

# JEE-Main-27-06-2022-Shift-1 (Memory Based)

## Chemistry

**Question:** What is the product formed in the given reaction?

**Options:**

- (a)  $\text{H}_2\text{O}_2$
- (b)  $\text{H}_2$
- (c) No reaction
- (d) Both (a) and (b)

**Answer:** (a)

**Solution:**



**Question:** What's the most stable oxidation state of Co?

**Options:**

- (a) +2
- (b) +5
- (c) +6
- (d) +7

**Answer:** (a)

**Solution:** The most common oxidation state for Cobalt is + 2 and +3.

**Question:** NaCN is used as a froth stabilizer for purification of which ore?

**Options:**

- (a) ZnS which contain PbS
- (b)  $\text{Cu}_2\text{S}$  which contain  $\text{Fe}_2\text{S}_3$
- (c) PbS which contain ZnS
- (d) PbS which contain  $\text{SiO}_2$

**Answer:** (b)

**Solution:** In the case of an ore containing ZnS and PbS, the froth stabilizer used is NaCN

**Question:** Calculate  $\Lambda_m^0$  for AgI given that  $\Lambda_m^0$  for  $\text{AgNO}_3$ , NaI and  $\text{NaNO}_3$  13.3, 12.07, 12  $\text{S cm}^2 \text{ mol}^{-1}$  respectively?

**Options:**

- (a) 13.37
- (b) 10.28
- (c) 17.25
- (d) 32.17

**Answer:** (a)

**Solution:**

$$\begin{aligned}\Lambda_{m(\text{AgI})}^0 &= \Lambda_{\text{AgNO}_3}^0 + \Lambda_{\text{NaI}}^0 - \Lambda_{\text{NaNO}_3}^0 \\ &= 13.3 + 12.07 - 12 = 13.37 \text{ S cm}^2 \text{ mol}^{-1}\end{aligned}$$

**Question:** White P  $\xrightarrow{\text{Conc. HNO}_3}$  ?

**Options:**

- (a)  $\text{H}_3\text{PO}_3 + \text{N}_2$
- (b)  $\text{NO}_2 + \text{PH}_3$
- (c)  $\text{H}_3\text{PO}_4 + \text{NO}_2$
- (d)  $\text{H}_3\text{PO}_3 + \text{NO}_2$

**Answer:** (c)

**Solution:**  $\text{P}_4 + \text{HNO}_3 \rightarrow \text{H}_3\text{PO}_4 + \text{NO}_2 + \text{H}_2\text{O}$

**Question:** 2 g of solute is dissolved in two different solvent A and B having 200 g mass each. Given that  $K_b(\text{A}) : K_b(\text{B}) = 1:2$ . Calculate the ratio of  $\Delta T_b(\text{A}) : \Delta T_b(\text{B})$ .

**Options:**

- (a) 1 : 2
- (b) 2 : 3
- (c) 3 : 1
- (d) 3 : 4

**Answer:** (a)

**Solution:**

Mass of solute = 2g

Mass of solvent A = 200 g

Mass of solvent B = 200 g

$K_b(\text{A}) : K_b(\text{B}) = 1 : 2$  (given)

As we know  $\Delta T_b = \frac{1000 \times K_b \times w_2}{M_2 \times w_1}$

$$\therefore \frac{\Delta T_b(\text{A})}{\Delta T_b(\text{B})} = \frac{\frac{1000 \times K_b(\text{A}) \times 2}{M_2 \times 200}}{\frac{1000 \times K_b(\text{B}) \times 2}{M_2 \times 200}}$$

$$\frac{\Delta T_b(\text{A})}{\Delta T_b(\text{B})} = \frac{K_b(\text{A})}{K_b(\text{B})} = \frac{1}{2}$$

$$\therefore \Delta T_b(\text{A}) = \Delta T_b(\text{B}) = 1:2$$

**Question:** Match the following.

Column I	Column II
A) Cationic detergent	i) Toothpaste
B) Anionic detergent	ii) Soap
C) Sodium Rosinate	iii) Dish wash
D) Nonionic detergent	iv) Hair conditioner

**Options:**

- (a) (A)  $\rightarrow$  (i); (B)  $\rightarrow$  (ii); (C)  $\rightarrow$  (iii); (D)  $\rightarrow$  (iv)
- (b) (A)  $\rightarrow$  (iv); (B)  $\rightarrow$  (i); (C)  $\rightarrow$  (ii); (D)  $\rightarrow$  (iii)
- (c) (A)  $\rightarrow$  (ii); (B)  $\rightarrow$  (iii); (C)  $\rightarrow$  (i); (D)  $\rightarrow$  (iv)
- (d) (A)  $\rightarrow$  (iii); (B)  $\rightarrow$  (i); (C)  $\rightarrow$  (iv); (D)  $\rightarrow$  (ii)

**Answer:** (b)

**Solution:**

- A) Cationic detergent  $\Rightarrow$  Hair conditioner
- B) Anionic detergent  $\Rightarrow$  Toothpaste
- C) Sodium Rosinate  $\Rightarrow$  Soap
- D) Nonionic detergent  $\Rightarrow$  Dish washer

**Question: Statement-1:**  $\Delta T_f = km$

**Statement-2:** Molality is independent of temperature.

**Options:**

- (a) Both statements are correct
- (b) Statement 1 is correct, statement 2 is incorrect
- (c) Both statements are incorrect
- (d) Statement 2 is correct, statement 1 is incorrect

**Answer:** (a)

**Solution:** Both statements are correct

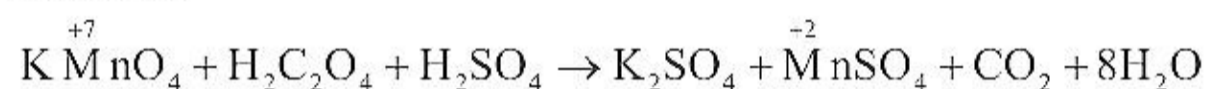
**Question:**  $\text{KMnO}_4$  reacts with oxalic acid, the oxidation no. of Mn in the product formed.

**Options:**

- (a) +7
- (b) +5
- (c) +2
- (d) +3

**Answer:** (c)

**Solution:**



**Question:** Correct uses of polymers

Column-I	Column-II
A) Bakelite	i) Switches
B) Glyptal	ii) Paints
C) PVC	iii) Raincoats

**Options:**

- (a) A  $\rightarrow$  (i); B  $\rightarrow$  (ii); C  $\rightarrow$  (iii)
- (b) A  $\rightarrow$  (iii); B  $\rightarrow$  (ii); C  $\rightarrow$  (i)
- (c) A  $\rightarrow$  (ii); B  $\rightarrow$  (iii); C  $\rightarrow$  (i)
- (d) A  $\rightarrow$  (ii); B  $\rightarrow$  (i); C  $\rightarrow$  (iii)

**Answer:** (a)

**Solution:**

Bakelite  $\Rightarrow$  Switches

Glyptal  $\Rightarrow$  Paints

PVC  $\Rightarrow$  Raincoats

**Question:** Hydrogen in ground state absorbs photon of energy 10.2 eV find change in angular momentum.

**Options:**

- (a)  $2.15 \times 10^{-34} \text{ Js}^{-1}$   
 (b)  $3.45 \times 10^{-34} \text{ Js}^{-1}$   
 (c)  $0.05 \times 10^{-34} \text{ Js}^{-1}$   
 (d)  $1.05 \times 10^{-34} \text{ Js}^{-1}$

**Answer:** (d)

**Solution:**

$$n = 1, n = 2$$

$$L_1 = \frac{h}{2\pi}, L_2 = \frac{2h}{2\pi}$$

$$\Delta L = \frac{h}{2\pi} = \frac{6.6 \times 10^{-34}}{6.28} = 1.05 \times 10^{-34} \text{ Js}^{-1}$$

**Question:** What is correct match?

Column I	Column II
A) $\text{BF}_3$	(i) See-saw
B) $\text{ClF}_3$	(ii) Square planar
C) $\text{XeF}_4$	(iii) T-shape
D) $\text{SF}_4$	(iv) Trigonal Planar

**Options:**

- (a) A  $\rightarrow$  (iv); B  $\rightarrow$  (iii); C  $\rightarrow$  (ii); D  $\rightarrow$  (i)  
 (b) A  $\rightarrow$  (iii); B  $\rightarrow$  (i); C  $\rightarrow$  (ii); D  $\rightarrow$  (iv)  
 (c) A  $\rightarrow$  (i); B  $\rightarrow$  (ii); C  $\rightarrow$  (iii); D  $\rightarrow$  (iv)  
 (d) A  $\rightarrow$  (ii); B  $\rightarrow$  (iii); C  $\rightarrow$  (iv); D  $\rightarrow$  (i)

**Answer:** (a)

**Solution:**

- A)  $\text{BF}_3 \Rightarrow$  Trigonal Planar  
 B)  $\text{ClF}_3 \Rightarrow$  T-shape  
 C)  $\text{XeF}_4 \Rightarrow$  Square planar  
 D)  $\text{SF}_4 \Rightarrow$  See-saw

**Question:** The product formed when  $\text{LiAlH}_4$  reacts with  $\text{BeCl}_2$

**Options:**

- (a)  $\text{BeH}_2$   
 (b)  $\text{Be}_2\text{H}_6$   
 (c)  $\text{HCl}$   
 (d) None

**Answer:** (a)

**Solution:**  $2\text{BeCl}_2 + \text{LiAlH}_4 \rightarrow 2\text{BeH}_2 + \text{LiCl} + \text{AlCl}_3$

**Question: Statement - 1:**  $\text{Mg}^{2+}$  and  $\text{O}^{2-}$  have same ionic radius

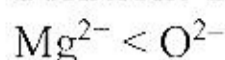
**Statement - 2:**  $\text{Mg}^{2+}$  and  $\text{O}^{2-}$  are isoelectronic species

**Options:**

- (a) Statement - 1 is false, Statement - 2 is true.  
 (b) Statement - 1 is false, Statement - 2 is false.  
 (c) Statement - 1 is true, Statement - 2 is true.  
 (d) Statement - 1 is true, Statement - 2 is false.

**Answer:** (a)

**Solution:** Statement 1 is false and statement 2 is true



**Question: Statement I:** Classical smog is formed in cold and humid environment.

**Statement II:** Photochemical smog contains  $\text{O}_3$  and PAN.

The correct statements are:

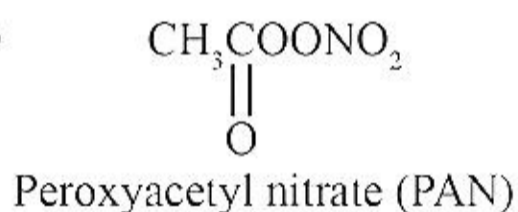
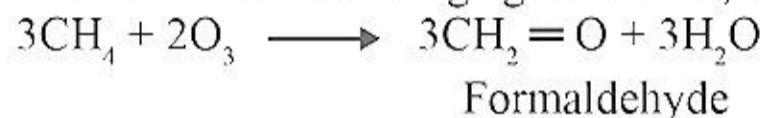
**Options:**

- (a) Both statements are correct
- (b) Statement I is correct
- (c) Statement II is correct
- (d) Both statements are incorrect

**Answer:** (a)

**Solution:** (a) Classical smog occurs in cool humid climate. It is a mixture of smoke, fog and sulphur dioxide. Chemically it is a reducing mixture and so it is also called as reducing smog.

(b) Photochemical smog occurs in warm, dry and sunny climate. The main components of the photochemical smog result from the action of sunlight on unsaturated hydrocarbons and nitrogen oxides produced by automobiles and factories. Photochemical smog has high concentration of oxidizing agents and is, therefore, called as oxidizing smog.



**Question:** Hydrogen and oxygen gas are present in a container of vol  $2000 \text{ cm}^3$  at  $300 \text{ K}$  and  $100 \text{ Kpa}$ . Total mass of mixture is  $0.76 \text{ g}$  what is the ratio of their moles.

**Options:**

- (a) 3 : 1
- (b) 1 : 3
- (c) 1 : 4
- (d) 3 : 2

**Answer:** (a)

**Solution:**

$$PV = nRT$$

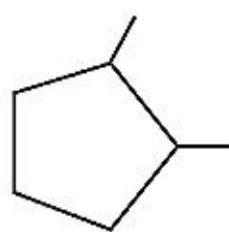
$$1 \times 2 = n \times 0.0821 \times 300 \Rightarrow n = 0.08$$

$$\text{H}_2 \rightarrow x \text{ mol}, \text{O}_2 \rightarrow (0.08 - x) \text{ mol}$$

$$2x + (0.08 - x)32 = 0.76 \Rightarrow x = 0.06$$

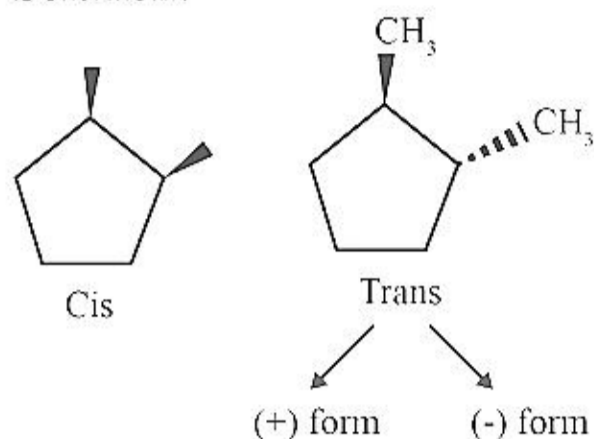
$$\frac{n_{\text{H}_2}}{n_{\text{O}_2}} = \frac{3}{1}$$

**Question:** Find out the number of stereoisomers formed by:



**Answer:** 3.00

**Solution:**

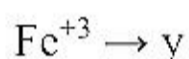
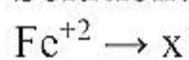


Total stereoisomers = 3

**Question:**  $\text{Fe}_{0.93}\text{O}$  has metal deficiency defect. Calculate the percentage of  $\text{Fe}^{2+}$  ions in  $\text{Fe}_{0.93}\text{O}$  compound. (Round off to the nearest integer)

**Answer:** 85.00

**Solution:**



$$x + y = 0.93 \dots(1) \times 2$$

charge balance

$$+2x + 3y = 2 \dots(2)$$

solving (1) and (2)

$$y = 0.14$$

$$\% y = \frac{0.14}{0.93} \times 100 = 15 \%$$

$$x = 100 - 15.85 \%$$

$$\text{Fe}^{+2} = 85\%$$

**Question:** How many of the following statement is correct?

Statement I.  $\text{Cu} \text{ II} \rightarrow$  Paramagnetic

Statement II.  $\text{Cu} \text{ I} \rightarrow$  Colourless

Statement III.  $\text{Cu} \text{ I} \rightarrow$  Can be oxidised

Statement IV.  $\text{Cu} \text{ I} \rightarrow$  Used as reactant in Fehling's solution.

**Answer:** 3.00

**Solution:** I) II) and III) are correct

Statement IV) is false,  $\text{Cu} \text{ (II)}$  is used as a reactant in Fehling's solution.

**Question:** How many of the following statement is correct?

Statement 1: Lyophilic  $\Rightarrow$  Protective colloid

Statement 2: Positive sol  $\Rightarrow \text{FeCl}_3 + \text{NaOH}$

Statement 3: Negative sol  $\Rightarrow \text{FeCl}_3 +$  hot water

Statement 4: Emulsion  $\Rightarrow$  liq - liq

**Answer:** 2.00

**Solution:**

Statement I and IV are correct match

Statement II and III are false

Positive solution:  $\text{FeCl}_3 + \text{hot water}$

Negative solution:  $\text{FeCl}_3 + \text{hot NaOH}$

**Question:** When electron makes transition from 3<sup>rd</sup> state to ground state in  $\text{Li}^{2+}$  ion. The wavelength of photon emitted is (Round of to the nearest integer)

**Answer:** 114.00

**Solution:**

$$E_3 - E_1 = 12.1 \times 9 \text{ eV}$$

$$\frac{12400}{\lambda} = 108.9 \text{ eV}$$

$$\lambda = 113.8 \text{ \AA}$$