Carboxylic Acids and Its Derivatives

Question1

Formic acid on heating with concentrated H_2SO_4 at 373 K gives X, a colourless substance and Y, a good reducing agent. The number of σ and π bonds in X, Y are respectively

TG EAPCET 2024 (Online) 11th May Morning Shift

Options:

A. $X = 2, 0; Y = 1, 2$

B. $X = 1, 2; Y = 2, 2$

C. $X = 2, 1; Y = 1, 1$

D. $X = 1, 2; Y = 3, 3$

Answer: A

Solution:

The complete reaction is as follows,

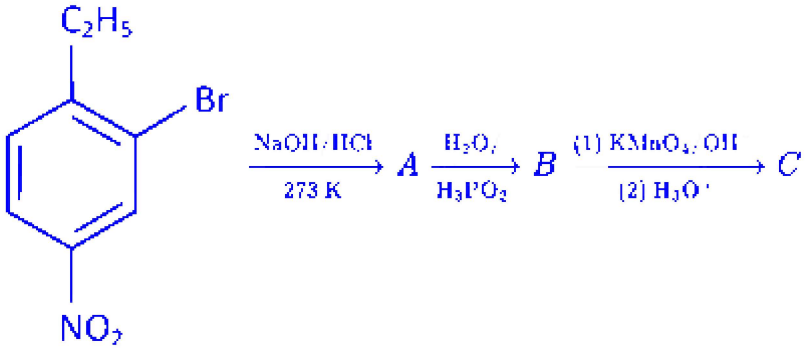
$$\underset{\text{Formic add}}{HCOOH} \xrightarrow[\Delta]{H_2SO_4} \underset{(\text{Product } X)}{H_2O} + \underset{(\text{Product } Y)}{CO}$$

CO has 3 bonds, 1σ bond and 2π bonds.

H_2O has 2 bonds, both are σ bonds. Hence, $X = 2, 0$ and $Y = 1, 2$

Question2

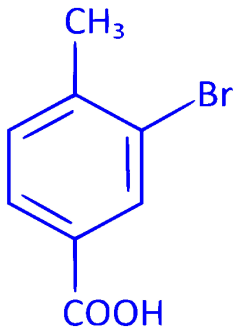
What is C in the given sequence of reactions?



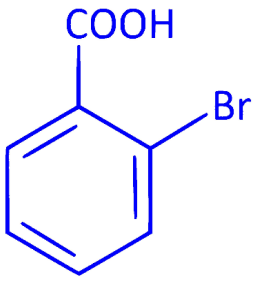
TG EAPCET 2024 (Online) 11th May Morning Shift

Options:

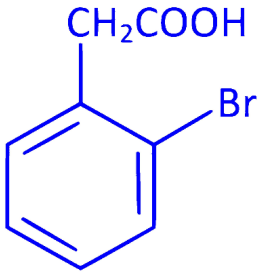
A.



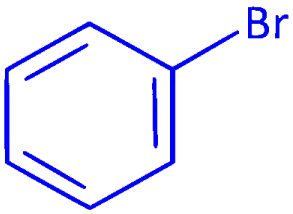
B.



C.



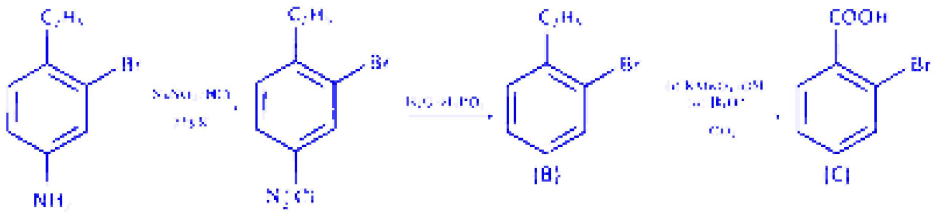
D.



Answer: B

Solution:

The complete reaction sequence is as follows,



Question3

$$NH_2CONH_2 + 2H_2O \rightarrow [X] \rightleftharpoons 2NH_3 + H_2O + [Y]$$

The hybridisation of carbon in X and Y respectively are

TG EAPCET 2024 (Online) 10th May Morning Shift

Options:

A. sp^2, sp

B. sp, sp^2

C. sp^3, sp^2

D. sp^2, sp^3

Answer: A

Solution:

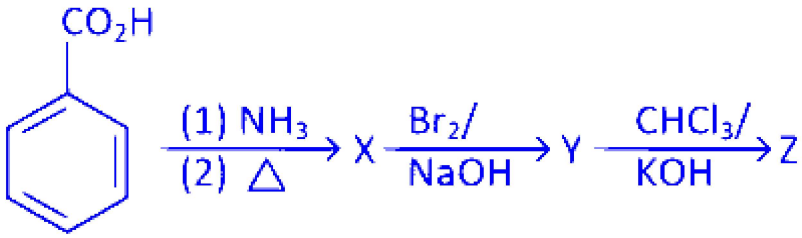
The complete reaction sequence is as follows

$$NH_2CONH_2 + 2H_2O \longrightarrow \underset{(X)}{[(NH_4)_2CO_3]} \rightleftharpoons 2NH_3 + H_2O + \underset{(Y)}{CO_2}$$

So, the hybridisation of carbon in compound X and Y are sp^2 and sp respectively.

Question4

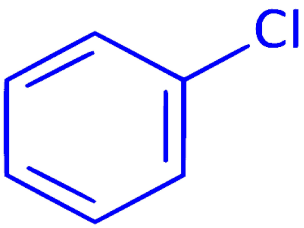
In the given reaction sequence sequence, Z is



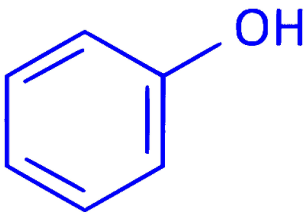
TG EAPCET 2024 (Online) 10th May Morning Shift

Options:

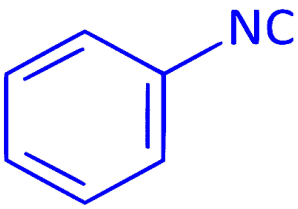
A.



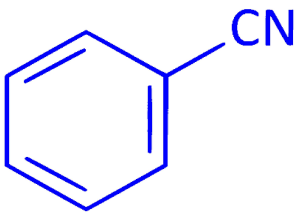
B.



C.



D.



Answer: C

Solution:

The complete reaction is as follows.