JEE-Main-29-07-2022-Shift-1 (Memory Based)

Chemistry

Question: Product for the given reaction is:

$Zn + NaOH \rightarrow$

Options:

(a) ZnO

(b) ZnO_2

(c) $[ZnO_3]^{4-}$

(d) $[Zn(OH)_4]^{2-}$

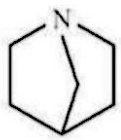
Answer: (d)

Solution: $Zn(s) + 2NaOH(aq) + 2H_2O(l) \rightarrow Na_2[Zn(OH)_4] + H_2(g)$

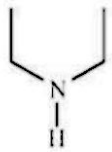
Question: Which of the following is the strongest Bronsted base?

Options:

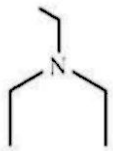
(a)



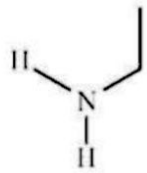
(b)



(c)



(d)



Answer: (a)

Solution: 3° aliphatic amines are strongest base among 3°, 2° and 1° amines. A is strongest base as it is 3° and lone pair is more available due to bridged alkyl group.

Question: Which of the following are examples of herbicides?

Options:

(a) Sodium arsinite, Sodium chlorate

(b) PAN, Sodium arsinite

(c) Sodium bicarbonate, DDT

(d) DDT, Sodium chlorate

Answer: (a)

Solution: Sodium chlorate ($NaClO_3$), sodium arsinite (Na_3AsO_3) are examples of herbicides.

Question: In Haber's process, 5 g of H_2 reacts with 20 g of N_2. Find the moles of ammonia formed.

Options:

(a) 1.42

(b) 2.8

(c) 2

(d) 1

Answer: (a)

Solution:

$N_2 + 3H_2 \rightarrow 2NH_3$

2g 5g

$= \left(\frac{20}{27}\right)$ moles $\left(\frac{5}{2}\right) = 2.5$ moles

= 0.714 moles

N_2 is limiting reagent

1 moles N_2 forms 2 moles NH_3

0.714 mole N_2 will form 2×0.714 mole = 1.428 moles NH_3

Question: Which pair among the following is colourless?

Options:

(a) Sc^{3+}, Zn^{2+}

(b) Ti^{2-}, Cu^{2+}

(c) Fe^{3+}, Mn^{2+}

(d) Fe^{3+}, Cu^{2+}

Answer: (a)

Solution:

Sc^{3+} – [Ar]

Zn^{2+} – $3d^{10}$

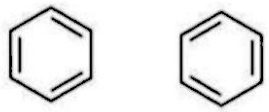
Both of them have completely filled orbitals.

Therefore, both are colourless

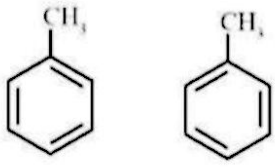
Question: Which of the following pairs will give different products on ozonolysis?

Options:

(a)



(b)



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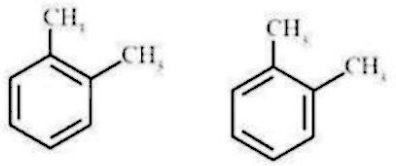
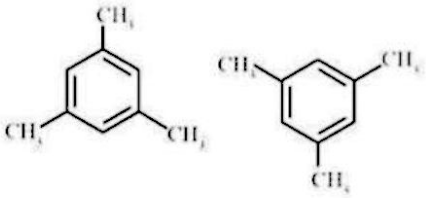
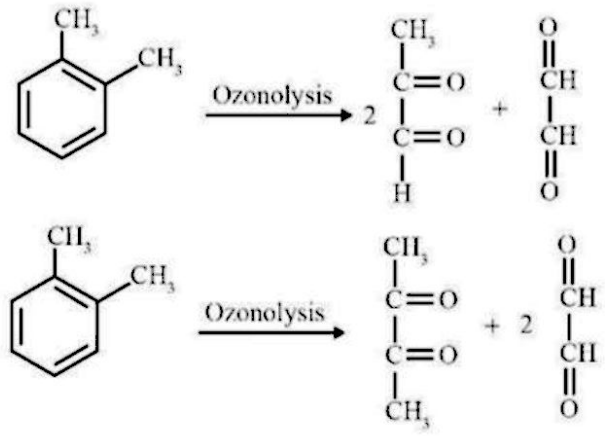


(d)

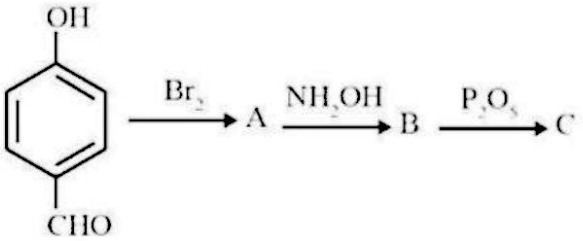


Answer: (c)

Solution:

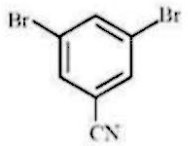


Question: Find 'C'

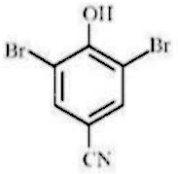


Options:

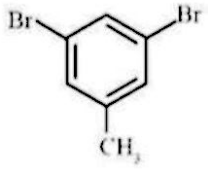
(a)



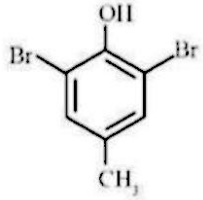
(b)



(c)

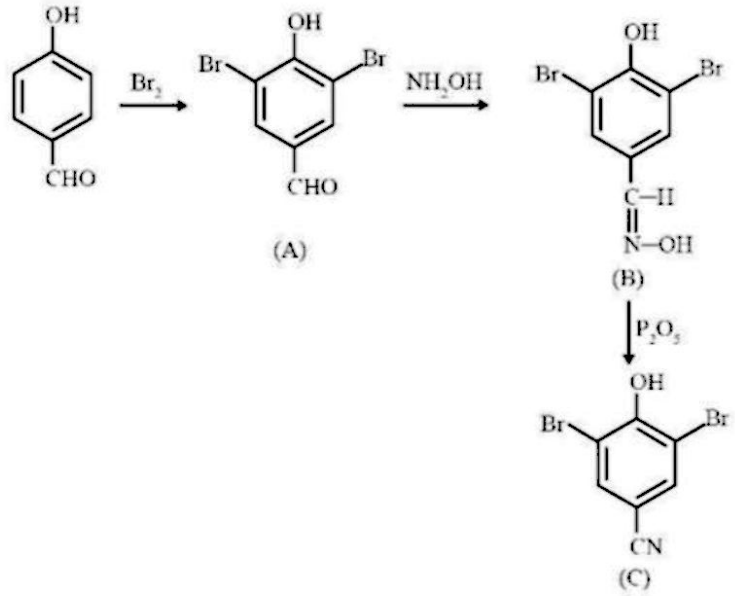


(d)

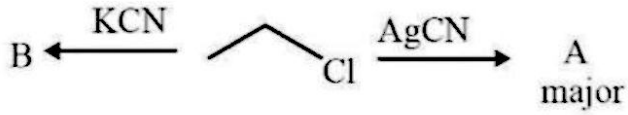


Answer: (b)

Solution:



Question: Find A and B respectively?

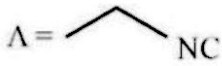


Options:

(a)

(b)

(c)



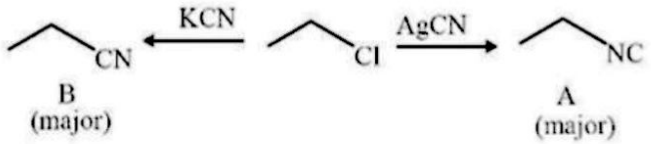
(d)

A = 

B = — C ≡ N

Answer: (a)

Solution:



Question: Which of the following is a hypnotic drug?

Options:

(a) Seldane

(b) Terpineol

(c) Amytal

(d) Histamine

Answer: (c)

Solution: Derivatives of barbituric acid viz, veronal, amytal, nembutal, luminal and seconal constitute an important class of tranquilizers. These are hypnotic.

Question: K_{sp} of PbS is given as 9×10^{-30} at a given temperature. Its solubility is $x \times 10^{-15}$. Find the value of x

Answer: 3.00

Solution: $PbS \rightleftharpoons \underset{s}{Pb^{2+}} + \underset{s}{S^{2-}}$

$K_{sp} = S^2$

$9 \times 10^{-30} = S^2$

$S = \sqrt{9 \times 10^{-30}} = 3 \times 10^{-15}$

Question: Ionic radius for A^+ and B^- are 281 pm and 180 pm respectively forming a ccp structure. If B^- forms a ccp lattice and A^- fills the octahedral voids, then what is the value of edge length in pm?

Answer: 778.00

Solution:

$$r^{+} + r^{-} = \frac{a}{2}$$

$$281 + 180 = \frac{a}{2}$$

$$a = 778 \text{ pm}$$

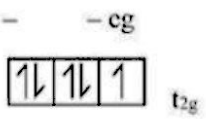
Question: Consider a complex $[Fe(OH)_6]^{3-}$ which act as an inner orbital complex. If the CFSE value after ignoring pairing energy is represented as $-x\ \Delta_o$, then x is:

(Δ_o is splitting energy in octahedral complex)

Answer: 2.00

Solution: Charge on Fe in $[Fe(OH)_6]^{3-}$ is +3

$Fe^{+3} - 3d^5$



$CFSE = (-0.4 \times 5)\Delta_o = -2\Delta_o$

Question: The magnitude of change in oxidation state of manganese in $KMnO_4$ in faintly alkaline or neutral medium is:

Answer: 3.00

Solution:

$$\overset{(+7)}{K}\overset{(+7)}{Mn}O_4 \xrightarrow[\text{Medium}]{\text{Neutral}} \overset{(+4)}{Mn}O_2$$

Change in oxidation state of Mn = 7 – 4 = 3