

Sol. Given $k_{net} = \frac{k_1 k_2}{k_3}$

We know that

$$k = A e^{-E_a/RT}$$

$$e^{-E_{a,net}} = \frac{e^{-E_{a_1}} \times e^{-E_{a_2}}}{e^{-E_{a_3}}}$$

$$e^{-E_{a,net}} = e^{-(E_{a_1} + E_{a_2}) - (-E_{a_3})}$$

$$E_{a,net} = E_{a_1} + E_{a_2} - E_{a_3}$$

$$= 40 + 50 - 60 = 30 \text{ KJ/mol}$$

8. Which of the following is incorrectly matched?

- (1) Cryolite – Na_3AlF_6
- (2) Fluorspar – BF_3
- (3) Fluorapatite – $3 \text{Ca}_3(\text{PO}_4)_2 \cdot \text{CaF}_2$
- (4) Carnalite – $\text{KCl} \cdot \text{MgCl}_2 \cdot 6\text{H}_2\text{O}$

Ans. (2)

Sol. Fluorspar – CaF_2

9. Match the column:

Column-A

- (a) Ziegler Natta catalyst
- (b) Blood pigment
- (c) Wilkinson catalyst
- (d) Vitamin B12

Column-B

- (i) Rh
- (ii) Co
- (iii) Fe
- (iv) Ti

Correct answer is :

- (1) a-(iv), b-(iii), c-(i), d-(ii)
- (2) a-(iii), b-(i), c-(iv), d-(ii)
- (3) a-(ii), b-(i), c-(iv), d-(iii)
- (4) a-(i), b-(ii), c-(iii), d-(vi)

Ans. (1)

- Sol. (a) $\text{R}_3\text{Al} + \text{TiCl}_4$
 (b) Haemoglobin (red colored pigment) contains Fe
 (c) $[\text{RhCl}(\text{Ph}_3\text{P})_3]$
 (d) complex of Co

10. Osmotic pressure of a solution at 273K is 2.73×10^{-5} bar, then osmotic pressure of same solution at 283K is $\underline{\hspace{2cm}}$ $\times 10^{-4}$ bar. (Nearest integer)

Ans. (28)

Sol. Osmotic pressure (π) = CRT

$$\frac{\pi_1}{\pi_2} = \frac{T_1}{T_2}$$

$$\Rightarrow \frac{2.73 \times 10^{-5}}{\pi_2} = \frac{273}{283}$$

$$\pi_2 = \left[\frac{2.73 \times 10^{-5}}{273} \right] 283$$

$$= 2.83 \times 10^{-5}$$

$$= 28.3 \times 10^{-4} \text{ bar}$$

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11. If the percentage by weight of a solution (M.wt, 98 gm/mol) is 31.4% and density of the solution is 1.56 gm/cm³ then the molarity of the solution is _____ M.

Ans. (5)

Sol.
$$\text{molarity} = \frac{\%(\text{w/w}) \times \text{density} \times 10}{\text{GMM of solute}}$$

$$= \frac{31.4 \times 1.56 \times 10}{98} = 4.99 \approx 5$$

12. **Statement-I:** The electronegativity values of group 14 elements decrease from Si to Pb.

Statement-II: Group 14 contains non-metals, metalloids and metals.

(1) **Statement-I** is incorrect & **Statement-II** is correct.

(2) **Statement-I** is correct & **Statement-II** is incorrect.

(3) Both **Statements I & II** are incorrect.

(4) Both **Statements I & II** are correct.

Ans. (1)

Sol.

Element :	C	Si	Ge	Sn	Pb
Electronegativity :	2.5	1.8	1.8	1.8	1.9

The electronegativity value for elements from Si to Pb are almost same.

Carbon (C), Silicon (Si) : non-metals

Germanium (Ge) : Metalloid

Tin (Sn), Lead (Pb) : Metals

13. Among the following incorrect option is:

(1) $\Delta G = (-)$ ve, spontaneous

(2) $\Delta G = (+)$ ve, spontaneous

(3) $\Delta G = 0$, equilibrium

(4) $\Delta G = (+)$ ve, nonspontaneous

Ans. (2)

Sol. $\Delta G = (+)$ ve, means process is nonspontaneous

14. For decomposition of N_2O_4 at 300 K value of $K_P = 0.246$ atm



then value of K_C is $____ \times 10^{-2}$ [Nearest integer]

(Given $R = 0.082 \frac{\text{atm} \times \text{Lit}}{\text{mole} \times \text{K}}$)

Ans. (1)

Sol. $\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g}) \quad K_P = 0.246$

$$K_P = K_C (RT)^{\Delta n}$$

$$0.4 = K_C [0.082 \times 300]$$

$$K_C = \left[\frac{0.246}{0.082 \times 300} \right] = \left(\frac{0.246}{24.6} \right) = 0.01 = 1 \times 10^{-2}$$

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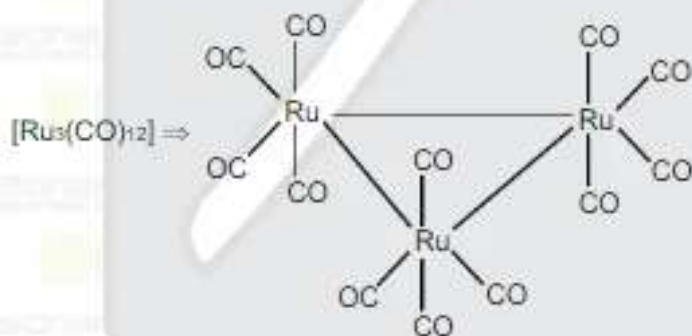
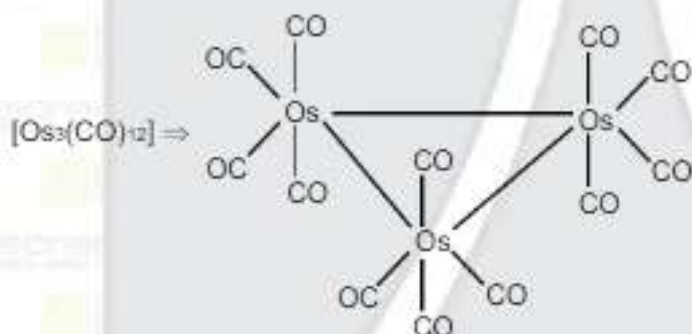
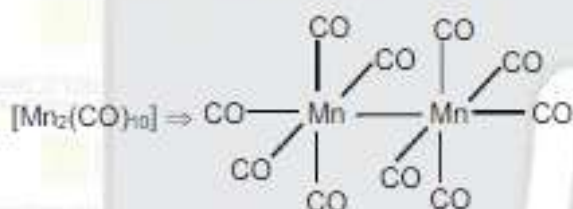
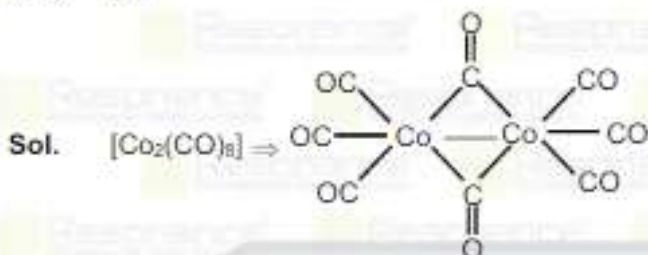
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15. In which of the following complex co form bridge between metal atoms ?

- (1) $Os_3(CO)_{12}$ (2) $Co_2(CO)_8$ (3) $Ru_3(CO)_{12}$ (4) $Mn_2(CO)_{10}$

Ans. (2)



16. **Assertion :** In a period on going left to right ionisation energy decrease.

Reason : In a period on moving left to right nuclear charge outweighs the shielding.

In light of above statement identify correct option.

- (1) Both assertion and reason are true and reason is correct explanation of assertion.
 (2) Assertion is wrong reason is true
 (3) Assertion is true and reason is false.
 (4) Both assertion & reason are false

Ans. (2)

Sol. On moving left to right ionisation energy is decrease.

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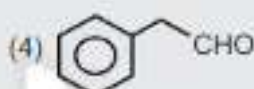
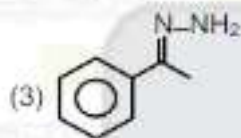
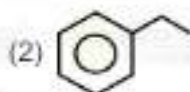
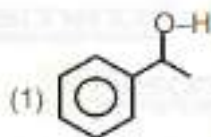
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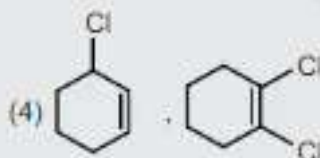
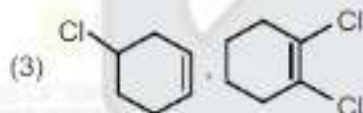
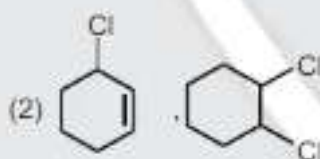
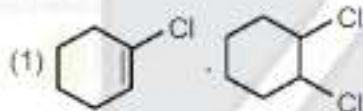
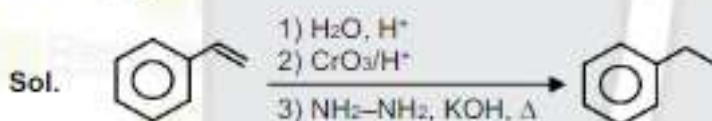
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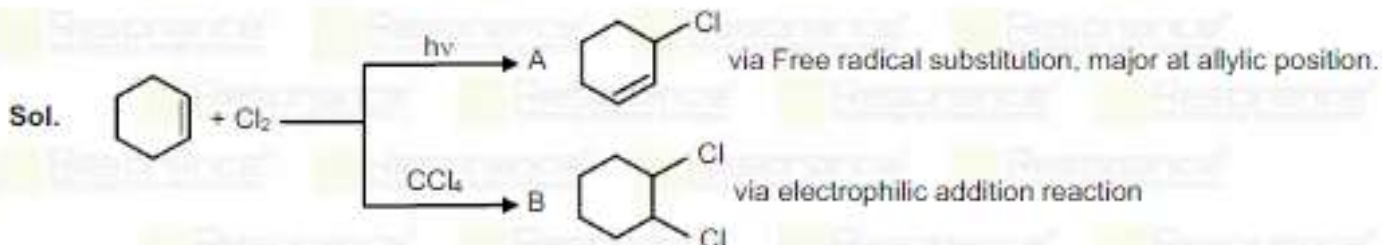
Product P is



Ans. (2)



Ans. (2)



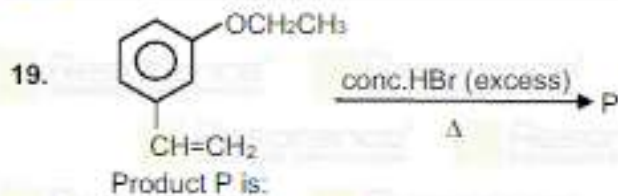
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- (1)  (2) 
 (3)  (4) 

Ans. (4)



20. What effect is observed in which Interaction occurs between π -bond & lone pair of electrons on adjacent atoms.

- (1) Resonance (2) Hyper conjugate
 (3) Inductive effect (4) Electronic effect.

Ans. (1)

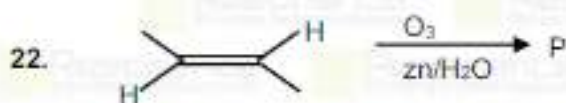
Sol. Interaction between π and lone pair of electrons on adjacent atom results in resonance effect.

21. Type of amino acid obtained on hydrolysis of proteins.

- (1) α - Amino acid (2) γ - Amino acid
 (3) β - Amino acid (4) δ - Amino acid.

Ans. (1)

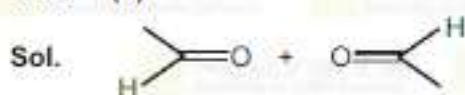
Sol. All naturally occurring proteins are made up of α -amino acid.



the no. of oxygen atom per molecule in product P is.

- (1) 1 (2) 2 (3) 3 (4) 4

Ans. (1)



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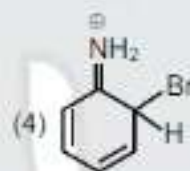
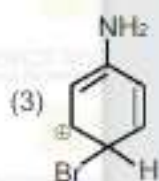
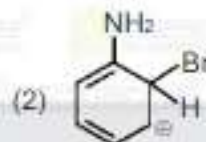
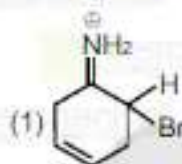
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23. How many of the following gives positive Fehling solution test.
Acetic acid, Aniline, Acetaldehyde, Acetone, Ethanoylchloride, 2-Methylpropanaldehyde, Crotonaldehyde, Benzaldehyde, Benzene carboxamide, Ethyne.

Ans. (3)

Sol. Only Acetaldehyde, 2-Methylpropanaldehyde and Crotonaldehyde gives positive Fehling solution test.

24. Arenium ion, which will not be formed in bromination of aniline.



Ans. (1)

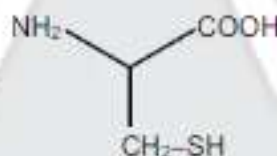
25. How many of the following have 'S' as heteroatom.
Furan, Thiophene, Pyrrole, Cysteine, Tyrosine, Tryptophan

Ans. (2)

Sol. (1) Thiophene



(2) Cysteine



26. Appearance of red colour on treatment with Na fusion extract of an organic compound with FeSO_4 in presence of conc. H_2SO_4 indicate element?

(1) N

(2) Br

(3) S

(4) N & S

Ans. (4)

Sol. Compound with both N & S gives NCS^- ion in sodium fusion extract \rightarrow which gives red colour of $[\text{Fe}(\text{SCN})_3]$ with FeSO_4 & H_2SO_4 .

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