

CHEMISTRY

Section-1

1. Match List-I with List-II :
 List-I - (Drug)
 List-II - (Class of Drug)

List1	List2
A. Furacin	I. Antibiotic
B. Arsphenamine	II. Tranquilizers
C. Dimetone	III. Antiseptic
D. Valium	IV. Synthetic antihistamines
A) A - i, B - iii, C - iv, D - ii	B) A - iii, B - iv, C - ii, D - i
C) A - ii, B - i, C - iii, D - iv	D) A - iii, B - i, C - iv, D - ii

Answer: D,

Explanation:

Furacine acts as Antiseptic

Arsphenamine also known as salvarsan acts as antibiotic

Dimetone is synthetic histamine

Valium is a Tranquilizer

Rizee
THE PERFECT GUIDE

2. Match List - I with List - II :

List1	List2
A. NaOH	I. Acidic
B. BeOH ₂	II. Basic
C. CaOH ₂	III. Amphoteric
D. BOH ₃	IV. .
E. ALOH ₃	V. ..

A) A - ii, B - ii, C - iii, D - ii, E - iii

B) A - ii, B - iii, C - ii, D - i, E - iii

C) A - ii, B - ii, C - iii, D - i, E - iii

D) A - ii, B - i, C - ii, D - iii, E - iii

Answer: B,**Explanation:**NaOH → **Basic**Be(OH)₂ → **Amphoteric**Ca(OH)₂ → **Basic**B(OH)₃ → **Acidic**Al(OH)₃ → **Amphoteric**

8. The statement that is INCORRECT about Ellingham diagram is

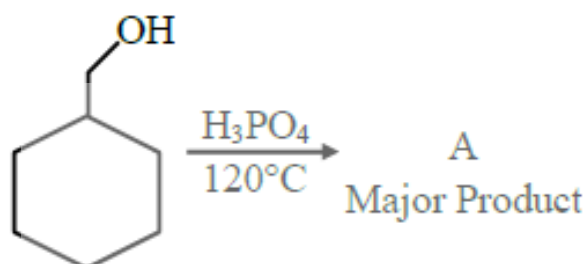
- A) provides idea about the reaction rate. B) provides idea about free energy change
 C) provides idea about changes in the phases during the reaction. D) provides idea about reduction of metal oxide.

Answer: A,

Explanation:

Ellingham diagram is a plot between ΔG° and T and does not give any information regarding rate of reaction

9.

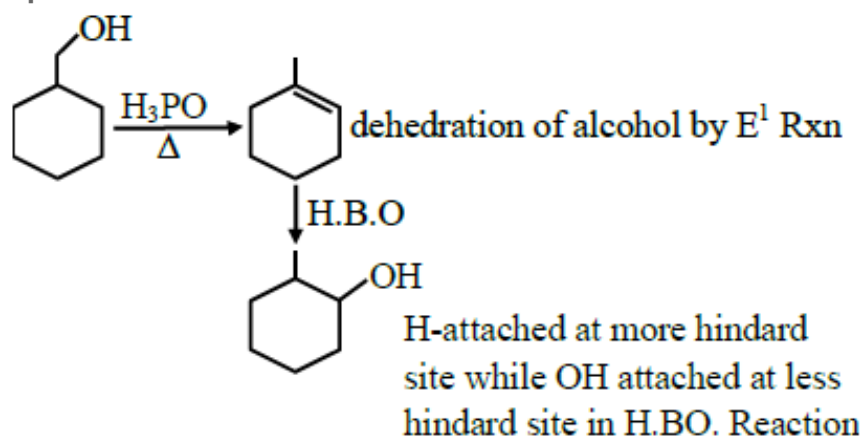


Consider the above reaction and identify the Product P :

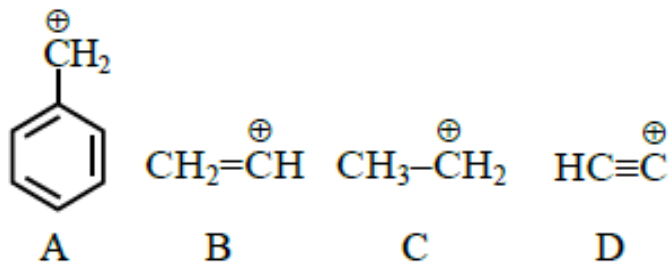
- A)  B) 
 C)  D) 

Answer: D,

Explanation:



12.



The correct order of stability of given carbocation is :

A) $A > C > B > D$

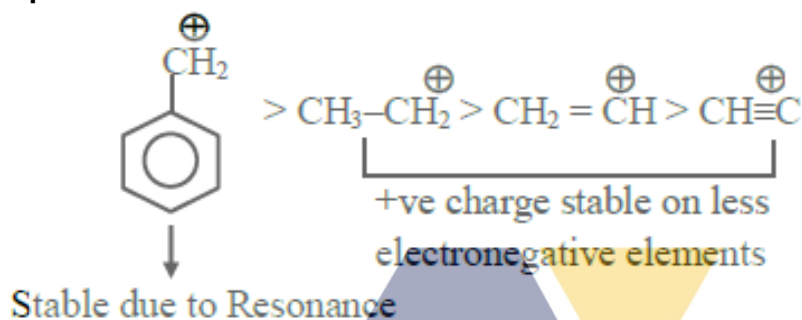
B) $D > B > C > A$

C) $D > B > A > C$

D) $C > A > D > B$

Answer: A,

Explanation:



13.

Given below are two statements : One is labelled as Assertion A and the other labelled as Reason R.

Assertion A : Lithium halides are somewhat covalent in nature.

Reason R : Lithium possess high polarisation capability.

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

A) A is true but R is false

B) A is false but R is true

C) Both A and R are true but R is NOT the correct explanation of A

D) Both A and R are true and R is the correct explanation of A

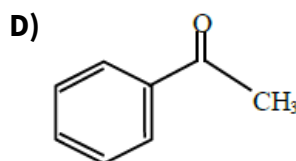
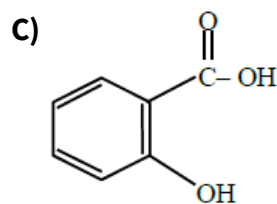
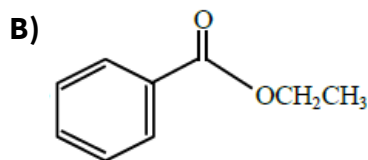
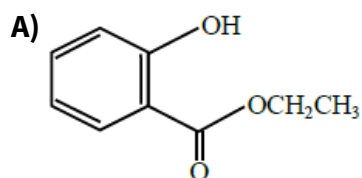
Answer: D,

Explanation:

Lithium due to small size has very high polarization capability and thus increases covalent nature in Halides.

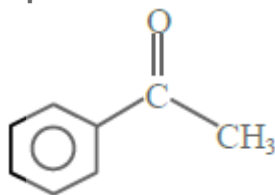
14.

Which one of the following compounds will give orange precipitate when treated with 2,4-dinitrophenyl hydrazine ?



Answer: D,

Explanation:



Explanation ⇒ 2 - 4 - D.N.P test is used for carbonyl compound (aldehyde & ketone)

15.

The product obtained from the electrolytic oxidation of acidified sulphate solutions, is :



Answer: B,

Explanation:

Electrolysis of concentrated solution of acidified sulphate solution yields $\text{H}_2\text{S}_2\text{O}_8$.

Rizee
THE PERFECT GUIDE

Section-2

16. The parameters of the unit cell of a substance are $a = 2.5$, $b = 3.0$, $c = 4.0$, $\alpha = 90^\circ$, $\beta = 120^\circ$, $\gamma = 90^\circ$. The crystal system of the substance is :

- A) Hexagonal
B) Orthorhombic
C) Monoclinic
D) Triclinic

Answer: C,

Explanation:

$a \neq b \neq c$ and $\alpha = \gamma = 90^\circ \neq \beta$ are parameters of monoclinic unit cell.

17. The oxidation states of 'P' in $\text{H}_4\text{P}_2\text{O}_7$, $\text{H}_4\text{P}_2\text{O}_5$ and $\text{H}_4\text{P}_2\text{O}_6$, respectively, are :

- A) 7, 5 and 6
B) 5, 4 and 3
C) 5, 3 and 4
D) 6, 4 and 5

Answer: C,

Explanation:

Oxidation state of P in $\text{H}_4\text{P}_2\text{O}_7$, $\text{H}_4\text{P}_2\text{O}_5$ and $\text{H}_4\text{P}_2\text{O}_6$ is 5, 3 & 4 respectively



$$2x + 4(+1) + 7(-1) = 0$$

$$x = +5$$



$$2x + 4(+1) + 5(-2) = 0$$

$$x = +3$$



$$2x + 4(+1) + 6(-2) = 0$$

$$x = +4$$

Rizee
THE PERFECT GUIDE

21. The density of NaOH solution is 1.2 g cm^{-3} . The molality of this solution is _____ m. (Round off to the Nearest Integer) [Use : Atomic masses: Na: 23.0 u O: 16.0 u H: 1.0 u Density of H_2O : 1.0 g cm^{-3}]

Answer: _____

Answer: 5

Explanation:

Consider 1 L solution

$$\text{Mass of Solution} = (1.2 \times 1000) \text{ g} = 1200 \text{ gm}$$

Neglecting volume of NaOH

$$\text{Mass of water} = 1000 \text{ gm}$$

$$\text{Mass of NaOH} = (1200 - 1000) \text{ gm} = 200 \text{ gm}$$

$$\text{Moles of NaOH} = \frac{200 \text{ g}}{50 \text{ g/mol}} = 5 \text{ mol}$$

$$\text{Molality} = \frac{5 \text{ mol}}{1 \text{ kg}} = 5 \text{ m}$$

22. CO_2 gas adsorbs on charcoal following Freundlich adsorption isotherm. For a given amount of charcoal, the mass of CO_2 adsorbed becomes 64 times when the pressure of CO_2 is doubled. The value of n in the Freundlich isotherm equation is _____ $\times 10^{-2}$. (Round off to the Nearest Integer)

Answer: _____

Answer: 17

Explanation:

$$\frac{x}{m} = k \cdot p^{\frac{1}{n}}$$

Freundlich isotherm:

$$\text{Substituting values: } \left(\frac{64}{1} \right) = (2)^{\frac{1}{n}}$$

$$\Rightarrow n = \frac{1}{6} = 0.166$$

$$\approx 17 \times 10^{-2}$$

23. The conductivity of a weak acid HA of concentration 0.001 mol L^{-1} is $2.0 \times 10^{-5} \text{ S cm}^{-1}$. If

$\Lambda_m^\circ(\text{HA}) = 190 \text{ S cm}^2 \text{ mol}^{-1}$, the ionization constant (K_a) of HA is equal to $\text{_____} \times 10^{-6}$.
(Round off to the Nearest Integer)

Answer: _____

Answer: 12

Explanation:

$$\Lambda_m = 1000 \times \frac{K}{M}$$

$$= 1000 \times \frac{2 \times 10^{-5}}{0.001} = 20 \text{ S cm}^2 \text{ mol}^{-1}$$

$$\Rightarrow \alpha = \frac{\Lambda_m}{\Lambda_m^\circ} = \frac{20}{190} = \left(\frac{2}{19}\right)$$

$$\text{HA} \rightleftharpoons \text{H}^+ + \text{A}^-$$

$$0.001(1-\alpha) \quad 0.001\alpha \quad 0.001\alpha$$

$$\Rightarrow K_a = 0.001 \left(\frac{\alpha^2}{1-\alpha} \right) = \frac{0.001 \times \left(\frac{2}{19}\right)^2}{1 - \left(\frac{2}{19}\right)}$$

$$= 12.3 \times 10^{-6}$$

24.

1.46 g of a bio polymer dissolved in a 100 mL water at 300 K exerted an osmotic pressure of $2.42 \times 10^{-3} \text{ bar}$. The molar mass of the bio polymer is $\text{_____} \times 10^4 \text{ g mol}^{-1}$ (Round off to the Nearest Integer) [Use: $R = 0.083 \text{ L bar mol}^{-1} \text{ K}^{-1}$]

Answer: _____

Answer: 15

Explanation:

$$\pi = CRT$$

$\pi =$ Osmotic pressure

$C =$ Molarity

$T =$ temperature of Solution

let the molar mass be $M \text{ gm / mol}$

$$2.42 \times 10^{-3} \text{ bar} = \frac{\left(\frac{1.46 \text{ g}}{M \text{ gm / mol}}\right)}{0.1 \text{ l}} \times \left(\frac{0.083 \text{ l-bar}}{\text{mol-K}}\right) \times 300 \text{ K}$$

$$\Rightarrow M = 15.02 \times 10^4 \text{ g / mol}$$

25.

An organic compound is subjected to chlorination to get compound A using 5.0 g of chlorine. When 0.5 g of compound A is reacted with AgNO_3 [Carius Method], the percentage of chlorine in compound A is _____ when it forms 0.3849 g of AgCl . (Round off to the Nearest Integer) (Atomic masses of Ag and Cl are 107.87 and 35.5 respectively)

Answer: _____

Answer: 19**Explanation:**

$$n_{\text{Cl in compound}} = n_{\text{AgCl}} = \frac{0.3849 \text{ g}}{(107.87 + 35.5)} \text{ g/mol}$$

$$\text{Mass of chlorine} = n_{\text{Cl}} \times 35.5 = 0.0953 \text{ gm}$$

$$\% \text{ wt of chlorine} = \frac{0.0953}{0.5} \times 100 = 19.06\%$$

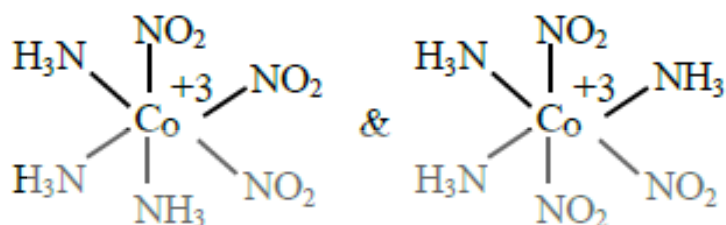
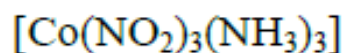
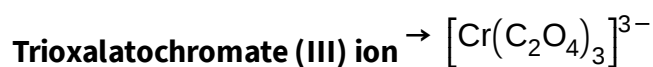
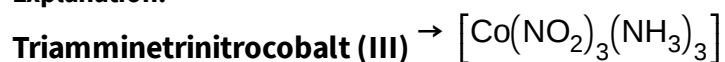


26. The number of geometrical isomers possible in triamminetrinitrocobalt (III) is X and in trioxalatochromate (III) is Y. Then the value of X + Y is _____.

Answer: _____

Answer: 2

Explanation:



Two geometrical isomers (X)



$$X + Y = 2 + 0 = 2.0$$

27. In gaseous triethyl amine the " $-\text{C}-\text{N}-\text{C}-$ " bond angle is _____ degree.

Answer: _____

Answer: 108

Explanation:

In gaseous triethyl amine the " $-\text{C}-\text{N}-\text{C}-$ " bond angle is 108 degree.

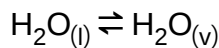
28. For water at 100°C and 1 bar, $\Delta_{\text{vap}} H - \Delta_{\text{vap}} U = \underline{\hspace{2cm}} \times 10^2 \text{ J mol}^{-1}$ (Round off to the Nearest Integer) [Use: $R = 8.31 \text{ J mol}^{-1} \text{ K}^{-1}$]

[Assume volume of $\text{H}_2\text{O}(\text{l})$ is much smaller than volume of $\text{H}_2\text{O}(\text{g})$. Assume $\text{H}_2\text{O}(\text{g})$ treated as an ideal gas]

Answer: _____

Answer: 31

Explanation:



$$\Delta H = \Delta U + \Delta n_g RT$$

for 1 mole waters $\Delta n_g = 1$

$$\therefore \Delta n_g RT = 1 \text{ mol} \times 8.31 \text{ J/mol} \cdot \text{K} \times 373 \text{ K}$$

$$= 3099.63 \text{ J} \approx 31 \times 10^2 \text{ J}$$

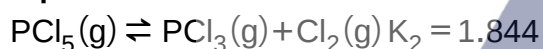
29. $\text{PCl}_5 \rightleftharpoons \text{PCl}_3 + \text{Cl}_2$, $K_c = 1.844$

3.0 moles of PCl_5 is introduced in a 1 L closed reaction vessel at 380 K. The number of moles of PCl_5 at equilibrium is $\underline{\hspace{2cm}} \times 10^{-3}$. (Round off to the Nearest Integer)

Answer: _____

Answer: 1396

Explanation:



t = 0 3 moles

$$t = \infty \quad \begin{array}{ccc} & x & x \\ \Rightarrow & \frac{[\text{PCl}_3][\text{Cl}_2]}{[\text{PCl}_5]} = \frac{x^2}{3-x} = 1.844 \end{array}$$

$$\Rightarrow x^2 + 1.844 - 5.532 = 0$$

$$\Rightarrow x = \frac{-1.844 + \sqrt{(1.844)^2 + 4 \times 5.532}}{2}$$

$$\approx 1.604$$

Moles of $\text{PCl}_5 = 3 - 1.604 \approx 1.396$

