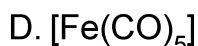
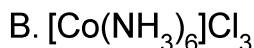
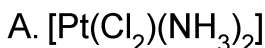




46. Match List-I with List-II -

List-I**(Complex/ion)****List-II****(Shape/geometry)**

I. Octahedral

II. Trigonal bipyramidal

III. Square planar

IV. Tetrahedral

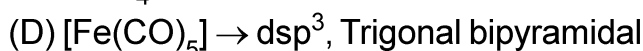
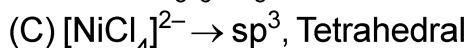
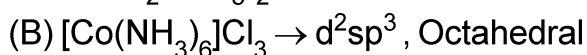
Choose the **correct** answer from the options given below -

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

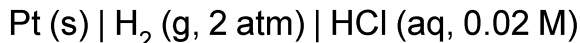
(2) A-III, B-IV, C-I, D-II

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

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

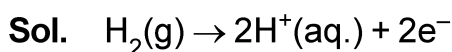
Ans. (3)**Sol.** (A) $[\text{Pt}(\text{Cl}_2)(\text{NH}_3)_2] \rightarrow$ Square planar, dsp^2 

47. Calculate emf of the half cell given below -



$$E_{\text{H}_2/\text{H}^+}^0 = 0 \text{ V}$$

$$\text{(Given : } \frac{2.303RT}{F} = 0.059, \log 2 = 0.3010)$$

(1) -0.109 V (2) 0.109 V (3) 0.035 V (4) -0.035 V **Ans. (2)**

$$Q = \frac{[\text{H}^+]^2}{P_{\text{H}_2(\text{g})}} = \frac{(0.02)^2}{2} = 2 \times 10^{-4}$$

$$E_{\text{H}_2/\text{H}^+} = E_{\text{H}_2/\text{H}^+}^0 - \frac{2.303RT}{nF} \log Q$$

$$= 0 - \frac{0.059}{2} \log 2 \times 10^{-4}$$

$$= -0.0295 (-3.7) = 0.10915$$

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48. At 298 K, a certain buffer solution contains equal concentrations of X^- and HX , K_b for X^- is 10^{-10} . What is the pH of this buffer solution ?

(1) 10

(2) 4

(3) 2

(4) 6

Ans. (2)

Sol. $HX \text{ \& } X^- \Rightarrow$ Acidic buffer

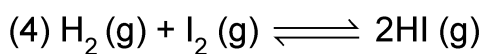
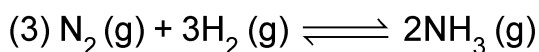
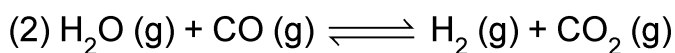
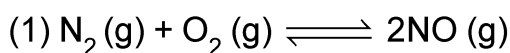
$$pH = pK_a + \log \frac{[C.B.]}{[Acid]}$$

$$K_a(HX) = \frac{K_w}{K_b(X^-)} = \frac{10^{-14}}{10^{-10}} = 10^{-4}$$

$$pH = 4 + \log \frac{x}{x} = 4$$

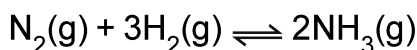
$$pH = 4$$

49. Given below are certain reactions. Identify the reaction for which $K_p \neq K_c$ -



Ans. (3)

Sol. $K_p = K_c (RT)^{\Delta n_g}$

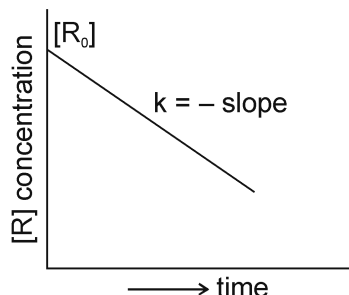


$$\Delta n_g = 2 - 4 = -2$$

$$\Delta n_g \neq 0 \Rightarrow K_p \neq K_c$$



50. For a certain reaction $R \rightarrow \text{Product}$, the plot of concentration $[R]$ vs time has a negative slope as shown. The order of reaction is -

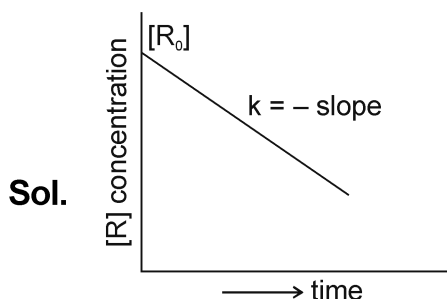


(1) 1

(2) 2.5

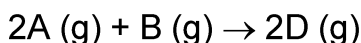
(3) 2

(4) 0

Ans. (4)

Concentration of $[R]$ is decreasing linearly, So reaction is zero order

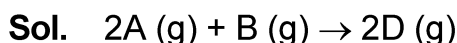
51. Consider the following reaction -



$$\Delta U^\ominus = -10 \text{ kJ mol}^{-1} \text{ and } \Delta S^\ominus = -44 \text{ J K}^{-1} \text{ at } 298 \text{ K.}$$

Identify the **correct** option with $\Delta G^\ominus$ for the reaction and spontaneity of the reaction at 298 K - (Given $R = 8.31 \text{ J mol}^{-1} \text{ K}^{-1}$)

- (1) $+0.63568 \text{ kJ mol}^{-1}$, non-spontaneous (2) $-0.63568 \text{ kJ mol}^{-1}$, spontaneous
(3) $-1.635 \text{ kJ mol}^{-1}$, spontaneous (4) $+1.635 \text{ kJ mol}^{-1}$, non-spontaneous

Ans. (1)

$$\Delta U = -10 \text{ kJ mol}^{-1} \text{ and } \Delta S = -44 \text{ J K}^{-1} \text{ at } 298 \text{ K}$$

$$\Delta G = \Delta H - T\Delta S, \quad \Delta H = \Delta U + \Delta n_g RT$$

$$\Delta G = \Delta U + \Delta n_g RT - T\Delta S$$

$$= -10 \times 1000 - 1 \times 8.31 \times 298 - \{298 \times (-44)\}$$

$$= 635.68 \text{ J mol}^{-1}$$

$$= 0.63568 \text{ kJ mol}^{-1}$$



52. Given below is an expression for the rate constant of a first order reaction occurring at a certain temperature, T (K).

$$\ln k = 14.34 - \frac{1.25 \times 10^4}{T}$$

The energy of activation in kcal mol⁻¹ for the reaction is -

(Given : k in s⁻¹, R = 1.987 cal mol⁻¹ K⁻¹)

- (1) 12.42 (2) 18.63 (3) 14.34 (4) 24.84

Ans. (4)

Sol. On comparing with $\ln k = \ln A - \frac{E_a}{RT}$

$$-\frac{E_a}{RT} = \frac{-1.25 \times 10^4}{T}$$

$$\begin{aligned} E_a &= 1.25 \times 10^4 R \\ &= 1.25 \times 10^4 \times 1.987 \\ &= 2.484 \times 10^4 \text{ cal mol}^{-1} \\ &= 24.84 \text{ Kcal mol}^{-1} \end{aligned}$$

53. Select the reagent that reduce nitriles to primary amines -

- A. (i) LiAlH₄; (ii) H₂O B. Sn + HCl
C. H₂/Ni D. Na(Hg)/C₂H₅OH
E. Br₂/aq. NaOH

Choose the **correct** answer from the option given below -

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

Ans. (3)

Sol. $R-C \equiv N \longrightarrow R-CH_2-NH_2$

Reducing Agent used $\rightarrow$ A. (i) LiAlH₄; (ii) H₂O

C. H₂/Ni

D. Na(Hg)/EtOH

$Sn + HCl \rightarrow R-CN \rightarrow RCH=NH$

$Br_2 + NaOH \rightarrow R-CN \rightarrow X$

Correct answer - (3) A, C and D only



54. The **correct** statement with regard to the secondary structure of DNA/RNA is -
- (1) DNA possesses a double strand helix structure and contains thymine as one of the four bases.
 - (2) DNA possesses a single strand helix structure and contains uracil as one of the four bases.
 - (3) RNA possesses a double strand helix structure and contains uracil as one of the four bases.
 - (4) RNA possesses a single strand helix structure and contains thymine as one of the four bases.

Ans. (1)

Sol. Theoretical

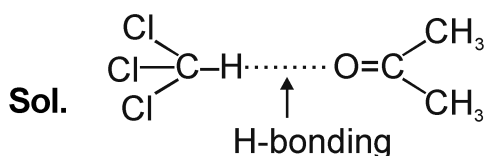
55. During Lassaigne's test, the elements present in an organic compound are converted from-
- (1) Ionic form to ionic form
 - (2) Covalent form to ionic form
 - (3) Ionic form to covalent form
 - (4) Covalent form to covalent form

Ans. (2)

Sol. Organic compound $\rightarrow$ Sodium extract (salt of sodium)
(Covalent) (Ionic)

56. Mixture of chloroform and acetone forms a solution with negative deviation from Raoult's law due to -
- (1) Stronger intermolecular forces between chloroform molecules than those between chloroform and acetone molecules.
 - (2) Formation of hydrogen bonding between acetone and chloroform.
 - (3) Repulsive forces.
 - (4) Increase in escaping tendency of molecules of each component.

Ans. (2)



intermolecular force is increases as H-bonding is formed.



57. In a test tube containing a salt, a few drops of dilute H_2SO_4 was added, which gave colourless vapours having the smell of vinegar. The vapours turned the blue litmus paper red.

Identify the **correct** anion from the following -

(1) Carbonate, CO_3^{2-}

(2) Sulphide, S^{2-}

(3) Acetate, CH_3COO^-

(4) Sulphate, SO_4^{2-}

Ans. (3)

Sol. $\text{CH}_3\text{COO}^- \xrightarrow{\text{dil. H}_2\text{SO}_4} \text{CH}_3\text{COOH}$, Vinegar smell acidic nature.

58. Identify the **correct** statement about ClF_3 from the following options -

(1) It has T-shaped geometry with three lone pairs on Cl atom.

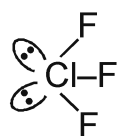
(2) It has T-shaped geometry with two lone pairs on Cl atom.

(3) It has a trigonal pyramidal geometry with two lone pairs on Cl atom.

(4) It has a planar trigonal geometry with two lone pairs on Cl atom.

Ans. (2)

Sol. $\text{ClF}_3 \rightarrow \text{sp}^3\text{d} (3\sigma + 2 \text{ l.p})$



T-shape

59. Match List-I with List-II -

List-I

(Complex)

A. $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$

B. $[\text{Co}(\text{en})_3]^{3+}$

C. $[\text{Co}(\text{NH}_3)_5\text{NO}_2]\text{Cl}_2$

D. $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$

List-II

(Type of isomerism)

I. Optical

II. Solvate

III. Geometrical

IV. Linkage

Choose the **correct** answer from the options given below -

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

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

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

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

Ans. (3)

Sol. (A) $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2] \rightarrow$ Geometrical

(B) $[\text{Co}(\text{en})_3]^{3+} \rightarrow$ Optical

(C) $[\text{Co}(\text{NH}_3)_5\text{NO}_2]\text{Cl}_2 \rightarrow$ Linkage

(D) $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3 \rightarrow$ Solvate

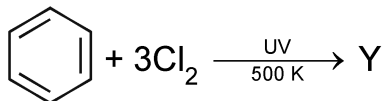
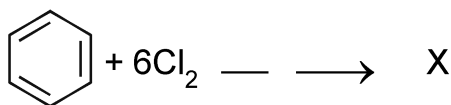
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60. The number of chlorine atoms present in the organic products X and Y of the following reactions, respectively, are -



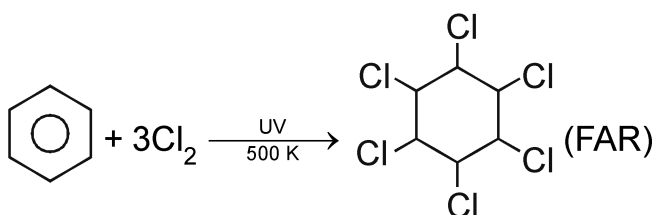
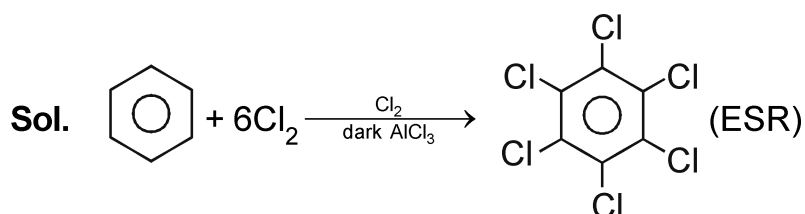
(1) 3 and 3

(2) 6 and 6

(3) 6 and 3

(4) 3 and 6

Ans. (2)



Correct answer (2)

61. Identify the **incorrect** statement from the following -

- (1) Phosphorus, arsenic and antimony show catenation property.
- (2) $\text{P}(\text{C}_2\text{H}_5)_3$ and $\text{As}(\text{C}_6\text{H}_5)_3$ form $d\pi-d\pi$ bond with transition metals.
- (3) Nitrogen can form $d\pi-p\pi$ bond with oxygen.
- (4) Nitrogen can form $p\pi-p\pi$ multiple bonds with itself.

Ans. (3)

Sol. 2nd period element can't form $p\pi-d\pi$ bond



62. At a certain temperature, T (K), during a process 500 J is absorbed by the system and work of 200 J is done by the system. Then change in internal energy of the system is -
(1) 700 J (2) 400 J (3) 300 J (4) 500 J

Ans. (3)

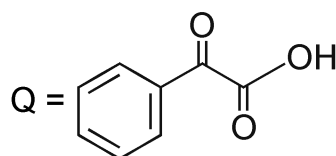
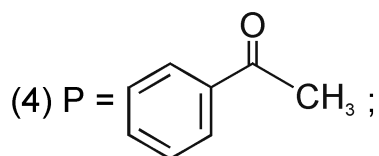
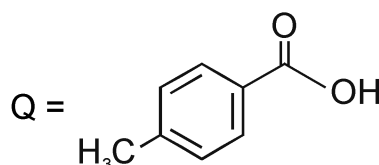
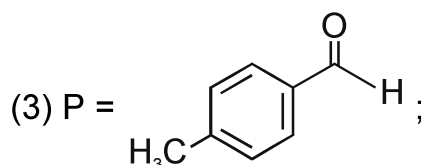
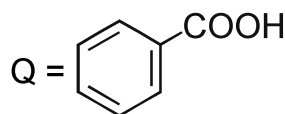
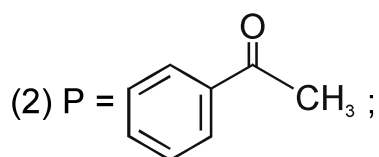
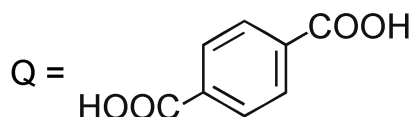
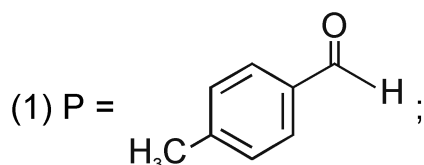
Sol. FLOT : $\Delta U = Q + w$

$Q = +500$ J heat is absorbed by the system

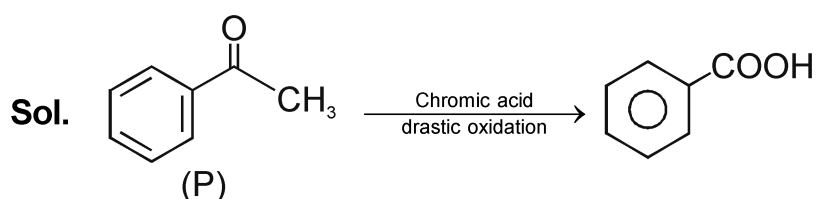
$w = -200$ J work is done by the system

$$\Delta U = 500 - 200 = 300 \text{ J}$$

63. Compound P (C_8H_8O) gives a red orange precipitate with 2,4-DNP reagent and it does not reduce Fehling's reagent. On drastic oxidation with chromic acid, P gives an aromatic product Q that produces effervescence on treating with aq. $NaHCO_3$. Compounds P and Q, respectively, are -



Ans. (2)

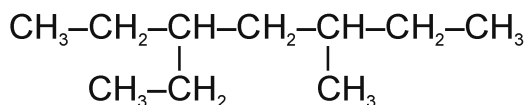


('P' Does not reduce fehling solution & give 2,4-DNP test)

Correct answer (2)



64. The **correct** IUPAC name of the following compound is -



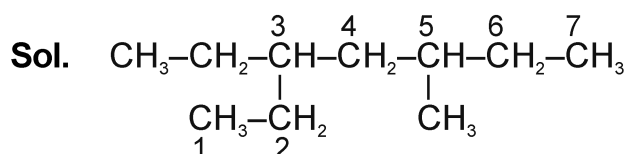
(1) 3-ethyl-5-methylheptane

(2) 3-methyl-5-ethylheptane

(3) 2,4-diethylhexane

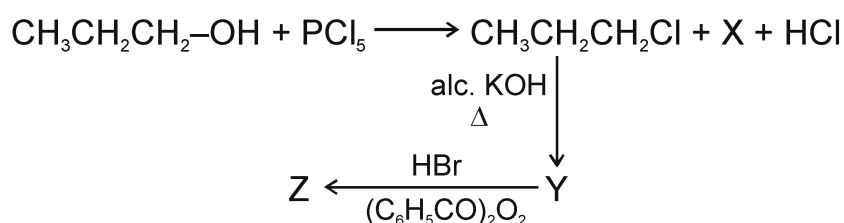
(4) 3,5-diethylhexane

Ans. (1)



3-ethyl-5-methylheptane

65. In the following reaction sequence, X and Z, respectively are -



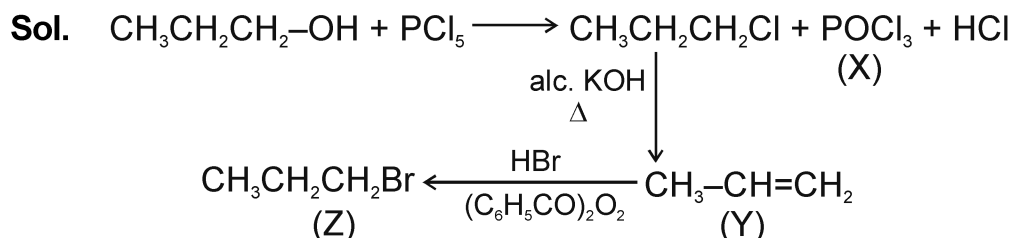
(1) $\text{X} = \text{POCl}_3$; $\text{Z} = \text{CH}_3-\underset{\text{Br}}{\text{CH}}-\text{CH}_3$

(2) $\text{X} = \text{POCl}_3$; $\text{Z} = \text{CH}_3\text{CH}_2\text{CH}_2\text{-Br}$

(3) $\text{X} = \text{H}_3\text{PO}_3$; $\text{Z} = \text{CH}_3-\underset{\text{Br}}{\text{CH}}-\text{CH}_3$

(4) $\text{X} = \text{H}_3\text{PO}_3$; $\text{Z} = \text{CH}_3\text{CH}_2\text{CH}_2\text{-Br}$

Ans. (2)

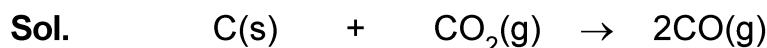




66. When 1 dm³ of CO₂ gas is passed over hot coke, the volume of gaseous mixture after complete reaction at STP becomes 1.4 dm³. The composition of the gaseous mixture at STP is -

- (1) 0.6 dm³ of CO, 0.8 dm³ of CO₂ (2) 0.8 dm³ of CO, 0.8 dm³ of CO₂
 (3) 0.6 dm³ of CO, 0.4 dm³ of CO₂ (4) 0.8 dm³ of CO, 0.6 dm³ of CO₂

Ans. (4)



Hot coke

$$\begin{array}{rcl} V_i & - & 1 \\ V_f & - & 1-x \quad \quad 2x \end{array}$$

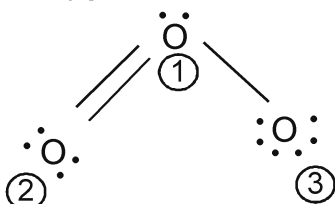
$$1 - x + 2x = 1.4$$

$$x = 0.4$$

$$\Rightarrow V_{\text{CO}_2} = 1 - x = 1 - 0.4 = 0.6 \text{ dm}^3$$

$$V_{\text{CO}} = 2x = 2 \times 0.4 = 0.8 \text{ dm}^3$$

67. The **correct** formal charges on oxygen atoms numbered 2, 1 and 3 respectively are -



- (1) 0, 0, 0, (2) -1, 0, +1 (3) +1, 0, -1 (4) 0, +1, -1

Ans. (4)



$$\text{F.C} \Rightarrow \begin{array}{ccc} 0 & +1 & -1 \end{array}$$

68. Match List I with List II -

List-I (Order of reaction)

- A. Zero order
 B. First order
 C. Second order
 D. Third order

List-II (Unit of rate constant)

- I. mol⁻¹ L s⁻¹
 II. mol⁻² L² s⁻¹
 III. s⁻¹
 IV. mol L⁻¹ s⁻¹

Choose the **correct** answer from the options given below -

- (1) A-IV, B-III, C-II, D-I (2) A-IV, B-III, C-I, D-II
 (3) A-I, B-II, C-III, D-IV (4) A-IV, B-II, C-I, D-III

Ans. (2)

Sol. Unit of rate constant = (mol)¹⁻ⁿ (L)ⁿ⁻¹ time⁻¹

∴ n ⇒ order of reaction



69. The correct order of increasing metallic character of Na, Be, P, Mg and Si is -

- (1) $\text{Be} < \text{Si} < \text{P} < \text{Mg} < \text{Na}$ (2) $\text{P} < \text{Si} < \text{Na} < \text{Mg} < \text{Be}$
 (3) $\text{P} < \text{Si} < \text{Be} < \text{Mg} < \text{Na}$ (4) $\text{P} < \text{Mg} < \text{Be} < \text{Si} < \text{Na}$

Ans. (3)

Sol. $\boxed{\text{P}} < \boxed{\text{Si}} < \boxed{\text{Be}} < \boxed{\text{Mg}} < \boxed{\text{Na}}$
 Non metal Metalloid Metals

70. The number of hydrogen atom present in 5.4 g of urea is -

(Given : Molar mass of urea : 60 g mol^{-1} , $N_A : 6.022 \times 10^{23} \text{ particles mol}^{-1}$)

- (1) 2.168×10^{22} (2) 2.168×10^{23} (3) 1.084×10^{22} (4) 1.084×10^{23}

Ans. (2)

Sol. 5.4 gm urea

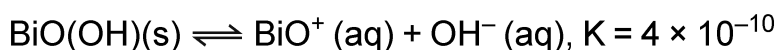
NH_2CONH_2 (Urea) molar mass 60 gm/mole

$$n_{\text{urea}} = \frac{5.4}{60}$$

$$n_{\text{H}} = \frac{5.4}{60} \times 4$$

$$\text{No. of H atom} = \frac{5.4}{60} \times 4 \times 6.022 \times 10^{23} = 2.168 \times 10^{23}$$

71. In a qualitative analysis, Bi^{3+} is detected by appearance of precipitate of $\text{BiO(OH)}(\text{s})$. Calculate pH when the following equilibrium exists at 298 K -



(Given : $\log 2 = 0.3010$)

- (1) 4.699 (2) 5.286 (3) 8.714 (4) 9.301

Ans. (4)

Sol. $\text{BiO(OH)}(\text{s}) \rightleftharpoons \text{BiO}^+(\text{aq}) + \text{OH}^-(\text{aq}), K = 4 \times 10^{-10}$

S S

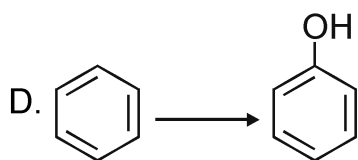
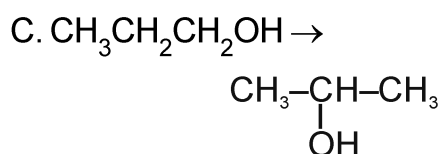
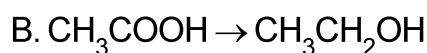
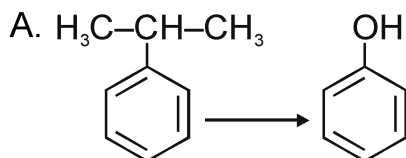
$$K = [\text{BiO}^+][\text{OH}^-]$$

$$4 \times 10^{-10} = S^2 \Rightarrow S = 2 \times 10^{-5}$$

$$[\text{OH}^-] = 2 \times 10^{-5} \Rightarrow \text{pOH} = 4.7; \text{pH} = 9.3$$



72. Match List I with List II -

List-I**List-II.**

I. (i) oleum;

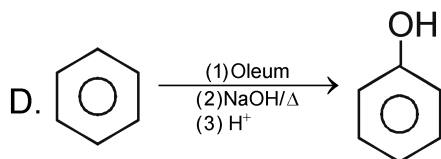
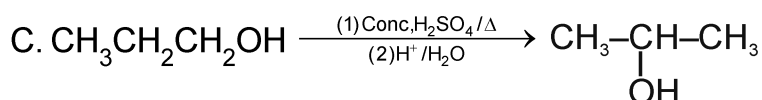
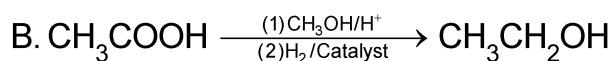
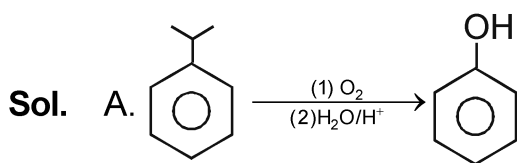
(ii) NaOH , Δ ;(iii) H^+ II. (i) O_2 ;(ii) $\text{H}_2\text{O}/\text{H}^+$ III. (i) CH_3OH , H^+ ;(ii) H_2 , catalystIV. (i) conc. H_2SO_4 , Δ ;(ii) $\text{H}^+/\text{H}_2\text{O}$ Choose the **correct** answer from the options given below -

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

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

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

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

Ans. (3)**MATRIX NEET****Office : Piprali Road, Sikar (Raj.) | Ph. 01572-243911****Website : www.matrixedu.in ; Email : smd@matrixacademy.co.in**



73. A bulb is rated at 150 watt, converting 8% energy into light. If energy of one photon is 4.42×10^{-19} J, how many photons are emitted by the bulb per second ?

- (1) 27.2×10^{19} (2) 4.06×10^{19} (3) 1.35×10^{19} (4) 2.71×10^{19}

Ans. (4)

Sol. Light energy emitted by the bulb per second = Power $\times$ time $\times$ % light

$$= 150 \times 1\text{sec.} \times \frac{8}{100} = 12 \text{ J}$$

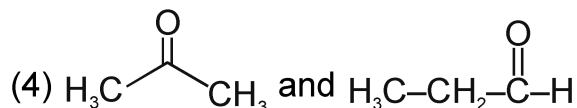
Total energy = Number of photon $\times$ energy of 1 photon

$$12 \text{ J} = n \times 4.42 \times 10^{-19}$$

$$n = 2.71 \times 10^{19}$$

74. The pair of molecules that are metamers among the following is -

- (1) $\text{CH}_3\text{OCH}_2\text{CH}_2\text{CH}_3$ and $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$
(2) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ and $\text{CH}_3-\text{CH}(\text{OH})-\text{CH}_3$
(3) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$ and $(\text{CH}_3)_2\text{CHCH}_2\text{CH}_3$

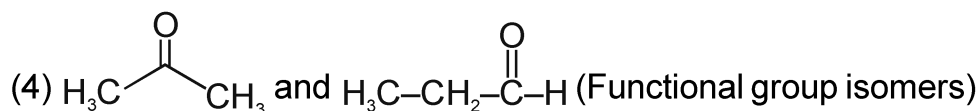


Ans. (1)

Sol. (1) $\text{CH}_3\text{OCH}_2\text{CH}_2\text{CH}_3$ and $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ (metamers)

(2) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ and $\text{CH}_3-\text{CH}(\text{OH})-\text{CH}_3$ (Position isomers)

(3) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$ and $(\text{CH}_3)_2\text{CHCH}_2\text{CH}_3$ (Chain isomers)



Correct answer (1)



75. Identify the **correct** statements -

A. The molality of 2.5 g of ethanoic acid (Molar mass : 60 g mol^{-1}) in 75 g of benzene solution is 0.556 m.

B. The molarity of a solution containing 5 g of NaOH (molar mass: 40 g mol^{-1}) in 450 mL of solution is 0.278 M at 298 K.

C. Aquatic species are more comfortable in cold water.

D. The solubility of gas increases with decrease in pressure.

E. For a binary mixture of A and B, the number of moles of A and B are n_A and n_B

respectively. The mole fraction of B will be $X_B = \frac{n_A}{n_A + n_B}$

Choose the **correct** answer from the options given below -

(1) A, B and C only

(2) A, D and E only

(3) A and B only

(4) A and C only

Ans. (1)

Sol. (A) Molality (m) = $\frac{2.5 \times 1000}{60 \times 75} = 0.55$

(B) Molarity (M) = $\frac{5 \times 1000}{40 \times 450} = 0.27$

(C) In cold water solubility of O_2 gas increased so aquatic life are more comfortable in cold water

(D) $P_{\text{gas}} \propto \text{Solubility of gas}$

(E) $X_B = \frac{n_B}{n_A + n_B}$

76. Which one of the following is an ambidentate ligand ?

(1) Oxalate

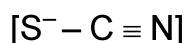
(2) Ethane-1,2-diamine

(3) Thiocyanate

(4) Ethylenediaminetetraacetate ion

Ans. (3)

Sol. $\text{SCN}^- \rightarrow \text{Thiocyanate}$





77. The functional group that can be identified through phthalein dye test is -

- (1) Carboxylic acid (2) Alcohol (3) Aldehyde (4) Phenolic

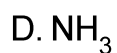
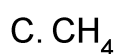
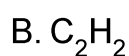
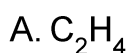
Ans. (4)

Sol. Phthalein dye test is used for phenolic group.

Correct answer (4)

78. Match List I with List II -

List-I



List-II

I. 3 σ bonds, 2 π bonds

II. 3 σ bonds, one lone pair

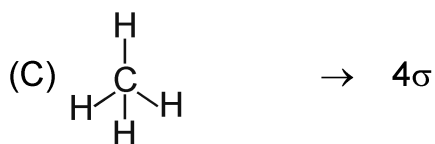
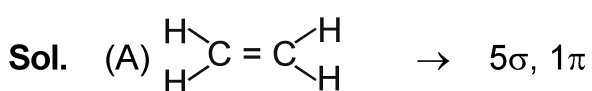
III. 4 σ bonds

IV. 5 σ bonds, 1 π bond.

Choose the **correct** answer from the options given below -

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

Ans. (1)





79. A solution of copper sulphate is electrolysed for 10 minutes with a current of 1.5 amperes. The mass of copper deposited at cathode is -

(Given : Molar mass of Cu = 63 g mol⁻¹ ; 1 F = 96487 C mol⁻¹)

- (1) 0.2938 g (2) 0.5876 g (3) 2.4036 g (4) 1.7018 g

Ans. (1)

Sol. $w_{\text{Cu}} = \frac{E}{96487} \times I \times t$

$$= \frac{63/2}{96487} \times 1.5 \times (10 \times 60 \text{ sec})$$
$$= 0.2938 \text{ gm}$$

80. Match List-I with List-II -

List-I

(Quantum Numbers)

'n'

'l'

A. 2

1

B. 4

0

C. 5

3

D. 3

2

List-II

(Orbital)

I. 3d

II. 2p

III. 4s

IV. 5f

Choose the **correct** answer from the options given below -

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

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

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

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

Ans. (1)

Sol.

	n	l
(A)	2	1 $\Rightarrow$ 2p
(B)	4	0 $\Rightarrow$ 4s
(C)	5	3 $\Rightarrow$ 5f
(D)	3	2 $\Rightarrow$ 3d

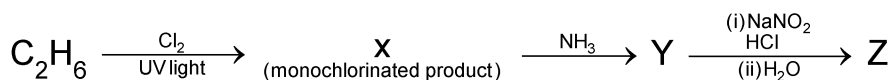
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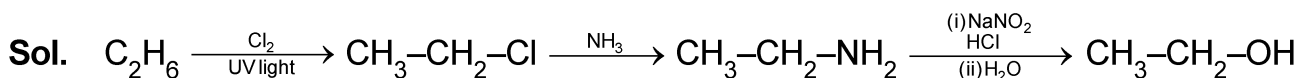


81. The major product z formed in the following sequence of reactions is -



- (1) $\text{C}_2\text{H}_5\text{-N=N-OH}$ (2) $\text{C}_2\text{H}_5\text{OH}$ (3) $\text{C}_2\text{H}_5\text{NO}_2$ (4) $\text{C}_2\text{H}_5\text{NH}_2$

Ans. (2)

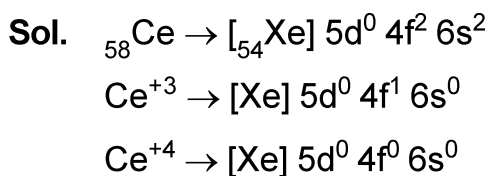


Correct answer (2)

82. Although +3 oxidation state is most common in lanthanoids, cerium still shows +4 oxidation state because -

- (1) After losing one more electron, it acquires $4f^{14}$ electronic configuration.
(2) Its nearest inert gas is Radon.
(3) After losing one more electron, it acquires $4f^0$ electronic configuration.
(4) Its atomic number is 61.

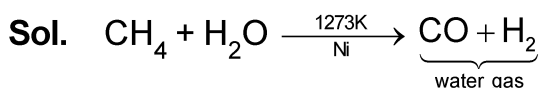
Ans. (3)



83. Methane reacts with steam at 1273 K in the presence of nickel catalyst to form -

- (1) CO and H_2
(2) CO and H_2O
(3) CO_2 and H_2
(4) CO_2 and H_2O

Ans. (1)



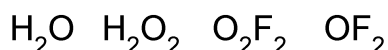


84. Identify the **incorrect** statement from the following -

- (1) Oxygen exhibits only -2 oxidation state.
- (2) The order of catenation property of Group 14 elements is $C \gg Si > Ge \approx Sn$.
- (3) Carbon has the ability to form $p\pi-p\pi$ multiple bond with itself.
- (4) ECI_3 ($E = B$ and Al) is a monomer when $E = B$ and a dimer when $E = Al$.

Ans. (1)

Sol. $O \rightarrow -2, -1, +1, +2$



85. Phenolphthalein is used as an indicator for the titration of sodium hydroxide solution against a standard solution of oxalic acid. The colour change that is observed at an alkaline pH close to the equivalence point during this titration is -

- (1) pink to colourless
- (2) pinkish red to yellow
- (3) colourless to pink
- (4) yellow to pinkish red

Ans. (3)

Sol. Phenolphthalein turns from colourless to pink in a basic solution.

86. Identify the **incorrect** statement from the following -

- (1) The largest and the smallest species among Mg , Mg^{2+} , Al and Al^{3+} are Al and Mg^{2+} , respectively.
- (2) The IUPAC name of the element with atomic number 107 is Unnilseptium.
- (3) The similarity in behaviour of Li with Mg is referred to as 'diagonal relationship'.
- (4) The oxidation state and covalency of Al in $[AlCl(H_2O)_5]^{2+}$ are 3 and 6 respectively.

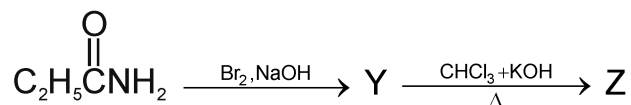
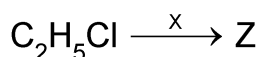
Ans. (1)

Sol. Largest $\rightarrow Mg$

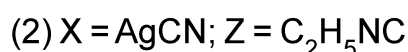
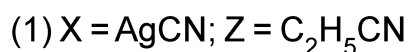
Smallest $\rightarrow Al^{+3}$



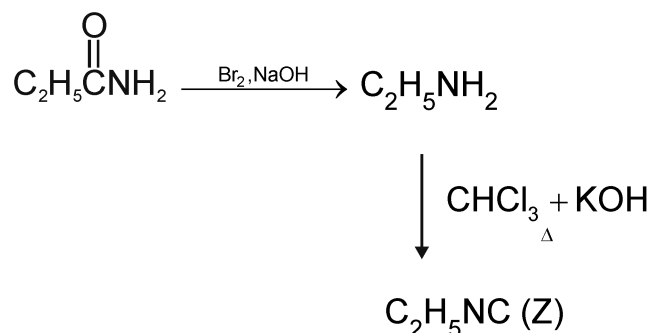
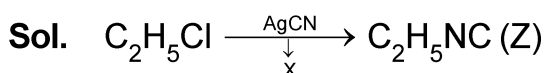
87. The following two reactions give the same foul smelling product Z.



X and Z, respectively, are -



Ans. (2)



88. The calculated 'spin-only' magnetic moment of Ti^{2+} ($3d^2$) is -

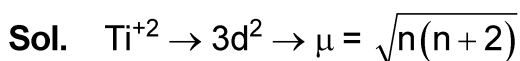
(1) 3.87 BM

(2) 4.90 BM

(3) 2.84 BM

(4) 5.92 BM

Ans. (3)



$$\mu = \sqrt{2(2+2)} = \sqrt{8}$$

$$\mu = 2.84 \text{ BM}$$



89. Match List I with List II -

List-I**(Transition metal/compound/complex)**

- A. V_2O_5
 B. Fe
 C. $PdCl_2$
 D. Ni complex

List-II**(Catalytic Role)**

- I. Preparation of ammonia from N_2/H_2 mixture
 II. Polymerisation of alkynes
 III. Preparation of H_2SO_4 from SO_2
 IV. Oxidation of ethyne to ethanal

Choose the correct answer from the options given below -

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

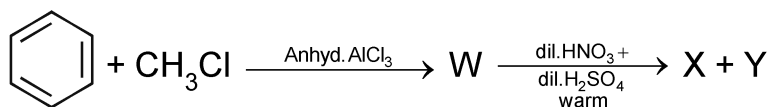
- (2) A-III, B-I, C-IV, D-II
 (4) A-IV, B-I, C-III, D-II

Ans. (2)

- Sol.** A. V_2O_5 →
 B. Fe →
 C. $PdCl_2$ →
 D. Ni complex →

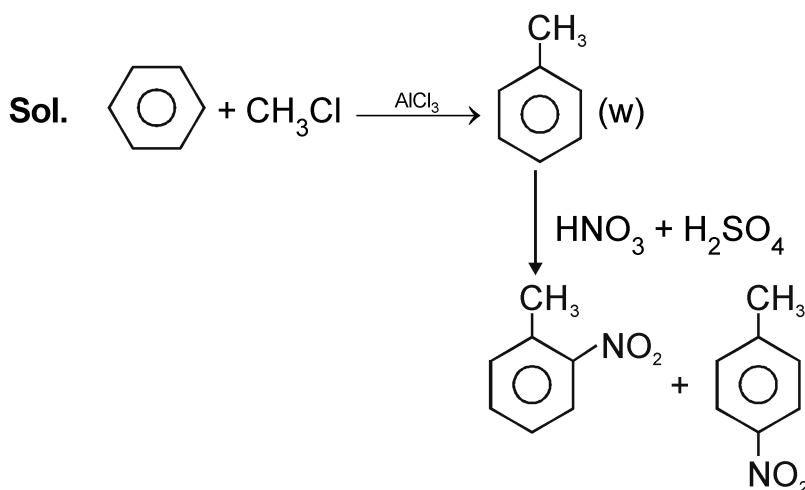
- Preparation of H_2SO_4 from SO_2
 Preparation of ammonia from N_2/H_2 mixture
 Oxidation of ethyne to ethanal
 Polymerisation of alkynes

90. Two products X and Y are formed in the following reaction sequence.



The suitable method that can be used for the separation of products X and Y is -

- (1) Continuous extraction (2) Differential extraction
 (3) Sublimation (4) Fractional distillation

Ans. (4)

Can be separated by fractional distillation

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