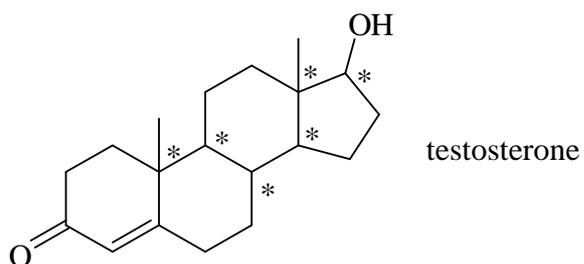
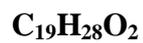


The structure of testosterone, an important male hormone, is shown below.

Marks
8



Give the molecular formula of testosterone.

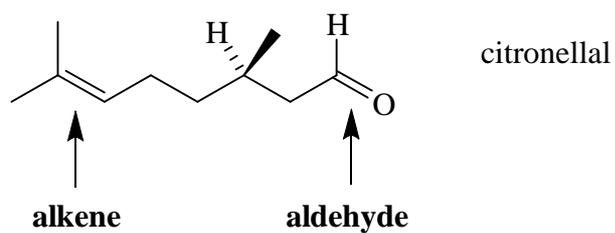


Identify the functional groups present in testosterone.

conjugated ketone, alkene, alcohol (secondary)

Marks
5

- (+)-Citronellal is a widely occurring natural product present in citronella oil, lemon and lemon grass. It is used as a soap perfume and in insect repellents.



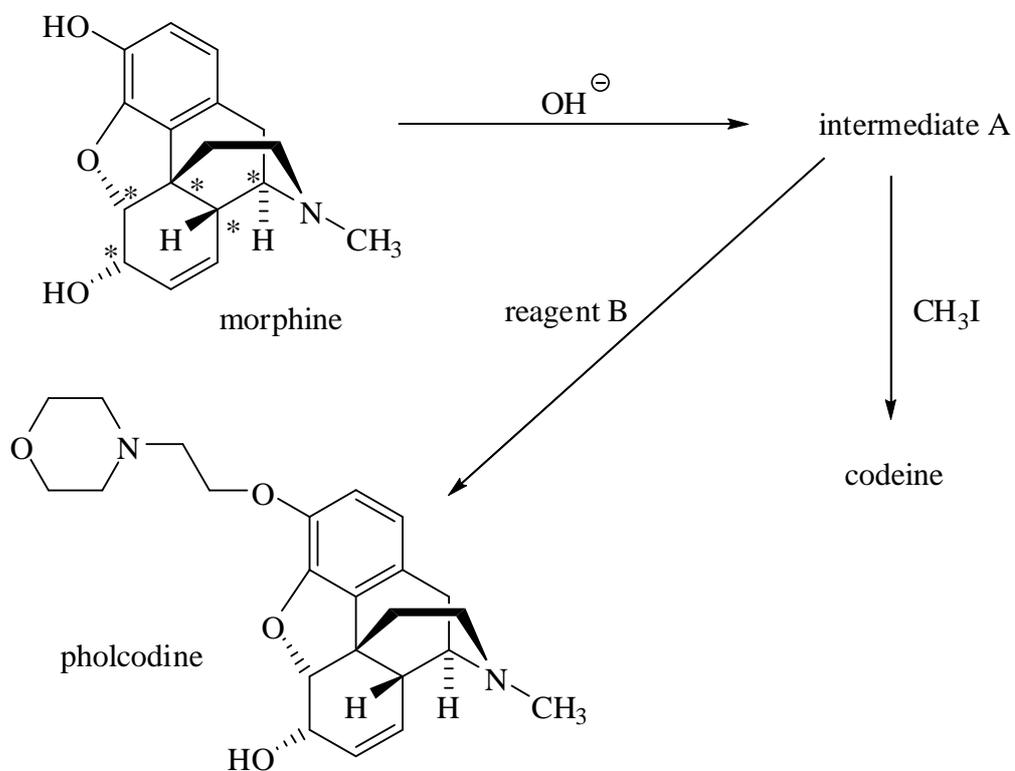
Give the molecular formula of citronellal.



Identify the functional groups present in citronellal.

Alkene and aldehyde (see structure above)

- Morphine is the principal active agent in opium and is a highly potent analgesic drug. Its structure and conversion into codeine (a moderate analgesic) and pholcodine (a cough suppressant) are shown below.



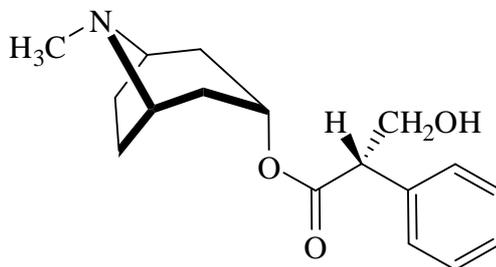
Give the molecular formula of morphine.



Identify the functional groups present in morphine.

phenol, amine, alcohol, ether, alkene

- The tropane alkaloid (-)-hyoscyamine is found in certain plants of the *Solanaceae* family. It is an anticholinergic agent that works by blocking the action of acetylcholine at parasympathetic sites in smooth muscle, secretory glands and the central nervous system.



Give the molecular formula of (-)-hyoscyamine.

C₁₇H₂₃O₃N

List the functional groups present in (-)-hyoscyamine.

amine, alcohol, ester, aromatic ring (arene)