

# JEE-Mains-06-04-2023 [Memory Based] [Morning Shift]

## Chemistry

**Question:** Polymer which is named as orlon is?

**Options:**

- (a) Polyacrylonitrile
- (b) Polycarbonate
- (c) Polyethene
- (d) Polyamide

**Answer:** (a)

**Solution:** Orlon is also called Acrilan or Polyacrylonitrile

**Question:** The correct set of strong oxidising and reducing agent  $\text{Ce}^{4+}$ ,  $\text{Yb}^{2+}$ ,  $\text{Tb}^{4+}$  and  $\text{Eu}^{2+}$

**Options:**

- (a)  $\text{Ce}^{4+}$ ,  $\text{Tb}^{4+}$ ,  $\text{Yb}^{2+}$ ,  $\text{Eu}^{2+}$
- (b)  $\text{Tb}^{4+}$ ,  $\text{Yb}^{2+}$ ,  $\text{Ce}^{4+}$ ,  $\text{Eu}^{2+}$
- (c)  $\text{Tb}^{4+}$ ,  $\text{Eu}^{2+}$ ,  $\text{Yb}^{2+}$ ,  $\text{Ce}^{4+}$
- (d)  $\text{Yb}^{2+}$ ,  $\text{Eu}^{2+}$ ,  $\text{Tb}^{4+}$ ,  $\text{Ce}^{4+}$

**Answer:** (a)

**Solution:**  $\text{Ce}^{4+}$ ,  $\text{Tb}^{4+}$  act as oxidising agent and  $\text{Yb}^{2+}$ ,  $\text{Eu}^{2+}$  act as reducing agent

**Question:** Match column I (Deficiency) with column II (Disease)

Vitamins Deficiency	Disease
(P) Vitamin A	(1) Scurvy
(Q) Vitamin C	(2) Xerophthalmia
(R) Vitamin B <sub>1</sub>	(3) Cheilosis
(S) Vitamin B <sub>2</sub>	(4) Beri-Beri

**Options:**

- (a) P-2, Q-1, R-4, S-3
- (b) P-2, Q-4, R-3, S-1
- (c) P-4, Q-2, R-4, S-1
- (d) P-3, Q-2, R-4, S-1

**Answer:** (a)

**Solution:** Fact based

**Question:** Y form FCC lattice in which X occupies 1/3 of tetrahedral Voids. Then formula of the compound will be

**Options:**

- (a)  $\text{X}_3\text{Y}_2$
- (b)  $\text{XY}_3$

(c)  $X_2Y_3$

(d)  $X_3Y$

**Answer:** (c)

**Solution:** tetrahedral voids are 8 in count in FCC thus X is  $\frac{8}{3}$  and  $Y = 4$  hence the formula

**Question:** Which of the following have highest electron gain enthalpy difference?

**Options:**

(a) F, Ne

(b) Ar, F

(c) Ne, Cl

(d) Ar, Cl

**Answer:** (a)

**Solution:** Fact based

EA values are  $F = -333$ ,  $Cl = -349$ ,  $Ne = 116$ ,  $Ar = 96$

**Question:** Name reactions Matching

Name Reaction	Reagents
(P) Etard Reaction	(1) NaOI
(Q) Iodoform	(2) $CO/HCl$ , Anh. $AlCl_3$
(R) Gatterman aldehyde	(3) $CrO_2Cl_2$ , $CS_2$ , $H_3O^+$
(S) HVZ	(4) $X_2/red P$ , $H_2O$

**Options:**

(a) P-3, Q-1, R-2, S-4

(b) P-3, Q-2, R-1, S-4

(c) P-3, Q-4, R-2, S-1

(d) P-1, Q-3, R-2, S-4

**Answer:** (a)

**Solution:** Fact based

**Question:** Match column I (Compound) with column II (Type of Bond)

Nitrogen oxides	Type of Bonds
(P) $N_2O$	(1) N-N bond
(Q) $N_2O_5$	(2) N-O-N bond
(R) $NO_2$	(3) N=N or N triple bond N
(S) $N_2O_4$	(4) N=O

**Options:**

(a) P-1, Q-4, R-2, S-3

(b) P-3, Q-2, R-4, S-1

(c) P-1, Q-2, R-4, S-3

(d) P-1, Q-3, R-2, S-4

**Answer:** (b)

**Solution:** structure-based question

**Question:** Photochemical smog is maximum in

**Options:**

- (a) Himalayan Region
- (b) Green Healthy vegetation
- (c) Marshy Lands
- (d) Industrial Region

**Answer:** (d)

**Solution:** Hydrocarbons and nitrogen oxides produced by automobiles and factories.

**Question:** Which of the reaction is correct among the following with appropriate enzyme?

**Options:**

- (a) Sucrose  $\rightarrow$  Glucose + fructose : Enzyme – Invertase
- (b) Glucose  $\rightarrow$  CO<sub>2</sub> + Ethanol : Enzyme : Maltase
- (c) Protein  $\rightarrow$  Amino acid : Enzyme : Zymase
- (d) Starch  $\rightarrow$  Maltose : Enzyme : Pepsin

**Answer:** (a)

**Solution:** Sucrose  $\rightarrow$  Glucose + fructose : Enzyme – Invertase

**Question:** Which of the following is used for settling of cement?

**Options:**

- (a) Gypsum
- (b) Limestone
- (c) Clay
- (d) Silica

**Answer:** (a)

**Solution:** Setting of cement: When mixed with water, the setting of cement takes place to give a hard mass. This is due to the hydration of the molecules of the constituents and their rearrangement.

**Question:** which of the following is having square Pyramidal shape

**Options:**

- (a) XeOF<sub>4</sub>
- (b) BrF<sub>5</sub>
- (c) IF<sub>5</sub>
- (d) ICl<sub>4</sub><sup>-</sup>

**Answer:** (a)

**Solution:** XeOF<sub>4</sub> has geometry of Sp<sup>3</sup>d<sup>2</sup> and shape of square pyramidal

**Question: Assertion:** Loss of the electron from hydrogen atom results in nucleus (H<sup>+</sup>) of  $\sim 1.5 \times 10^{-3}$  pm size.

**Reason:** H<sup>+</sup> does not exist freely and is always associated with other atoms or molecules.

**Options:**

- (a) Both assertion and reason are correct but reason is not correct explanation
- (b) Both assertion and reason are correct but reason is correct explanation
- (c) Both assertion and reason are incorrect
- (d) Assertion is correct and reason is incorrect

**Answer:** (b)

**Solution:** Loss of the electron from hydrogen atom results in nucleus ( $H^+$ ) of  $\sim 1.5 \times 10^{-3}$  pm size. This is extremely small as compared to normal atomic and ionic sizes of 50 to 200 pm. As a consequence,  $H^+$  does not exist freely and is always associated with other atoms or molecules. Thus, it is unique in behavior.

**Question: Assertion:** The magnetic Moment of  $[Fe(H_2O)_6]^{3+}$  and  $[Fe(CN)_6]^{3-}$  are 5.92 BM and 1.74 BM respectively.

**Reason:** The oxidation state Fe is +3.

**Options:**

- (a) Both assertion and reason are correct but reason is not correct explanation
- (b) Both assertion and reason are correct but reason is correct explanation
- (c) Both assertion and reason are incorrect
- (d) Assertion is correct and reason is incorrect

**Answer: (a)**

**Solution:** water as ligand do not cause pairing in complex but  $CN^-$  does

**Question:** If radius of ground state hydrogen is 51 pm, find out the radius of 5<sup>th</sup> orbit of  $Li^{2+}$  (closest integer)

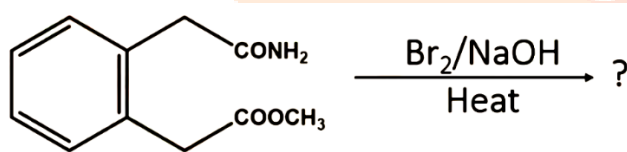
**Options:**

- (a) 170 pm
- (b) 180 pm
- (c) 120 pm
- (d) 425 pm

**Answer: (d)**

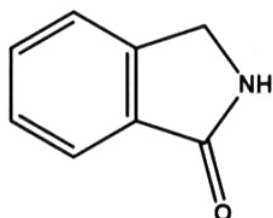
**Solution:** Apply  $r = 51 \times 5^2 / 3$

**Question:** Identify the product formed in the following reaction.

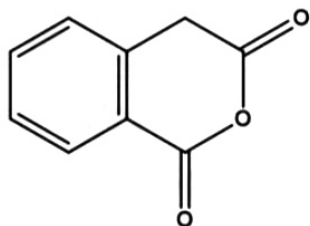


**Options:**

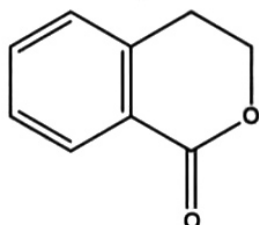
(a)



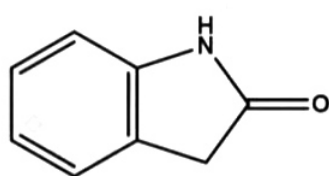
(b)



(c)

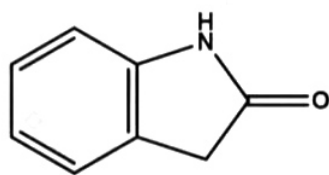


(d)



**Answer: (d)**

**Solution:**



**Question:** Matrix match for detection of element

Column-I	Column-II
(A) Nitrogen	(P) AgX
(B) Sulphur	(Q) $(\text{NH}_4)_3\text{PO}_4 \cdot 12\text{MoO}_3$
(C) Phosphorous	(R) $\text{Fe}(\text{SCN})_3$
(D) Halogens	(S) $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$

**Options:**

- (a) A-P, B-R, C-Q, D-S
- (b) A-R, Q, B-P, C-Q, D-S
- (c) A-S, B-R, C-Q, D-P
- (d) A-Q, B-R, C-P, D-S

**Answer: (c)**

**Solution:** A-S, B-R, C-Q, D-P

**Question:** Consider the following reaction.



If the initial concentration of  $A_2B_3(g)$  is  $c$ , find the value of  $\alpha$

**Options:**

(a)  $\left(\frac{K_{eq}}{27c^4}\right)^{\frac{1}{5}}$

(b)  $\left(\frac{K_{eq}}{c^4}\right)^{\frac{1}{5}}$

(c)  $\left(\frac{K_{eq}}{108c^4}\right)^{\frac{1}{5}}$

(d)  $\left(\frac{K_{eq}}{4c^4}\right)^{\frac{1}{5}}$

**Answer:** (c)

**Solution:**

$\left(\frac{K_{eq}}{108c^4}\right)^{\frac{1}{5}}$

