



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

Assertion A : Metallic sodium dissolves in liquid ammonia giving a deep blue solution, which is paramagnetic.

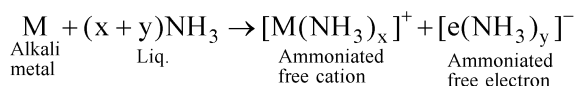
Reasons R : The deep blue solution is due to the formation of amide.

In the light of the above statements, choose the **correct** answer from the options given below :

- (1) Both A and R are true but R is NOT the correct explanation of A.
- (2) A is true but R is false.
- (3) A is false but R is true.
- (4) Both A and R are true and R is the correct explanation of A.

Ans. (2)

Sol. All alkali metals and alkaline earth metals reacts with liq. NH_3 and form deep blue coloured solution. The cause of blue colour, reducing property and paramagnetism is formation of free ammoniated electrons.



52. The conductivity of centimolar solution of KCl at 25°C is $0.0210 \text{ ohm}^{-1} \text{ cm}^{-1}$ and the resistance of the cell containing the solution at 25°C is 60 ohm. The value of cell constant is -

- (1) 3.28 cm^{-1}
- (2) 1.26 cm^{-1}
- (3) 3.34 cm^{-1}
- (4) 1.34 cm^{-1}

Ans. (2)

Sol. $K = \frac{1}{R} \times G$

$$G = 0.0210 \times 60 = 1.26 \text{ cm}^{-1}$$



53. For a certain reaction, the rate = $k[A]^2 [B]$, when the initial concentration of A is tripled keeping concentration of B constant, the initial rate would

- (1) increase by a factor of six.
- (2) increase by a factor of nine.
- (3) increase by a factor of three.
- (4) decrease by a factor of nine.

Ans. (2)

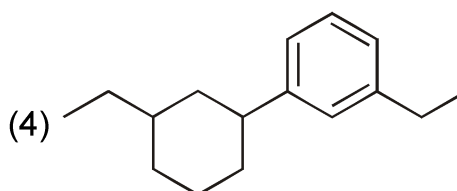
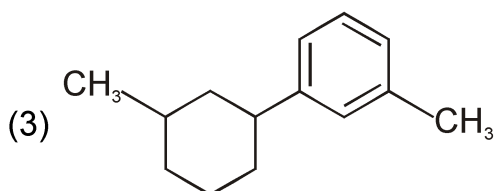
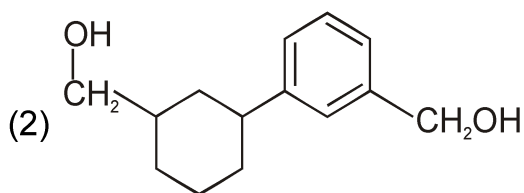
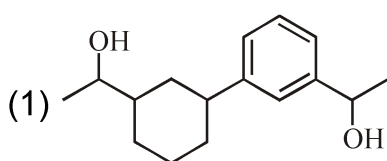
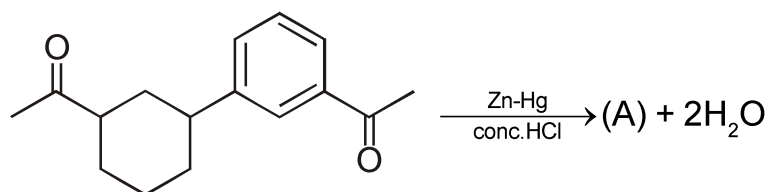
Sol. $r = k (A)^2 (B)$

$$r' = k (3A)^2 (B)$$

$$\frac{r'}{r} = 9$$

$$r' = 9r$$

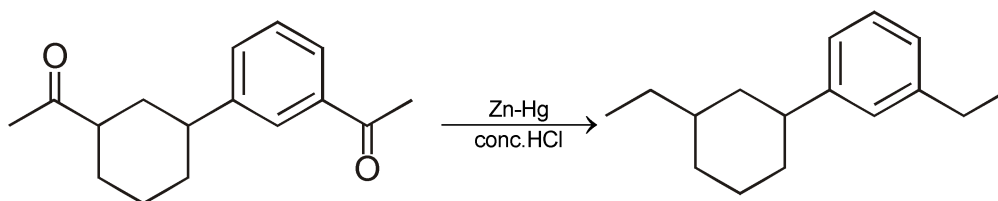
54. Identify product (A) in the following reaction :



Ans. (4)



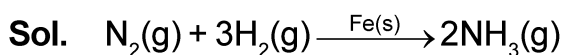
Sol. Given reaction is clemenson reduction in which carbonyl group is converted to alkane in presence of Zn–Hg/conc. HCl



55. Which one is an example of heterogenous catalysis ?

- (1) Hydrolysis of sugar catalysed by H^+ ions.
- (2) Decomposition of ozone in presence of nitrogen monoxide.
- (3) Combination between dinitrogen and dihydrogen to form ammonia in the presence of finely divided iron.
- (4) Oxidation of sulphur dioxide into sulphur trioxide in the presence of oxides of nitrogen.

Ans. (3)



Heterogenous catalysis

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

Assertion A : Helium is used to dilute oxygen in diving apparatus.

Reasons R : Helium has high solubility in O_2 . In the light of the above statements, choose the **correct** answer from the options given below:

- (1) Both A and R are true but R is NOT the correct explanation of A.
- (2) A is true but R is false.
- (3) A is false but R is true.
- (4) Both A and R are true and R is the correct explanation of A.

Ans. (1)

Sol. Because of very low solubility in blood Helium is used in diving apparatus but Helium is highly soluble in O_2 as all gases mix with each other.



57. Amongst the following, the total number of species **NOT** having eight electrons around central atom in its outer most shell, is

$\text{NH}_3, \text{AlCl}_3, \text{BeCl}_2, \text{CCl}_4, \text{PCl}_5$:

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

Ans. (4)

Sol. AlCl_3 and BeCl_2 both are electron deficient in which valence electrons in central atom are 6 and 4 respectively

While PCl_5 is octet expanded molecule in which central atom (P) has 10 valence electrons. Remaining NH_3 , and CCl_4 has 8 electron in valence shell of central atom.

58. The **correct** order of energies of molecular orbitals of N_2 molecule, is :

- (1) $\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < \sigma 2p_z < (\pi 2p_x = \pi 2p_y) < (\pi^* 2p_x = \pi^* 2p_y) < \sigma^* 2p_z$
 (2) $\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < \sigma 2p_z < \sigma^* 2p_z < (\pi 2p_x = \pi 2p_y) < (\pi^* 2p_x = \pi^* 2p_y)$
 (3) $\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < (\pi 2p_x = \pi 2p_y) < (\pi^* 2p_x = \pi^* 2p_y) < \sigma 2p_z < \sigma^* 2p_z$
 (4) $\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < (\pi 2p_x = \pi 2p_y) < \sigma 2p_z < (\pi^* 2p_x = \pi^* 2p_y) < \sigma^* 2p_z$

Ans. (4)

Sol. Increasing order of energy $\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < \pi 2p_x = \pi 2p_y < \sigma 2p_z < \pi^* 2p_x = \pi^* 2p_y < \sigma^* 2p_z$ (applied in molecules such as $\text{B}_2, \text{C}_2, \text{N}_2$ etc.)

59. Match List-I with List-II :

List-I

- A. Coke
 B. Dimaond
 C. Fullerence
 D. Graphite

List-II

- I. Carbon atoms are sp^3 hybridised.
 II. Used as a dry lubricant
 III. Used as a reducing agent
 IV. Cage like molecules

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

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

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Ans. (2)

Sol. (A) Coke is used as reducing agent in smelting (Blast furnace)

(B) Diamond - in this each carbon attached with 4 other carbon so hybridisation of carbon is sp^3 .

(C) Fullerene - It has C_{60} structure which has cage like structure

(D) Graphite - It is soft and used as dry lubricant

60. The number of σ bonds, π bonds and lone pair of electrons in pyridine, respectively are :

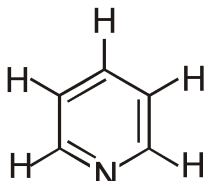
(1) 12, 3, 0

(2) 11, 3, 1

(3) 12, 2, 1

(4) 11, 2, 0

Ans. (2)

Sol.  in pyridine, 11σ , 3π , one lone pair

61. The element expected to form largest ion to achieve the nearest noble gas configuration is :

(1) F

(2) N

(3) Na

(4) O

Ans. (2)

Sol. $F + 1e^- \rightarrow F^-$

$N + 3e^- \rightarrow N^{3-}$

$Na \rightarrow Na^+ + 1e^-$

$O + 2e^- \rightarrow O^{2-}$

Size $N^{3-} > O^{2-} > F^- > Na^+$ $\left(\text{Size} \propto \frac{1}{Z_{\text{eff}}} \right)$

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

Assertion A : A reaction can have zero activation energy.

Reasons R : The minimum extra amount of energy absorbed by reactant molecules so that their energy becomes equal to threshold value, is called activation energy.

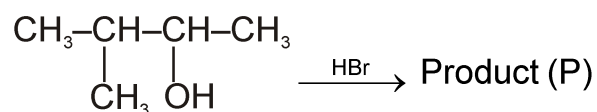
In the light of the above statements, choose the correct answer from the options given below :

- (1) Both A and R are true and R is NOT the correct explanation of A.
- (2) A is true but R is false.
- (3) A is false but R is true.
- (4) Both A and R are true and R is the correct explanation of A.

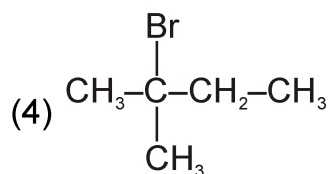
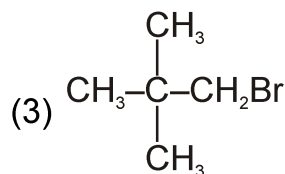
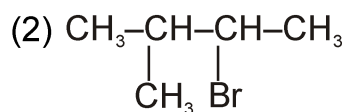
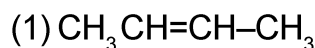
Ans. (1)

Sol. Reaction can have zero activation energy, like ionic reactions, free radical combination reactions.

63. Consider the following reaction and identify the product (P).



3-Methylbutan-2-ol

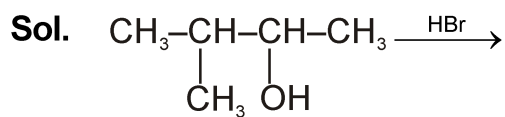


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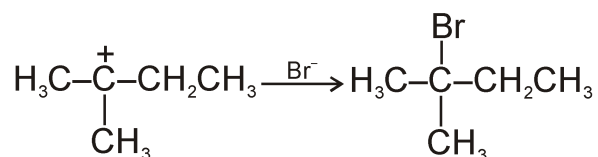
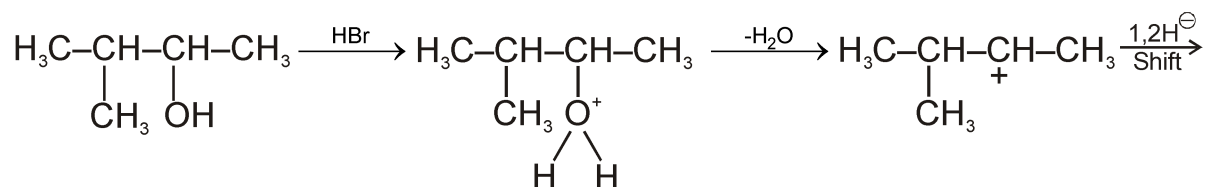
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Ans. (4)



Above reaction mechanism is SN^1



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

Assertion A : In equation $\Delta_r G = -nFE_{\text{cell}}$, value of $\Delta_r G$ depends on n .

Reasons R : E_{cell} is an intensive property and $\Delta_r G$ is an extensive property.

(1) Both A and R are true and R is NOT the correct explanation of A.

(2) A is true but R is false.

(3) A is false but R is true.

(4) Both A and R are true and R is the correct explanation of A.

Ans. (4)

Sol. If a reaction is multiplied by a factor n then ΔG will become n times while E_{cell} remains constant.

ΔG is extensive property and E_{cell} is intensive property.

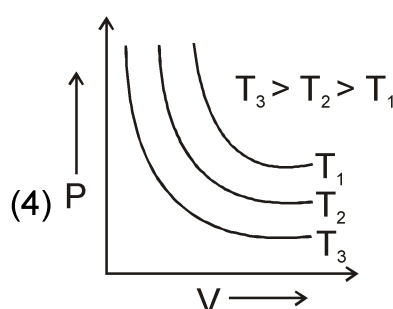
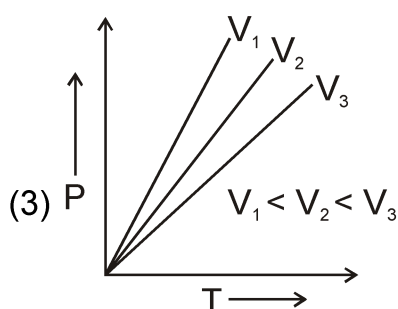
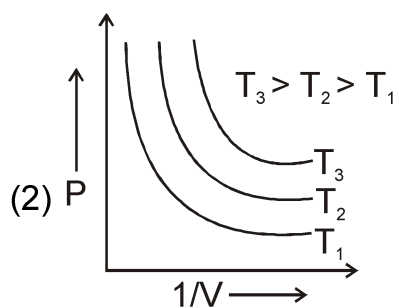
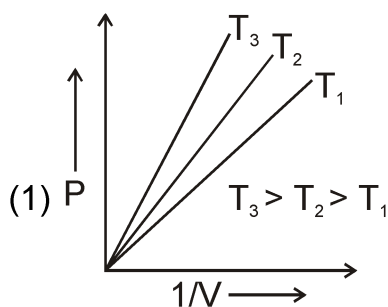
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65. Which amongst the following options is **correct** graphical representation of Boyle's law ?



Ans. (1)

Sol. $P = \frac{nRT}{V}$ So at constant temperature $P \propto \frac{1}{V}$

66. In Lassaigne's extract of an organic compound, both nitrogen and sulphur are present, which gives blood red colour with Fe^{3+} due to the formation of -

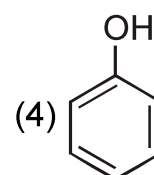
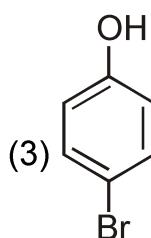
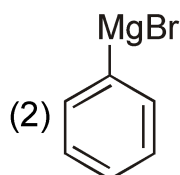
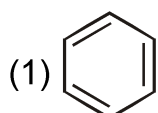
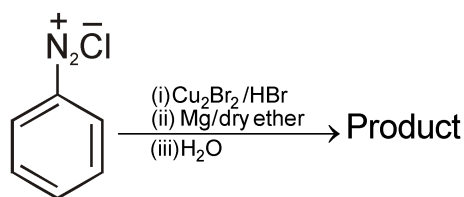
- (1) NaSCN
- (2) $[\text{Fe}(\text{CN})_5 \text{NOS}]^{4-}$
- (3) $[\text{Fe}(\text{SCN})]^{2+}$
- (4) $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3 \cdot x\text{H}_2\text{O}$

Ans. (3)

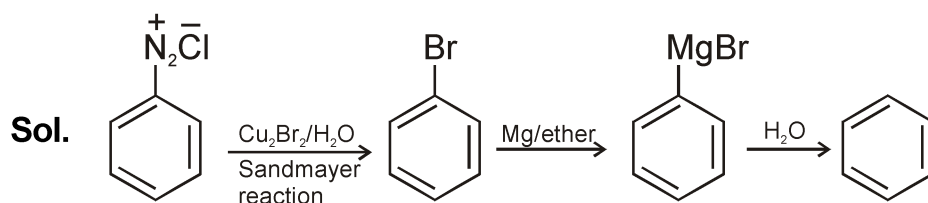
Sol. $\text{Fe}^{+3} + \text{SCN}^- \longrightarrow [\text{Fe}(\text{SCN})]^{2+}$
Red coloured



67. Identify the product in the following reaction :



Ans. (1)



68. Select the **correct** statements from the following :

- A. Atoms of all elements are composed of two fundamental particles.
- B. The mass of the electron is 9.10939×10^{-31} kg.
- C. All the isotopes of a given element show same chemical properties.
- D. Protons and electrons are collectively known as nucleous.
- E. Dalton's atomic theory, regarded the atom as an ultimate particle of matter.

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

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

Ans. (3)

Sol. (A) Fundamental particles are electron, proton and neutron.

(D) Nucleons = neutron + proton

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69. A compound is formed by two elements A and B. The element B forms cubic close packed structure and atoms of A occupy $\frac{1}{3}$ of tetrahedral voids. If the formula of the compound is A_xB_y , then the value of $x + y$ is in option

- (1) 4 (2) 3 (3) 2 (4) 5

Ans. (4)

Sol. $B = 4$

$$A = 8 \times \frac{1}{3} = \frac{8}{3}$$

$$A_2B_3 = x + y = 5$$

70. Given below are two statements :

Statement I : A unit formed by the attachment of a base to 1' position of sugar is known as nucleoside

Statement II : When nucleoside is linked to phosphorous acid at 5' –position of sugar moiety, we get nucleotide.

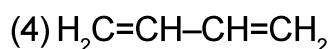
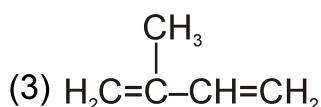
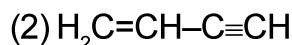
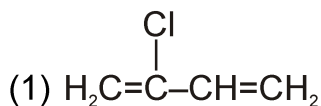
In the light of the above statements, choose the **correct** answer from the options given below :

- (1) Both statement I and Statement II are false.
(2) Statement I is true but Statement II is false
(3) Statement I is false but Statement II is true.
(4) Both Statement I and Statement II are true.

Ans. (2)

Sol. When nucleoside is linked to phosphoric acid at 5' –position of sugar moiety, we get nucleotide. (XII NCERT Pg. No. 428)

71. Which amongst the following molecules on polymerization produces neoprene ?



Ans. (1)

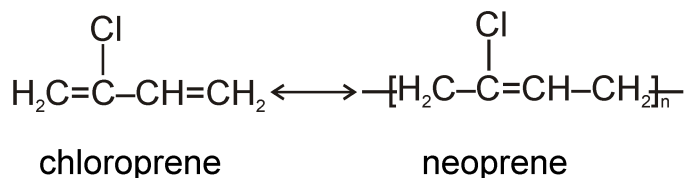
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Sol. Chloroprene is monomer of neoprene

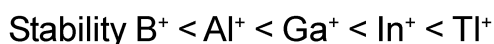
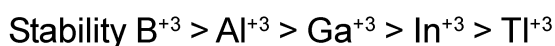


72. Taking stability as the factor, which one of the following represents **correct** relationship ?

- (1) $\text{InI}_3 > \text{InI}$ (2) $\text{AlCl} > \text{AlCl}_3$ (3) $\text{TlI} > \text{TlI}_3$ (4) $\text{TlCl}_3 > \text{TlCl}$

Ans. (1) and (3)

Sol. Due to inert pair effect stability of higher oxidation state in group decreases and stability of lower oxidation state in group increases



73. Some tranquilizers are listed below. Which one from the following belongs to barbiturates ?

- (1) Meprobamate (2) Valium (3) Veronal (4) Chlordiazepoxide

Ans. (3)

Sol. Veronal belongs to barbiturates (XII NCERT Pg. No. 445)

74. Which of the following statements are NOT correct ?

- A. Hydrogen is used to reduce heavy metal oxides to metals.
B. Heavy water is used to study reaction mechanism.
C. Hydrogen is used to make saturated fats from oils.
D. The H–H bond dissociation enthalpy is lowest as compared to a single bond between two atoms of any element.
E. Hydrogen reduces oxides of metals that are more active than iron.

Choose the most appropriate answer from the options given below :

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

Ans. (2)

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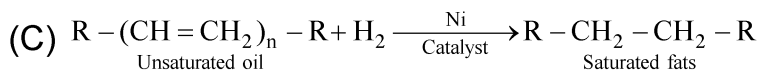
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Sol. (A) H_2 is used to reduce heavy metal oxide

(B) Heavy water is used to study reaction mechanism due to difference in bond energy in O–H and O–D bonds



(D) Due to high extent of overlapping in 1s-1s orbitals H–H bond is very strong than other single bonds.

(E) According to ECS hydrogen can not reduce oxide of metals that are more active than iron like alkali metals and alkaline earth metals.

75. Intermolecular forces are forces of attraction and repulsion between interacting particles that will include :

- A. dipole - dipole forces.
- B. dipole - induced dipole forces.
- C. hydrogen bonding.
- D. covalent bonding.
- E. dispersion force.

Choose the most appropriate answer from the options given below :

- (1) A, B, C, D are correct
- (2) A, B, C, E are correct
- (3) A, C, D, E are correct
- (4) B, C, D, E are correct

Ans. (2)

Sol. Except covalent bond all other are intermolecular forces.

76. Amongst the given options which of the following molecules/ion acts as a Lewis acid?

- (1) H_2O
- (2) BF_3
- (3) OH^-
- (4) NH_3

Ans. (2)

Sol. BF_3 act as Lewis acid because BF_3 have incomplete octet So, it has electron deficient in nature.

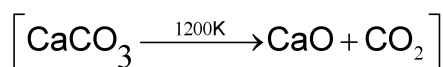
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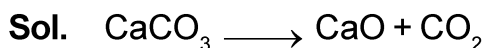


77. The **right** option for the mass of CO_2 produced by heating 20 g of 20% pure limestone is
(Atomic mass of Ca = 40)



- (1) 1.76 g (2) 2.64 g (3) 1.32 g (4) 1.12 g

Ans. (1)



$$0.04 \text{ mole} \longrightarrow 0.04 \text{ mole}$$

$$\text{mass of } \text{CO}_2 = 0.04 \times 44 = 1.76 \text{ gm}$$

mass of pure

$$\text{CaCO}_3 = \frac{20 \times 20}{100} = 4 \text{ gm}$$

$$n_{\text{CaCO}_3} = 0.04$$

78. The relation between n_m , (n_m = the number of permissible values of magnetic quantum number (m)) for a given value of azimuthal quantum number (l), is

- (1) $l = 2n_m + 1$ (2) $n_m = 2l + 1$ (3) $n_m = l + 2$ (4) $l = \frac{n_m - 1}{2}$

Ans. (4)

Sol. $n_m = 2l + 1$

$$l = \frac{n_m - 1}{2}$$

79. The stability of Cu^{2+} is more than Cu^+ salts in aqueous solution due to –

- (1) enthalpy of atomization
(2) hydration energy
(3) second ionisation enthalpy
(4) first ionisation enthalpy

Ans. (2)

Sol. The stability of Cu^{2+} (aq) rather than Cu^+ (aq) is due to the much more negative $\Delta H_{\text{hyd}}^\circ$ of Cu^{2+} (aq) than Cu^+ (aq) which more than compensates for the second IE of Cu.



80. Which one of the following statements is **correct**?

- (1) All enzymes that utilise ATP in phosphate transfer require Ca as the cofactor
- (2) The bone in human body is an inert and unchanging substance.
- (3) Mg plays roles in neuromuscular function and interneuronal transmission
- (4) The daily requirement of Mg and Ca in the human body is estimated to be 0.2 – 0.3 g.

Ans. (4)

- Sol.** (1) Mg is used as co-factor in enzyme that utilize ATP in phosphate transfer
- (2) Bone is continuously being solublized and redeposited to the extent of 400 mg per day in man.
 - (3) Ca is used in neuromuscular function and Interneuronal transmission
 - (4) The daily requirement of Mg and Ca in the human body is 200-300 mg

81. Which of the following reactions will **NOT** give primary amine as the product?

- (1) $\text{CH}_3\text{CN} \xrightarrow[\text{(ii) H}_3\text{O}^\oplus]{\text{(i) LiAlH}_4} \text{Pr oduct}$
- (2) $\text{CH}_3\text{NC} \xrightarrow[\text{(ii) H}_3\text{O}^\oplus]{\text{(i) LiAlH}_4} \text{Pr oduct}$
- (3) $\text{CH}_3\text{CONH}_2 \xrightarrow[\text{(ii) H}_3\text{O}^\oplus]{\text{(i) LiAlH}_4} \text{Pr oduct}$
- (4) $\text{CH}_3\text{CONH}_2 \xrightarrow{\text{Br}_2/\text{KOH}} \text{Pr oduct}$

Ans. (2)

- Sol.** (1) $\text{H}_3\text{C} - \text{C} \equiv \text{N} \xrightarrow[\text{(ii) H}_3\text{O}^\oplus]{\text{(i) LiAlH}_4} \text{H}_3\text{C} - \text{CH}_2\text{NH}_2$
- (2) $\text{H}_3\text{C} - \text{N} \equiv \text{C} \xrightarrow[\text{(ii) H}_3\text{O}^\oplus]{\text{(i) LiAlH}_4} \text{H}_3\text{C} - \text{NH} - \text{CH}_3$
- (3) $\text{H}_3\text{C} - \overset{\text{O}}{\parallel}{\text{C}} - \text{NH}_2 \xrightarrow[\text{(ii) H}_3\text{O}^\oplus]{\text{(i) LiAlH}_4} \text{H}_3\text{C} - \text{CH}_2 - \text{NH}_2$
- (4) $\text{H}_3\text{C} - \overset{\text{O}}{\parallel}{\text{C}} - \text{NH}_2 \xrightarrow[\text{Hoffmanbromamide}]{\text{Br}_2/\text{KOH}} \text{H}_3\text{C} - \text{NH}_2$

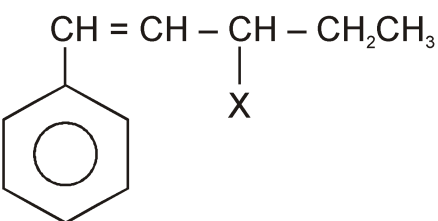
In (2) option 2° amine obtained as a product

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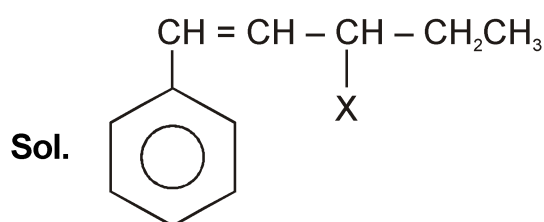
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82. The given compound  is an example of _____.

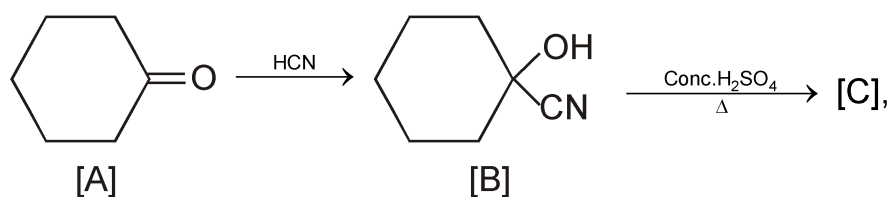
- (1) aryl halide (2) allylic halide (3) vinylic halide (4) benzylic halide

Ans. (2)

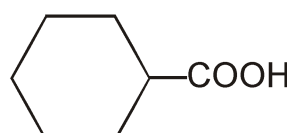
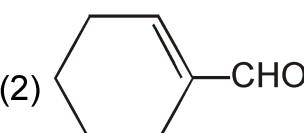
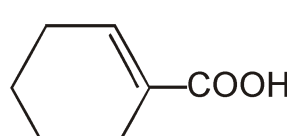
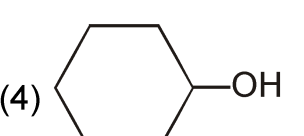


above halide is allylic halide

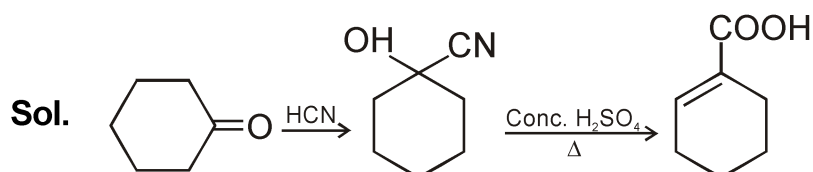
83. Complete the following reaction :



[C] is _____

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

Ans. (3)



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84. Homoleptic complex from the following complexes is :

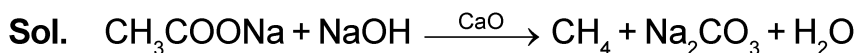
- (1) Diamminechloridonitrito–N–platinum (II)
- (2) Pentaamminecarbonatocobalt (III) chloride
- (3) Triamminetriaquachromium (III) chloride
- (4) Potassium trioxalatoaluminate (III)

Ans. (4)

85. Weight (g) of two moles of the organic compound, which is obtained by heating sodium ethanoate with sodium hydroxide in presence of calcium oxide is :

- (1) 32 (2) 30 (3) 18 (4) 16

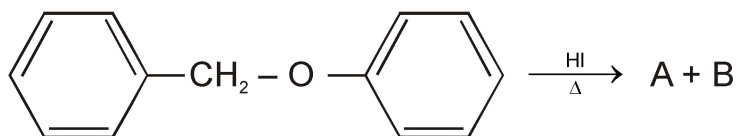
Ans. (1)



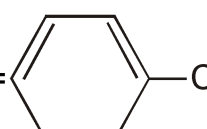
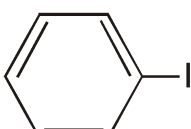
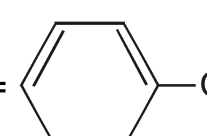
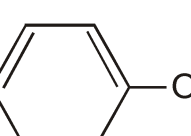
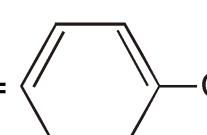
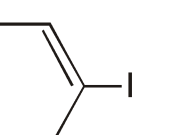
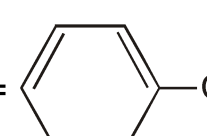
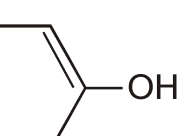
mass of 2 mole of organic compound = $2 \times 16 = 32$ gm

SECTION - B

86. Consider the following reaction :



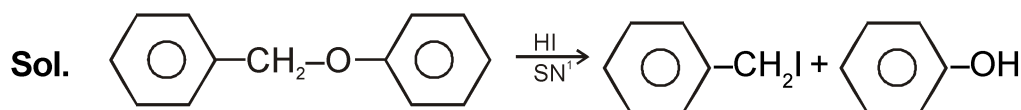
Identify products A and B.

- (1) A =  and B = 
- (2) A =  and B = 
- (3) A =  and B = 
- (4) A =  and B = 

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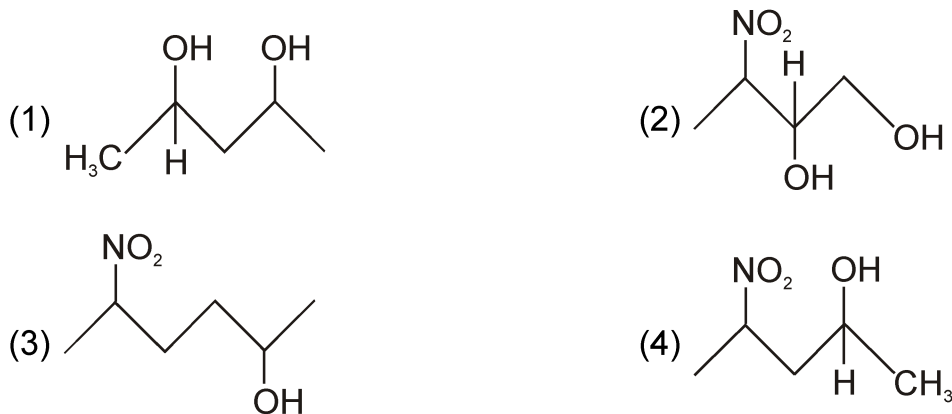
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**Ans. (2)**

Phenol doesn't show NSR due to partial double character

87. Which amongst the following will be most readily dehydrated under acidic conditions ?

**Ans. (2)****Sol.** Reactivity of alcohol \propto stability of carbocation for dehydration.88. The equilibrium concentrations of the species in the reaction $A + B \rightleftharpoons C + D$ are 2, 3, 10 and 6 mol L⁻¹, respectively at 300 K. ΔG_0 for the reaction is (R = 2 cal/ mol K).

(1) - 137.26 cal

(2) -1381.80 cal

(3) -13.73 cal

(4) 1372.60 cal

Ans. (2)

Sol. $k_{eq} = \frac{(C)(D)}{(A)(B)} = \frac{10 \times 6}{2 \times 3} = 10$

$$\Delta G^0 = -2.303 RT \log_{10} k_{eq}$$

$$= -2.303 \times 2 \times 300 \log 10$$

$$= -1381.8 \text{ cal}$$

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89. Given below are two statements :

Statement I : The nutrient deficient water bodies lead to eutrophication.

Statement II : Eutrophication leads to decrease in the level of oxygen in the water bodies.

In the light of the above statements, choose the **correct** answer from the options given below :

- (1) Both **statement I** and **statement II** are false.
- (2) **Statement I** is correct but **statement II** is false.
- (3) **Statement I** is incorrect but **statement II** is true
- (4) Both **statement I** and **statement II** are true.

Ans. (3)

Sol. The nutrient enriched water bodies lead to eutrophication. (XI NCERT Pg. No. 415)

90. Which amongst the following options is the **correct** relation between change in enthalpy and change in internal energy ?

- | | |
|---|--|
| (1) $\Delta H = \Delta U + \Delta n_g RT$ | (2) $\Delta H - \Delta U = -\Delta n_g RT$ |
| (3) $\Delta H + \Delta U = \Delta n_g RT$ | (4) $\Delta H = \Delta U - \Delta n_g RT$ |

Ans. (1)

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

91. Match List – I and List – II :

List – I (Oxoacids of Sulphur)

List–II (Bonds)

A. Peroxodisulphuric acid

I. Two S–OH, Four S = O, One S–O–S

B. Sulphuric acid

II. Two S–OH, One S = O

C. Pyrosulphuric acid

III. Two S–OH, Four S = O, One S–O–O–S

D. Sulphurous acid

IV. Two S–OH, Two S = O

(1) A–III, B–IV, C–I, D–II

(2) A–I, B–III, C–IV, D–II

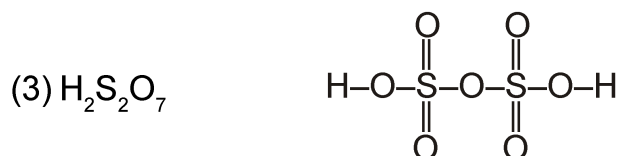
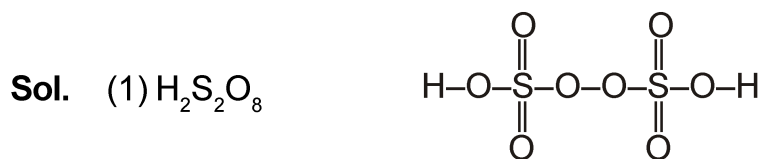
(3) A–III, B–IV, C–II, D–I

(4) A–I, B–III, C–II, D–IV

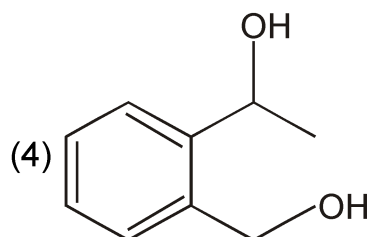
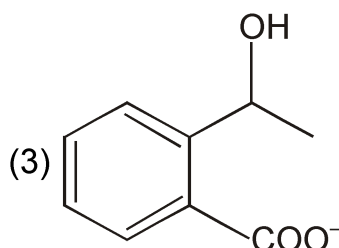
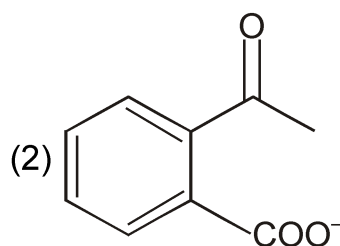
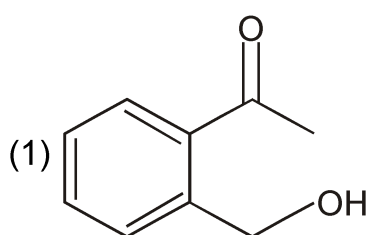
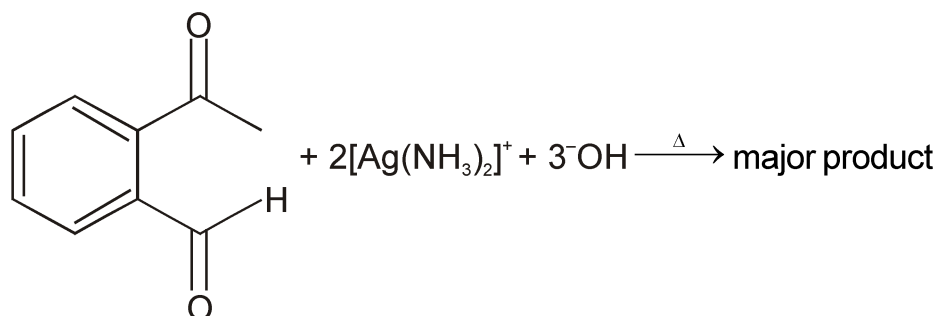
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**Ans. (1)**

92. Identify the major product obtained in the following reaction :

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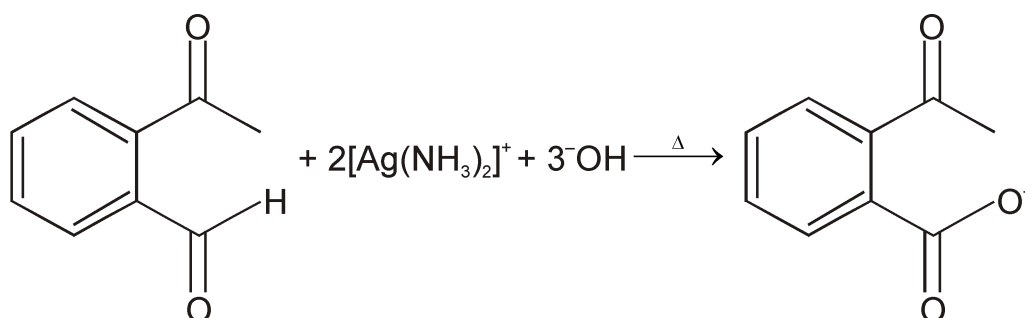
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Ans. (2)

Sol. Aldehyde give tollen test but ketone doesn't give tollen test



93. Pumice stone is an example of –

(1) gel

(2) solid sol

(3) foam

(4) sol

Ans. (2)

Sol. Pumice stone = Air dispersed in solid.

94. The reaction that does **NOT** take place in a blast furnace between 900K to 1500 K temperature range during extraction of iron is :

(1) $\text{FeO} + \text{CO} \rightarrow \text{Fe} + \text{CO}_2$

(2) $\text{C} + \text{CO}_2 \rightarrow 2\text{CO}$

(3) $\text{CaO} + \text{SiO}_2 \rightarrow \text{CaSiO}_3$

(4) $\text{Fe}_2\text{O}_3 + \text{CO} \rightarrow 2\text{FeO} + \text{CO}_2$

Ans. (4)

Sol. Following three reaction occurs in 900 - 1500 K temperature range

(1) $\text{FeO} + \text{CO} \rightarrow \text{Fe} + \text{CO}_2$

(2) $\text{C} + \text{CO}_2 \rightarrow 2\text{CO}$

(3) $\text{CaO} + \text{SiO}_2 \rightarrow \text{CaSiO}_3$



95. Which of the following statements are **INCORRECT**?

- A. All the transition metals except scandium form MO oxides which are ionic.
- B. The highest oxidation number corresponding to the group number in transition metal oxides is attained in Sc_2O_3 to Mn_2O_7 .
- C. Basic character increases from V_2O_3 to V_2O_4 to V_2O_5 .
- D. V_2O_4 dissolves in acids to give VO_4^{3-}
- E. CrO is basic but Cr_2O_3 is amphoteric

Choose the correct answer from the options given below :

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

Ans. (2)

Sol. (A) Sc does not show +2 ox. state while all other metals can show +2 ox. states.

(B) In 3d series transition metal show +3(Sc_2O_3) to +7(Mn_2O_7) oxidation states

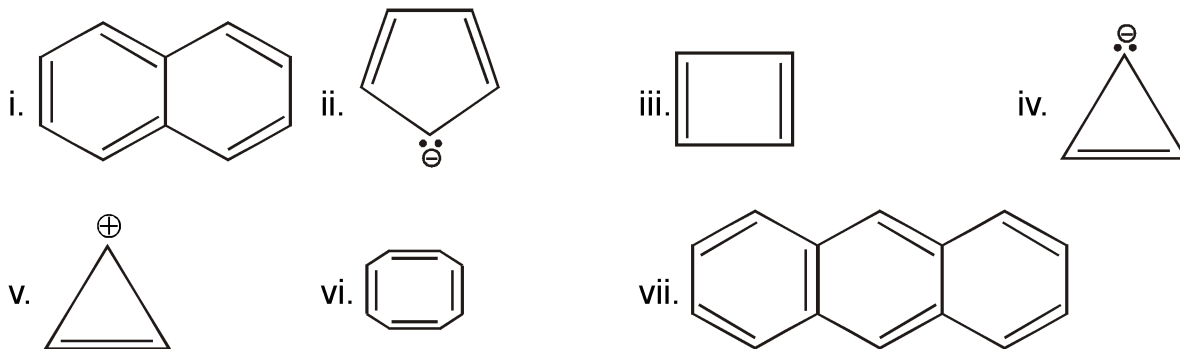
(C) Basic character decreases with increase the ox. state in oxides.

Basic character = $\text{V}_2\text{O}_3^{+3} > \text{V}_2\text{O}_4^{+4} > \text{V}_2\text{O}_5^{+5}$

(D) V_2O_4 does not give $\text{VO}_4^{3-}(\text{V}^{+5})$ Salt with acids.

(E) Basic strength $\text{CrO} > \text{Cr}_2\text{O}_3 > \text{CrO}_3$
Basic Amphoteric Acidic

96. Consider the following compounds/species :



The number of compounds/species which obey Huckel's rule is _____.

- (1) 6 (2) 2 (3) 5 (4) 4

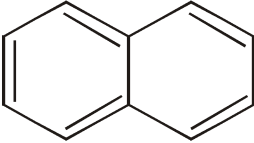
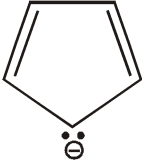

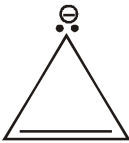
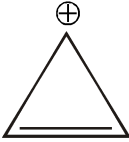

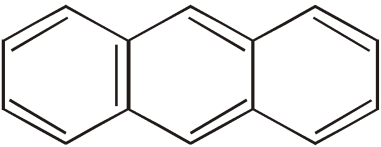
Ans. (4)

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		Huckel rule
Sol.		$10\pi e^-$ ✓
		$6\pi e^-$ ✓
		$4\pi e^-$ ×
		$4\pi e^-$ ×
		$2\pi e^-$ ✓
		$8\pi e^-$ ×
		$14\pi e^-$ ✓

4 compounds follow huckel rule

97. What fraction of one edge centred octahedral void lies in one unit cell of fcc?

(1) $\frac{1}{3}$

(2) $\frac{1}{4}$

(3) $\frac{1}{12}$

(4) $\frac{1}{2}$

Ans. (2)

Sol. Octahedral void present at each edge centre so its contribution is $\frac{1}{4}$.

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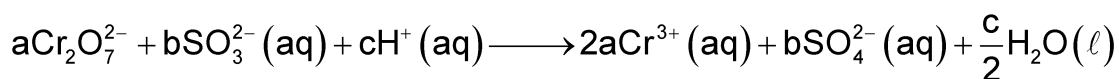
98. Which complex compound is most stable?

- (1) $[\text{Co}(\text{NH}_3)_3(\text{NO}_3)_3]$ (2) $[\text{CoCl}_2(\text{en})_2]\text{NO}_3$
 (3) $[\text{Co}(\text{NH}_3)_6]_2(\text{SO}_4)_3$ (4) $[\text{Co}(\text{NH}_3)_4(\text{H}_2\text{O})\text{Br}](\text{NO}_3)_2$

Ans. (2)

Sol. Stability of complex compound is directly proportional to chelating nature of ligands and strength of ligands so $[\text{CoCl}_2(\text{en})_2]\text{NO}_3$ is most stable.

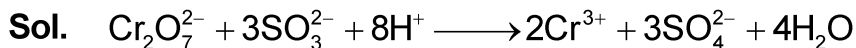
99. On balancing the given redox reaction,



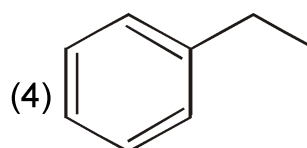
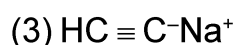
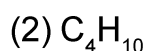
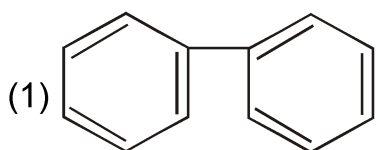
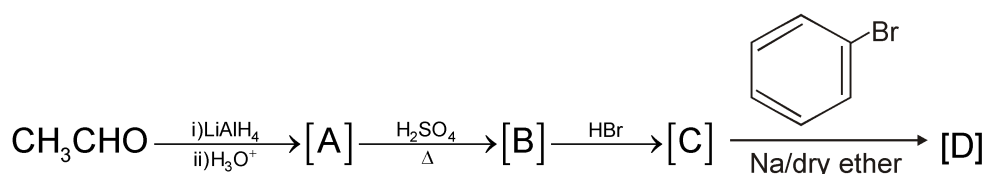
the coefficients a, b and c are found to be, respectively –

- (1) 3,8,1 (2) 1,8,3 (3) 8,1,3 (4) 1,3,8

Ans. (4)



100. Identify the final product [D] obtained in the following sequence of reactions.



Ans. (4)

