Exercise 4 : - Infrared spectra
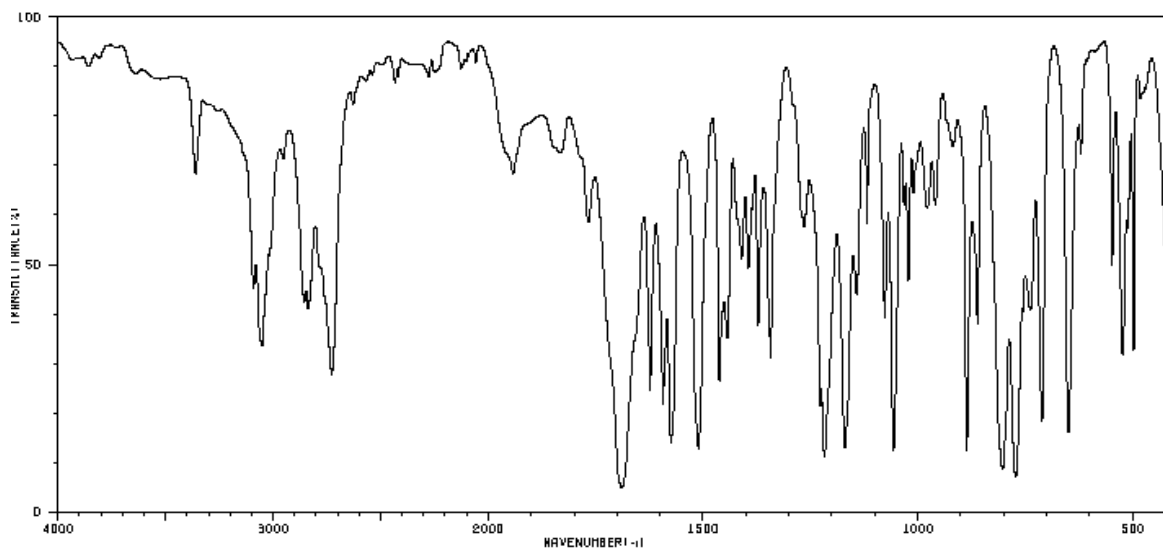
1. The IR spectrum of a compound of molecular formula $C_{11}H_8O$ is given below:

a. Calculate the degree of unsaturation indicated by the molecular formula.
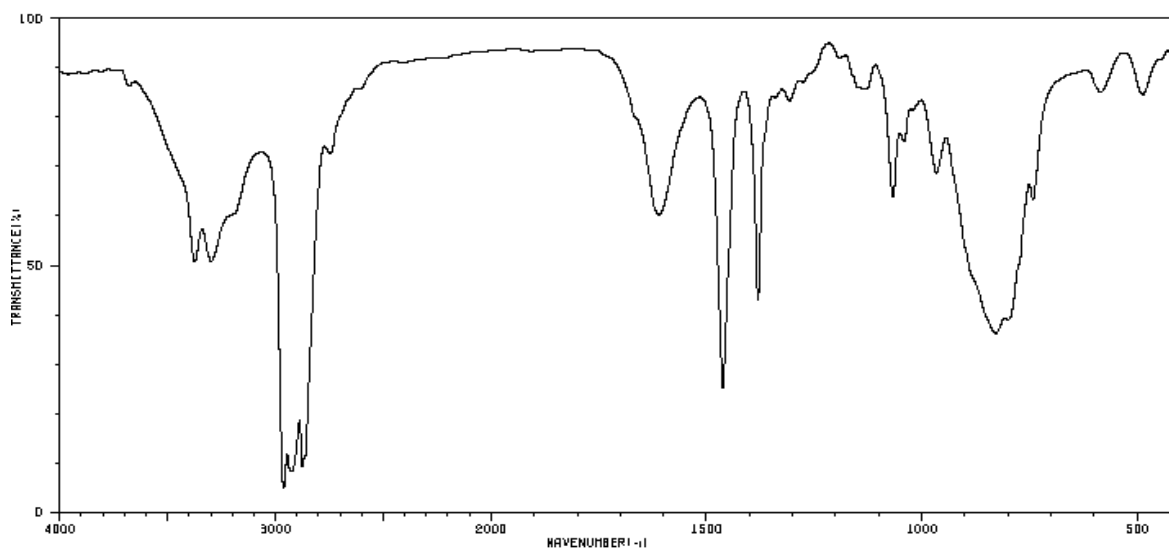
$(2 \times 11 - 8 + 2)/2 = 8$

b. Using the molecular formula, list all possible functional groups.

alcohol, aldehyde, ether, ketone

c. Identify the functional group.

aldehyde

2. The IR spectrum of a compound of molecular formula $C_6H_{15}N$ is given below:

a. Calculate the degree of unsaturation indicated by the molecular formula.
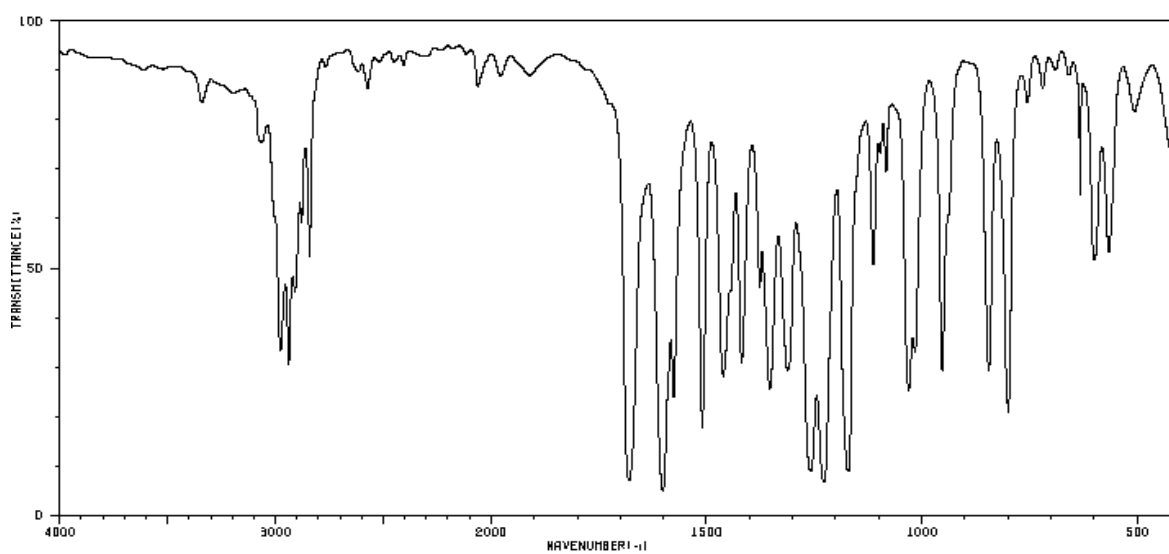
(2 x 6 + 1 − 15 + 2)/2 = 0

b. Using the molecular formula, list all possible functional groups.

1°, 2° or 3° amine

c. Identify the functional group.

primary amine

3. The IR spectrum of a compound of molecular formula $C_{10}H_{12}O_2$ is given below:

a. Calculate the degree of unsaturation indicated by the molecular formula.
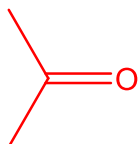
(2 x 10 – 12 + 2)/2 = 5

b. Using the molecular formula, list all possible functional groups.

alcohol, aldehyde, carboxylic acid, ester, ether, ketone,

c. Identify the two functional groups.

ketone and ether

4. The infrared spectrum of compound "A", C_3H_6O, shows a peak at 1730 cm^{-1} and no peak at 2726 cm^{-1}. Suggest a structure for this compound.

5. A compound with a molecular formula C_2H_6O has an infrared spectrum which shows, amongst others, a broad absorption between 3200 - 3400 cm^{-1} and a peak at 1380 cm^{-1}. Propose a structure for this compound.

CH_3CH_2OH