (ii) AX_{4n}^{n+}, where central atom A is 15th group element and their maximum covalency is 3n. If total number of proton in surrounding atom X is n and value of n is one, then calculate value of $x^3 + y^2 + z^2$. (where x, y and z are total number of lone pair at central atom in compounds (i), (ii) and (iii) respectively.

A. 3

B. 2

C. 5

D. 9

Answer:

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7. Gas A is bubbled through slaked lime when a white precipitate is formed. On prolonged bubbling the precipitate is dissolved. On heating the resultant solution, the white precipitate

appears with evolution of gas B. The gases A and B respectively are

A. CO and CO

B. CO_2 and CO

C. CO and CO_2
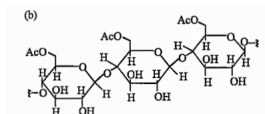
D. CO_2 and CO_2

Answer:

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8. Cellulose upon acetylation with excess acetic anhydride/H_2SO_4 (catalytic) gives cellulose triacetate whose structure is
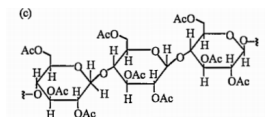
A.

B.

C.

D.

Answer:

9. On addition of increasing amount of $AgNO_3$ to 0.1 M each of NaCl and NaBr in a solution, what % of Br^- ion gets precipitated when Cl^- ion starts precipitating? $K_{sp}(AgCl) = 1.0 \times 10^{-10}, K_{sp}(AgBr) = 1 \times 10^{-13}$

A. 0.1

B. 0.01

C. 99.9

D. 99.99

Answer:

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10. 5 g of Na_2SO_4 was dissolved in x g of H_2O . The change in freezing point was found to be $3.82°C$. If Na_2SO_4 is 81.5% ionised , the value of x

(k_f for water $=1.86°C$ kg mol^{-1}) is apporximately :

(molar mass of S=32 g mol^{-1} and that of Na=23 g mol^{-1})

A. 15 g

B. 25 g

C. 45 g

D. 65 g

Answer:

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11. Passing H_2S gas into a mixture of Mn^{2+}, Ni^{2+}, Cu^{2+} and Hg^{2+} ions in an acidified aqueous solution precipitates

A. CuS and HgS

B. MnS and CuS

C. MnS and NiS

D. NiS and HgS

Answer:

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12. When $2g$ of a gas A is introduced into an evacuated flask kept at $25^\circ C$, the pressure is found to be $1atm$. If $3g$ of another gas B is then heated in the same flask, the total pressure becomes $1.5atm$. Assuming ideal gas behaviour, calculate the ratio of the molecular weights M_A and M_B.

A. $3:1$

B. $1:3$

C. $1:9$

D. $9:1$

Answer:

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13. Which of the following componds does not evolve oxygen when heated alone ?

A. $KClO_3$

B. $KMnO_4$

C. NH_4NO_2

D. KNO_3

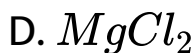**Answer:**

14. Equimolar solutions of the following substances were prepared separately. Which one of these will record the highest pH value?

A. $BeCl_2$

B. $SrCl_2$

C. $CaCl_2$

D. $MgCl_2$

Answer:

15. $n-$ Propyl benzene can be obtained in quantitative yield by following method :

(i) By treating benzene with $n-$ propyl chloride in presence of $AlCl_3$

(ii) By treating excess of benzene with $n-$ propyl chloride in presence of $AlCl_3$

(iii) By treating benzene with allyl chloride in presence of $AlCl_3$ followed by reduction

(iv) By treating benzene with propionyl chloride in the presence of $AlCl_3$ followed by Clemmensen reduction

A. By(ii),(iii) and(iv)

B. By(i),(iii)and(iv)

C. By (iii)and(iv)

D. By(ii) only

Answer:

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16. A solution of (+)-1-chloro-1-phenylethane in t

toluene racemises slowly in the presence of a

small amount of $SbCl_5$ due to the formation of

A. carbanion

B. carbene

C. carbocation

D. freeradical

Answer:

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17. At $300K$ and $1atm, 15mL$ of a gaseous hydrocarbon requires $375mL$ air containing $20\%\, O_2$ by volume for complete combustion. After combustion, the gases occupy $330mL$.

Assuming that the water formed is in liquid form and the volumes were measured at the same temperature and pressure, the formula of the hydrocarbon is

A. C_4H_8

B. C_4H_{10}

C. C_3H_6

D. C_3H_8
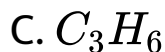
Answer:

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18. The compression factor (compressibility factor) for $1mol$ of a van der Waals gas at $0°C$ and $100atm$ pressure is found to be 0.5. Assuming that the volume of a gas molecule is neligible, calculate the van der Waals constant a.

   A. 2524

   B. 1.253×10^{-6}

   C. 1253

   D. 2.524×10^{-6}

Answer:

19. Two reactants A and B separately shows two chemical reactions.Both reactions are made with same initial concentration of each reactant. Reactant A follows first order kinetics whereas reactant B follows second order kinetics. If both have same half lives, find the ratio of the ratios of their rates at the start of reaction and after the lapse of one half life.

A. $2:1$

B. $1:3$

C. $1:2$

D. $2:3$

Answer:

20. Compounds $\left[Cu(H_2O)_6\right]^{2+}(A)$ and $\left[Ti(H_2O)_6\right]^{3+}$ (B) exhibit tetragonal elongation and tetragonal compression,respectively.The unpaired electron A and B are found respectively, in orbitals,

A. d_{z^2} and $d_{x^2-y^2}$

B. $d_{x^2-y^2}$ and d_{z^2}

C. d_{z^2} and d_{z^2}

D. $d_{x^2-y^2}$ and $d_{x^2-y^2}$

Answer:

21. A gas undergoes a process such that $p \propto \dfrac{1}{T}$. If the molar heat capacity for this process is $C = 33.24J/mol - K$, find the degree of freedom of the molecules of the gas.

A. 3

B. 2

C. 4

D. 6

Answer:

22. The decomposition of N_2O_5 according to the equation: $2N_2O_5(g) \rightarrow 4NO_2(g) + O_2(g)$ is a first order reaction. After 30 min. from the start of the decomposition in a closed vessel, the total

pressure developed is found to be 284.5 mm of Hg and on complete decomposition, the total pressure is 584.5 mm of Hg. Calculate the rate constant for the reaction.

A. $5.2min^{-1}$

B. $520 \times 10^{-3}min^{-1}$

C. $5.2 \times 10^{-3}min^{-1}$

D. $0.52 \times 10^{-3}min^{-1}$

Answer:

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23. Arrange the wavelengths (λ) of the following emission lines of H-atom in an increasing order. (1) $n = 3 \xrightarrow{\lambda_1} n = 1$ (2) $n = 5 \xrightarrow{\lambda_2} n = 3$ (3) $n = 12 \xrightarrow{\lambda_3} n = 10$ (4) $n = 22 \xrightarrow{\lambda_4} n = 20$

A. $\lambda_4 < \lambda_3 < \lambda_2 < \lambda_1$

B. $\lambda_1 < \lambda_2 < \lambda_3 < \lambda_4$

C. $\lambda_1 < \lambda_2 < \lambda_4 < \lambda_3$

D. $\lambda_1 < \lambda_3 < \lambda_4 < \lambda_2$

Answer:

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24. Which of the following expression for % dissociation of a monoacidic base (BOH) in aqueous solution at appreciable concentration is not correct?

A. $100 \times \sqrt{\dfrac{K_a}{c}}$

B. $\dfrac{1}{1 + 10^{(pK_b - pOH)}}$
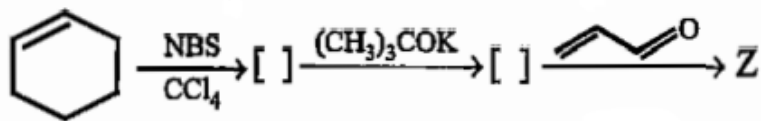
C. $\dfrac{K_W[H^+]}{K_b + K_W}$
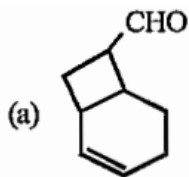
D. $\dfrac{K_b}{K_b + [OH^-]}$

Answer:

25. The final product Z in the following reaction is

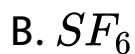$$\bigcirc \xrightarrow[\text{CCl}_4]{\text{NBS}} [\ ] \xrightarrow{(\text{CH}_3)_3\text{COK}} [\ ] \xrightarrow{\ \diagup\!\!\diagdown\!\!\diagup^{\!\!O}\ } Z$$

A.

CHO

(a)

B.

C.

D.

Answer:

26. Which of the following species contains minimum number of atoms in XY plane ?

A. XeF_5^-

B. SF_6

C. IF_7

D. All

Answer:

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