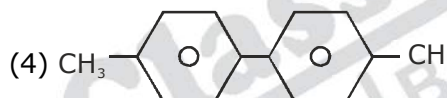
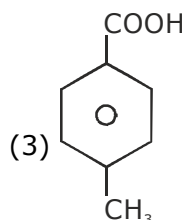
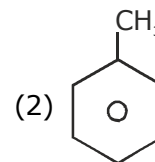
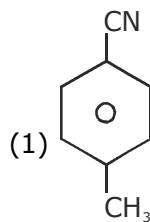
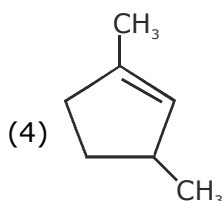
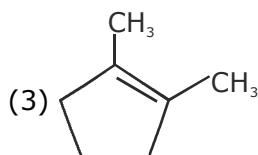
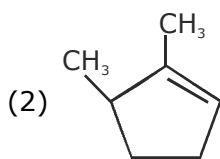
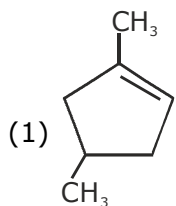
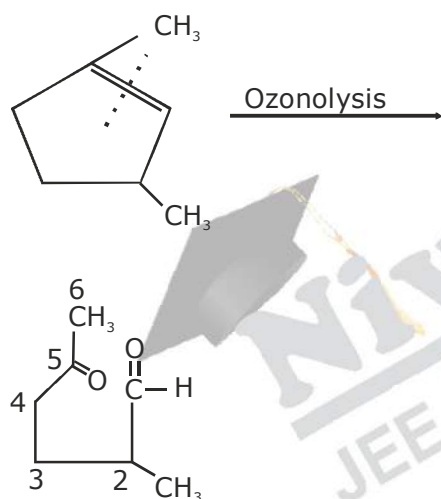


61. Which compound would give 5-keto-2-methyl hexanal upon ozonolysis? the product E is



**Sol.(4)**



62. Which of the vitamins given below is water soluble?

- (1) Vitamin E (2) Vitamin K  
 (3) Vitamin C (4) Vitamin D

**Sol.(3)**

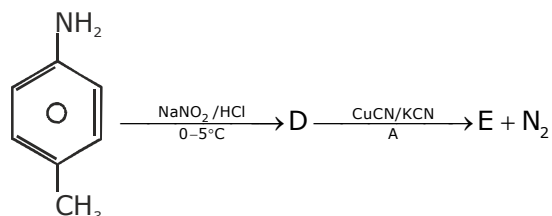
Vitamin C

63. Which one of the following alkaline earth metal sulphates has its hydration enthalpy greater than its lattice enthalpy ?

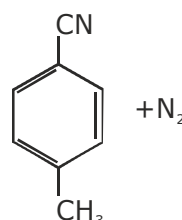
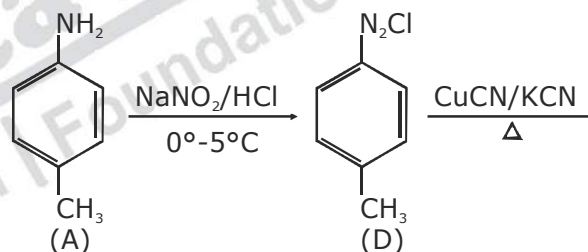
- (1) BaSO<sub>4</sub> (2) SrSO<sub>4</sub>  
 (3) CaSO<sub>4</sub> (4) BeSO<sub>4</sub>

**Sol. (4)**

64. In the reaction



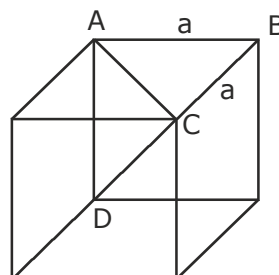
**Sol.(1)**



65. Sodium metal crystallizes in a body centered cubic lattice with a unit cell edge of 4.29 Å . The radius of sodium atom is approximately.

- (1) 5.72 Å (2) 3.22 Å  
 (3) 1.86 Å (4) 0.93 Å

**Sol.(3)**



In body centred where  $r$  = radius of sphere unit, cell Body diagonal =  $4r$

$$AC = \sqrt{a^2 + a^2} = \sqrt{2}.a$$

$$\text{Body diagonal (CD)} = \sqrt{AC^2 + AD^2}$$

$$= \sqrt{2a^2 + a^2} = \sqrt{3a^2}$$

$$4r = \sqrt{3a^2}$$

$$\text{or } 4r = \sqrt{3}.a$$

$$r = \frac{\sqrt{3}.a}{4} = \frac{\sqrt{3} \times 4.29}{4} \text{ \AA} = 1.86 \text{ \AA}$$

66. Which of the following compounds is not colored yellow?

- (1)  $(\text{NH}_4)_3 [\text{As Mo}_3\text{O}_{10}]_4$
- (2)  $\text{BaCrO}_4$
- (3)  $\text{Zn}_2[\text{Fe}(\text{CN})_6]$
- (4)  $\text{K}_3 [\text{Co}(\text{NO}_2)_6]$

**Sol.(3)**

67. Which of the following is the energy of a possible excited state of a possible excited state of hydrogen?

- (1) -3.4eV
- (2) +6.8eV
- (3) +13.6eV
- (4) -6.8eV

**Sol.(1)**

$$E = \frac{-z^2}{n^2} \times 13.6 \text{ ev.}$$

$$= \frac{-1}{n^2} \times 13.6 \text{ ev.}$$

if  $n = 2$

$$\text{Then } E = \frac{-13.6}{4} = -3.4 \text{ ev.}$$

68. Which of the following compounds is not an antacid ?

- (1) Phenelzine
- (2) Ranitidine
- (3) Aluminium hydroxide
- (4) Cimetidine

**Sol.(1)**

69. The ionic radii (in  $\text{\AA}$ ) of  $\text{N}^{3-}$ ,  $\text{O}^{2-}$  and  $\text{F}^-$  are respectively:

- (1) 1.71, 1.40 and 1.36
- (2) 1.71, 1.36 and 1.40
- (3) 1.36, 1.40 and 1.71
- (4) 1.36, 1.71 and 1.40

**Sol.(1)**

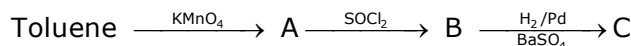
$\text{N}^{3-}$ ,  $\text{O}^{2-}$  and  $\text{F}^-$  are isoelectronic species so, as the number of proton increases ionic radii decreases.

70. In the context of the Hall - Heroult process for the extraction of Al, which of the following statements is false?

- (1)  $\text{Al}^{3+}$  is reduced at the cathode to form Al
- (2)  $\text{Na}_3\text{AlF}_6$  serves as the electrolyte
- (3) CO and  $\text{CO}_2$  are produced in this process
- (4)  $\text{Al}_2\text{O}_3$  is mixed with  $\text{CaF}_2$  which lowers the melting point of the mixture and brings conductivity

**Sol.(2)**

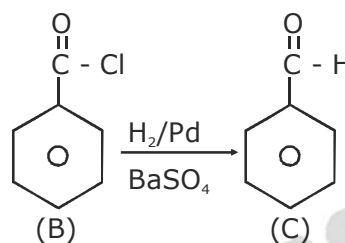
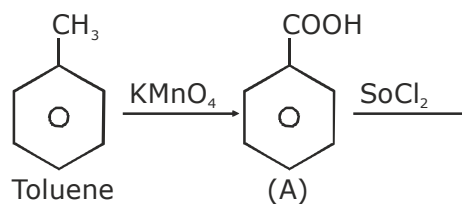
71. In the following sequence of reactions:



the product C is:

- (1)  $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$
- (2)  $\text{C}_6\text{H}_5\text{CHO}$
- (3)  $\text{C}_6\text{H}_5\text{COOH}$
- (4)  $\text{C}_6\text{H}_5\text{CH}_3$

**Sol.(2)**



72. Higher order (>3) reactions are rare due to :

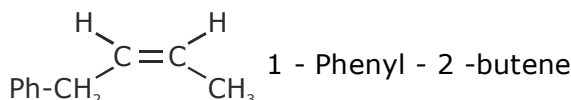
- (1) shifting of equilibrium towards reactants due to elastic collisions
- (2) loss of active species on collision
- (3) low probability of simultaneous collision of all the reacting species
- (4) increase in entropy and activation energy as more molecules are involved

**Sol.(3)**

73. Which of the following compounds will exhibit geometrical isomerism?

- (1) 2-Phenyl-1-butene
- (2) 1,1-Diphenyl-1-propane
- (3) 1-Phenyl - 2 butene
- (4) 3-Phenyl-1-butene

**Sol.(3)**



74. Match the catalysts to the correct processes:

Catalyst Process

- |                            |                                |
|----------------------------|--------------------------------|
| (A) $\text{TiCl}_3$        | (i) Wacker process             |
| (B) $\text{PdCl}_2$        | (ii) Ziegler - Natta polymeron |
| (C) $\text{CuCl}_2$        | (iii) Contact process          |
| (D) $\text{V}_2\text{O}_5$ | (iv) Deacon's process          |
- (1) A- (ii), B- (iii), C- (iv), D- (i)
  - (2) A- (iii), B- (i), C- (ii), D- (iv)
  - (3) A- (iii), B- (ii), C- (iv), D- (i)
  - (4) A- (ii), B- (i), C- (iv), D- (iii)

**Sol.(4)**

75. The intermolecular interaction that is dependent on the inverse cube of distance between the molecules is:

- (1) London force
- (2) hydrogen bond
- (3) ion-ion interaction
- (4) ion-dipole interaction

**Sol.(2)**

76. The molecular formula of a commercial resin

used for exchanging ions in water softening is  $C_8H_7SO_3Na$  (Mol. wt 206).  $Ca^{2+}$  ions by the resin when expressed in mole per gram resin?

- (1)  $\frac{2}{306}$  (2)  $\frac{1}{412}$   
(3)  $\frac{1}{103}$  (4)  $\frac{1}{206}$

**Sol.(4)**

Two moles of water softner require 1 mol of  $Ca^{2+}$ .

77. Two Faraday of electricity is passed through a solution of  $CuSO_4$ . The mass of copper deposited at the cathode is: (at. mass of Cu = 63.5 amu)

- (1) 2 g (2) 127 g  
(3) 0 g (4) 63.5 g

**Sol.(4)**

No. of equivalent = no. of faraday

$$\text{or } \frac{m}{63.5/2} = 2$$

or  $m = 63.5$  gram

78. The number of geometric isomers that can exist for square planar  $[Pt(Cl)(py)(NH_3)(NH_2OH)]^+$  is (py = pyridine):

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

**Sol.(4)**

79. In carius method of estimation of halogens, 250 mg of an organic compound gave 141 mg of AgBr. The percentage of bromine in the comkound is (at mass Ag = 108, Br = 80)

- (1) 48 (2) 60  
(3) 24 (4) 36

**Sol.(3)**

% of Br

$$= \frac{\text{Atomic mass of Br} \times \text{mass of AgBr}}{\text{Molecular mass of AgBr} \times \text{Mass of compound}}$$

80. The color of  $KMnO_4$  is due to :

- (1)  $L \rightarrow M$  charge transfer transtion  
(2)  $\sigma \rightarrow \sigma^*$  transition  
(3)  $M \rightarrow L$  charge transfer transition  
(4)  $d \rightarrow d$  transition

**Sol.(1)**

81. The synthesis of alkyl fluorides is best accomplished by:

- (1) Finkelstein reaction  
(2) Swarts reaction  
(3) Free radical fluorination  
(4) Sandmeyer's reaction

**Sol.(2)**

82. 3 g of activated charcoal was added to 50 mL of acetic acid solution (0.06N) in a flask. After qan hour it was filered and the strenght of tyhe filtrate was found to be 0.042 N. The amount of acetic acid adsorbed (per gram of charcoal) is:

- (1) 42 gm (2) 54 mg  
(3) 18 mg (4) 36 mg

**Sol.(3)**

$$N = \frac{n}{v} \times 100$$

$$n_1 = \frac{n \times v}{1000}$$

$$n_1 = \frac{0.06 \times 50}{1000} = \frac{0.6}{100} = 3 \times 10^{-3}$$

$$n_2 = \frac{0.042 \times 50}{1000} = \frac{0.210}{100} = 2.1 \times 10^{-3}$$

No. of gram equation of  $CH_3COOH$  deposited  
=  $(3 - 2.1) \times 10^{-3}$   
=  $0.9 \times 10^{-3}$   
=  $9 \times 10^{-4}$

$$\frac{m}{60} = 9 \times 10^{-4}$$

$$\text{or } m = 60 \times 9 \times 10^{-4} \text{ gram} = 54 \times 10^{-3} \text{ gram} = 54 \text{ mg.}$$

amount of acetic adsorbed per gram of charcoal

$$= \frac{54}{3} \text{ mg} = 18 \text{ mg}$$

83. The vapour pressure of acetone at  $20^\circ$  is 185 torr. When 1.2 g of a non-volatile substance was dissolved in 100 g of acetone at  $20^\circ C$ , its vaopour pressure was 183 torr. The molar mass ( $g \text{ mol}^{-1}$ ) of the substance is

- (1) 128 (2) 488  
(3) 32 (4) 64

**Sol.(4)**

V.P. of Acetone ( $P^\circ$ ) = 185 torr = 185 mm of hg

mass of nonvolatile solute = 1.2 gram

mass of acetone = 100 gram

v.p of solution ( $P$ ) = 193 torr

Let molar mass of substance =  $m$

$$\text{thus no. of moles of substance} = \frac{1.2}{m}$$

$$\frac{P^\circ - P}{P^\circ} = \frac{n}{N + n}$$

$$\text{or } \frac{P^\circ - P}{P^\circ} = \frac{n}{N}$$

$$\text{or } \frac{185 - 183}{185} = \frac{1.2}{m} \times \frac{100}{100}$$

$$\text{Or } \frac{2}{185} = \frac{1.2}{m} \times \frac{58}{100}$$

$$\text{or } m = \frac{1.2 \times 58 \times 185}{200} = 64$$

84. Which among the following is the most reactive ?

- (1) I<sub>2</sub> (2) ICl  
(3) Cl<sub>2</sub> (4) Br<sub>2</sub>

**Sol.(2)**

Since interhalogen compounds are more reactive than halogens.

85. The standard Gibbs energy change at 300 K for the reaction  $2A \rightleftharpoons B + C$  is 2494.2 J.

At a given time, the composition of the

reaction mixture is  $[A] = \frac{1}{2}$ ,  $[B] = 2$  and  $[C]$

$= \frac{1}{2}$ . The reaction proceeds in the :  $[R =$

8.314 J/K/mol,  $e = 2.718]$

- (1) forward direction because  $Q < K_C$   
(2) reverse direction because  $Q < K_C$   
(3) forward direction because  $Q > K_C$   
(4) reverse direction because  $Q > K_C$

**Sol.(4)**

$$\Delta G^\circ = 2494.2 \text{ J}$$

$$Q = \frac{[B][C]}{[A]^2}$$

$$= \frac{2 \times \frac{1}{2}}{\left(\frac{1}{2}\right)^2} = \frac{1}{\frac{1}{2}} = 2$$

$$\Delta G = -RT \ln K$$

$$\text{or } K = e^{-\Delta G^\circ/RT}$$

$$= e^{\frac{-2494.2}{8.314 \times 300}}$$

$$= e^{-1}$$

$$= \frac{1}{e}$$

$$= \frac{1}{2.718} = 0.36$$

$\therefore Q > K$  so the reaction proceeds in backward direction.

86. Assertion: Nitrogen and Oxygen are the main components in the atmosphere but these do not react to form oxides of nitrogen.

Reason: The reaction between nitrogen and oxygen requires high temperature.

(1) The assertion is incorrect, but the reason is correct

(2) Both the assertion and reason are incorrect

(3) Both assertion and reason are correct, and the reason is the correct explanation for the assertion

(4) Both assertion and reason are correct, but the reason is the not correct explanation for the assertion

**Sol.(3)**

87. Which one has the highest boiling point ?

- (1) Kr (2) Xe  
(3) He (4) Ne

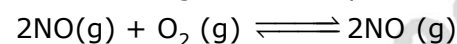
**Sol.(2)**

88. Which polymer is used in the manufacture of paints and lacquers ?

- (1) Polypropene (2) Poly vinyl chloride  
(3) Bakelite (4) Glyptal

**Sol.(4)**

89. The following reaction is performed at 298 K.



The standard free energy of formation of NO(g) is 86.6 kJ/mol at 298 K. What is the standard free energy of formation of NO<sub>2</sub>(g) at 298 K? ( $K_p = 1.6 \times 10^{12}$ )

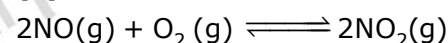
(1)  $86600 - \frac{\ln(1.6 \times 10^{-12})}{R(298)}$

(2)  $0.5 [2 \times 86,600 - R(298) \ln(1.6 \times 10^{-12})]$

(3)  $R(298) \ln(1.6 \times 10^{-12}) - 86600$

(4)  $86600 + R(298) \ln(1.6 \times 10^{-12})$

**Sol.(2)**



$$\text{or } \Delta G = -RT \ln K_p$$

$$\Delta G = -RT \ln 1.6 \times 10^{12}$$

$$\Delta G = 2 \times \Delta G_{\text{NO}_2} - 2 \times \Delta G_{\text{NO}}$$

$$\Delta G_{\text{NO}_2} = 0.5 [2 \times 86600 - R(298) \ln(1.6 \times 10^{12})]$$

90. Form the following statements regarding H<sub>2</sub>O<sub>2</sub>, choose the incorrect statement:

- (1) It has to be stored in plastic or was lined glass bottles in dark  
(2) It has to be kept away from dust  
(3) It can act only as an oxidizing agent  
(4) It decompose on exposure to light

**Sol.(3)**

H<sub>2</sub>O<sub>2</sub> acts as both oxidising agent and reducing agent.