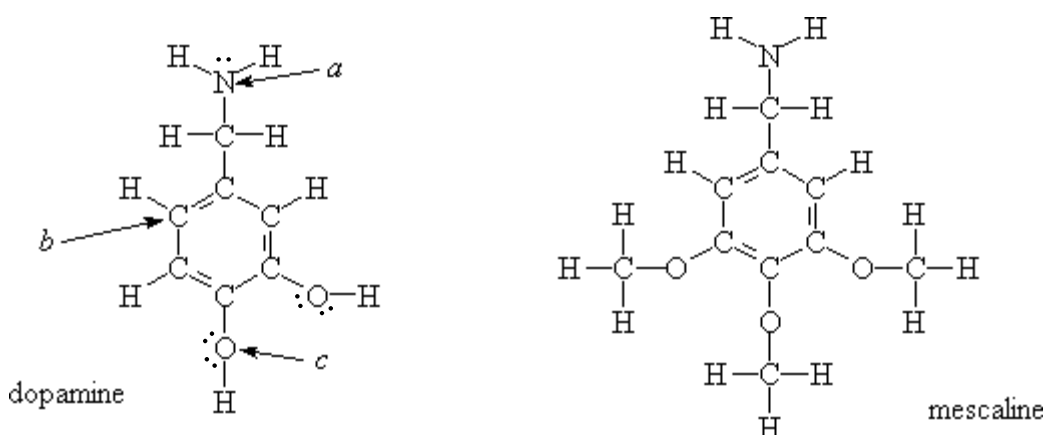


Marks
6

- The structures of dopamine and mescaline are given below.



Dopamine is involved in the transmission of nerve impulses in the brain. Complete the Lewis structure for dopamine by including all lone pair electrons.

How many π electrons are there in dopamine?

1 lone pair on each O and the π electrons in the 3 C=C bonds are involved in π bonding: 10 e⁻ in total

Predict the bond angles at the points labelled *a*, *b*, and *c* in dopamine.

<i>a</i>	~109.5°
<i>b</i>	~120°
<i>c</i>	~109.5

Mescaline is a hallucinogenic compound found in the peyote cactus. Suggest a reason for the ability mescaline to disrupt nerve impulses.

Mescaline has a similar structure to dopamine, with a benzene ring and a amine group plus O groups on the ring. It can bind to the receptors designed for dopamine.

Which compound, dopamine or mescaline, has the higher solubility in water? Give reasons for your answer.

The O-H groups in dopamine are able to form H-bonds with water molecules making it quite soluble. In mescaline, these are ethers groups which will form much weaker H-bonds and so mescaline has a lower solubility.