

JEE-Main-26-06-2022-Shift-1 (Memory Based)

Chemistry

Question: Which of the following is responsible for the secretion of pepsin?

Options:

- (a) Histamine
- (b) Cimctidine
- (c) Zantac
- (d) Serotonin

Answer: (a)

Solution: Histamine, stimulates the secretion of pepsin and hydrochloric acid in the stomach.

Question: Arrange the following species in increasing order of their Bond Order O_2^- , O_2^{2-} , O_2 , O_2^+

Options:

- (a) $O_2^- < O_2 < O_2^+ < O_2^{2-}$
- (b) $O_2 < O_2^- < O_2^+ < O_2^{2-}$
- (c) $O_2^+ < O_2^- < O_2 < O_2^{2-}$
- (d) $O_2^{2-} < O_2^- < O_2 < O_2^+$

Answer: (d)

Solution: Electronic configuration of O_2

$(\sigma 1s^2) (\sigma^* 1s^2) (\sigma 2s^2) (\sigma^* 2s^2) (\sigma 2p_z^2) (\pi 2p_x^2) (\pi 2p_y^2) (\pi^* 2p_x^1) (\pi^* 2p_y^1)$

$$\text{Bond order of } O_2 = \frac{N_B - N_A}{2} = \frac{10 - 6}{2} = 2$$

$$\text{Bond order of } O_2^- = \frac{10 - 7}{2} = \frac{3}{2} = 1.5$$

$$\text{Bond order of } O_2^+ = \frac{10 - 5}{2} = 2.5$$

$$\text{Bond order of } O_2^{2-} = \frac{10 - 8}{2} = 1$$

Increasing order of bond order is $O_2^{2-} < O_2^- < O_2 < O_2^+$

Question: The increasing order of stability of +1 oxidation state of group 13 elements is:

Options:

- (a) $Ga < Al < In < Tl$
- (b) $Tl < In < Ga < Al$
- (c) $Al < Ga < Tl < In$
- (d) $Al < Ga < In < Tl$

Answer: (d)

Solution: On going down the group 13, stability of +1 oxidation state increases due to inert pair effect.

Question: The correct order of melting point of group 16 elements is:

Options:

- (a) $O < S < Se < Te > Po$
- (b) $Po < S < Se < Te < O$
- (c) $S < O < Se < Te < Po$
- (d) $Te < O < Po < Se < S$

Answer: (a)

Solution: As we go down the group as the metallic character increases, the melting point increases for group 16 elements. But due to its packed structure and lesser shielding of electrons, Te has the highest melting point among them. So, the correct order is $O < S < Se < Te > Po$

Question: Which of the following alkaline earth metal has highest melting point?

Options:

- (a) Be
- (b) Mg
- (c) Ca
- (d) Sr

Answer: (a)

Solution:

Melting point of Be is 1560

Melting point of Mg is 924

Melting point of Ca is 1124

Melting point of Sr is 1062

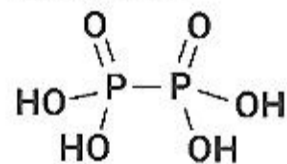
Question: $A + \text{Alkali} \rightarrow B$, where B is an oxyacid of Phosphorus with no P-H bonds, what is A?

Options:

- (a) White Phosphorus
- (b) Red Phosphorus
- (c) H_3PO_3
- (d) P_2O_5

Answer: (b)

Solution:



Red $P_4 + \text{Alkali} \rightarrow \text{Hypophosphoric acid}$

(A) (B)

Question: Among V_2O_3 , V_2O_5 and V_2O_4 , calculate magnetic moment of the most basic oxide.

Options:

- (a) $2\sqrt{2}$
- (b) $\sqrt{2}$
- (c) $2\sqrt{3}$

(d) 2

Answer: (a)

Solution:

Most basic is $V_2O_3 \rightarrow V^{3+}$

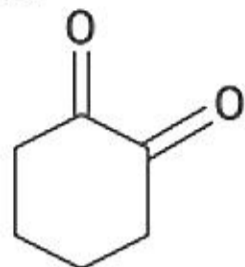
${}_{23}V \rightarrow 4s^2 3d^3, V^{3+} = 3d^2$

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

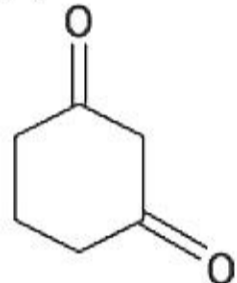
Question: Which of the following has maximum enol content?

Options:

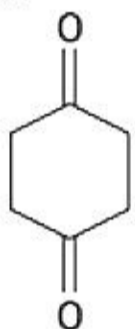
(a)



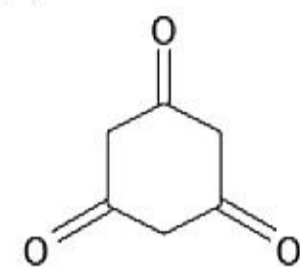
(b)



(c)



(d)



Answer: (d)

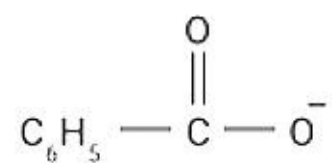
Solution: Cyclohexane-1,3,5-trione on tautomerisation forms resonance stabilized molecule benzene-1,3,5-triol. Hence, enol content is maximum.

Question: The intermediate in the given reaction is

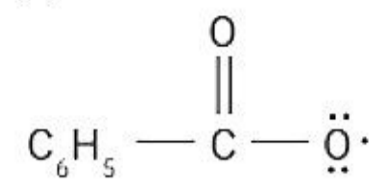


Options:

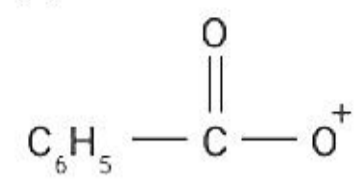
(a)



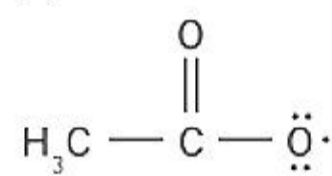
(b)



(c)

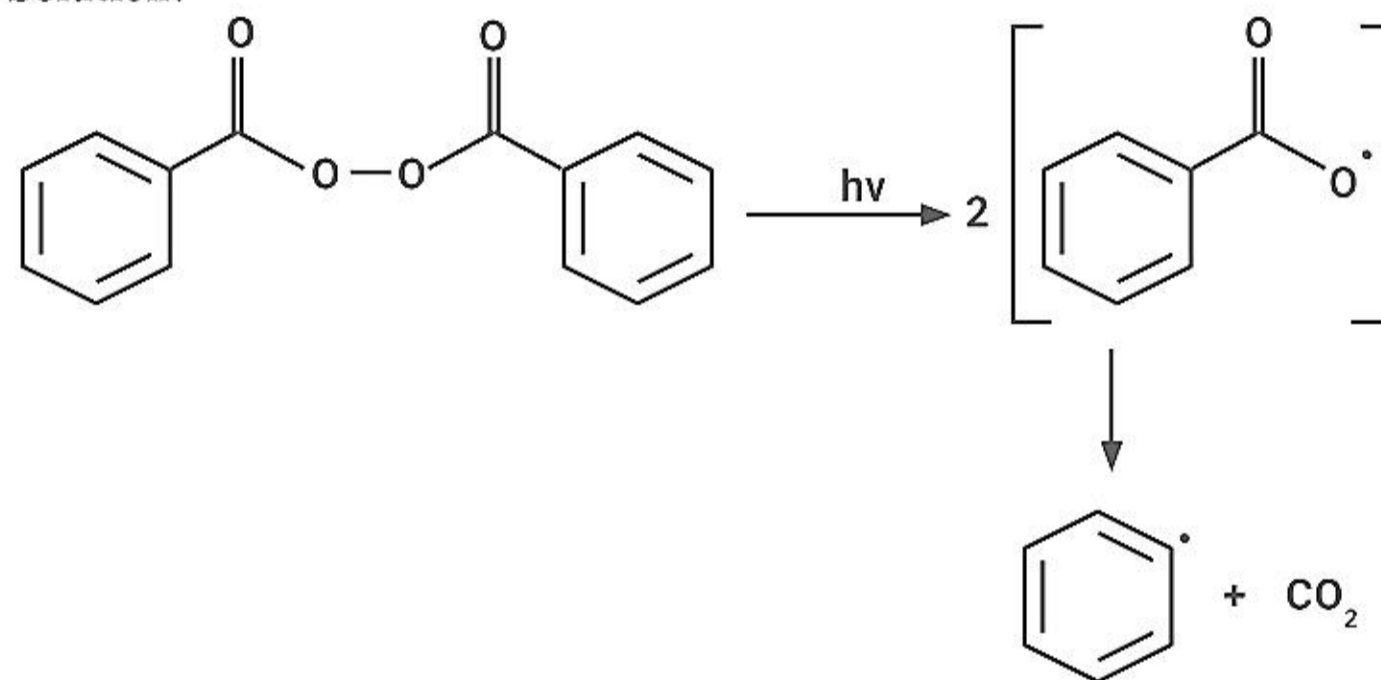


(d)

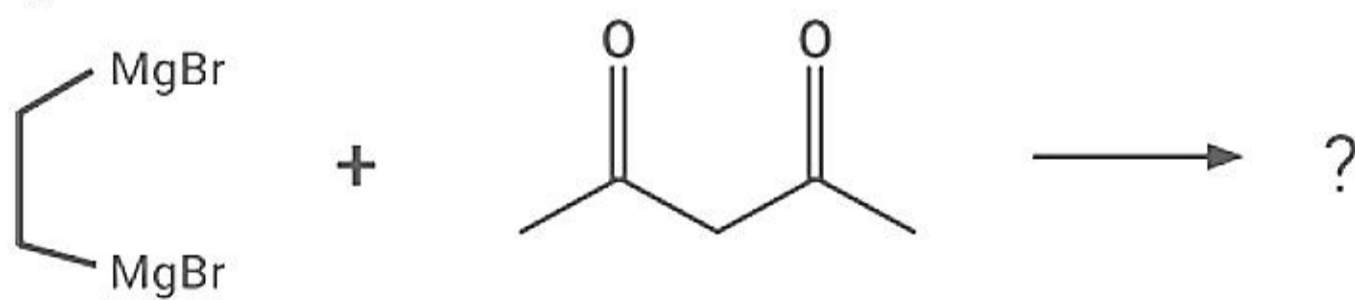


Answer: (b)

Solution:

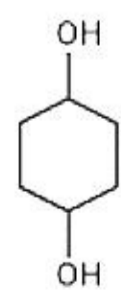


Question:

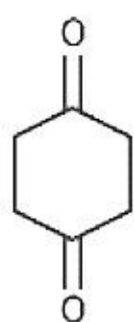


Options:

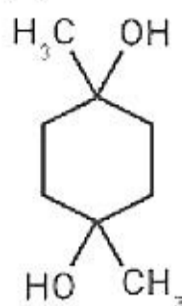
(a)



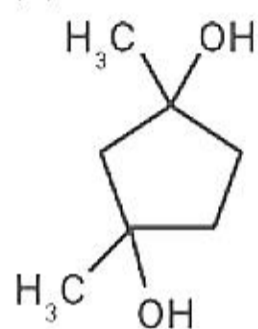
(b)



(c)

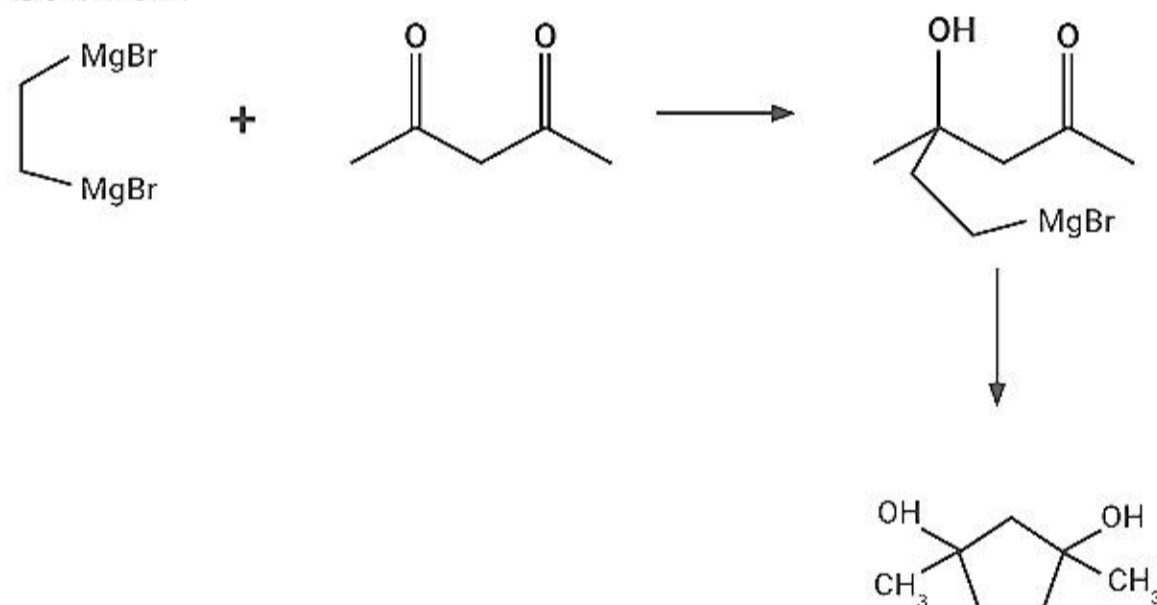


(d)



Answer: (d)

Solution:



Question: Which of the following is produced in stratostrophic clouds?

Options:

- (a) Smog
- (b) Ozone hole
- (c) Acid rain
- (d) Carbon dioxide

Answer: (b)

Solution: Ozone hole is produced by stratostrophic cloud

Question: If the Bohr radius of 3rd orbit of H-atom is r_3 and that of 4th orbit is r_4 then

Options:

- (a) $r_4 = \frac{16}{9}r_3$

$$(b) r_4 = \frac{4}{3} r_3$$

$$(c) r_4 = \frac{9}{16} r_3$$

$$(d) r_4 = \frac{3}{4} r_3$$

Answer: (a)

Solution:

$$r \propto \frac{n^2}{z}$$

$z = 1$ for hydrogen

$$r_3 \propto 9$$

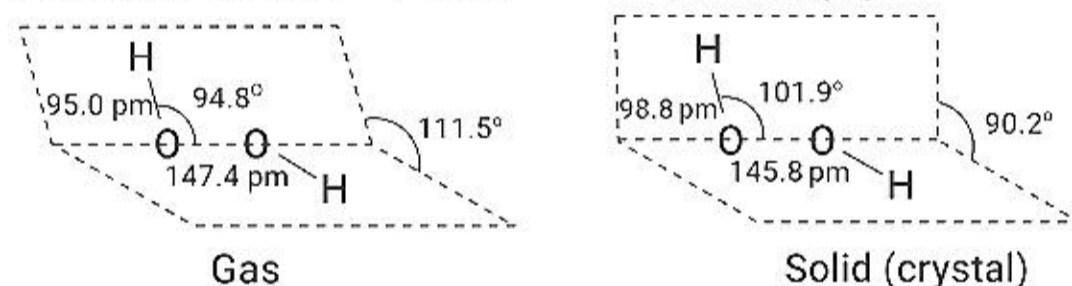
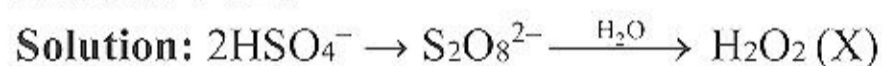
$$r_4 \propto 4^2 = 16$$

$$\frac{r_3}{r_4} = \frac{9}{16}$$

$$r_4 = \frac{16}{9} r_3$$

Question: On electrolysis of HSO_4^- , compound is formed which on hydrolysis forms 'X'. What is the dihedral angle of X in solid state?

Answer: 90.20



Question: Weight of evacuated glass vessels is 40 g. Weight when a liquid of density 0.95 g/mL is 135 g. When gas is put at 0.82 atm pressure and 250 K temp weight is 40.5 g, then find the molar mass of the gas in (g).

Answer: 125.00

Solution:

$$\text{Weight of liquid} = 135 - 40 = 95 \text{ g}$$

$$\text{Volume of liquid} = \frac{\text{mass}}{\text{density}} = \frac{95}{0.95} = 100 \text{ mL}$$

$$\text{Volume of vessel} = 100 \text{ mL}$$

$$PV = nRT$$

$$0.82 \times \frac{100}{1000} = nRT$$

$$n = \frac{0.82 \times \frac{100}{1000}}{0.0821 \times 250} = \frac{0.082}{0.0821 \times 250} = \frac{1}{250}$$

$$\text{Mass of ideal gas} = 40.5 - 40 = 0.5 \text{ g}$$

$$n = \frac{w}{M} = \frac{1}{250}$$

$$\frac{0.5}{M} = \frac{1}{250}$$

$$\text{Molar mass} = 0.5 \times 250 = 125 \text{ g}$$

Question: An organic compound when reacts with dil. HNO_3 produces two isomers A and B. A possess intramolecular hydrogen bonding and B possess intermolecular hydrogen bonding. When the same compound reacts with conc. HNO_3 it produces a strong acid D. Find the no. of oxygen atoms in D.

Answer: 7.00

Solution:

