

Homework 5

Match the C-13 spectra below to the correct isomer:

D = toluene

C = 1,3-dimethylbenzene or *m*-xylene

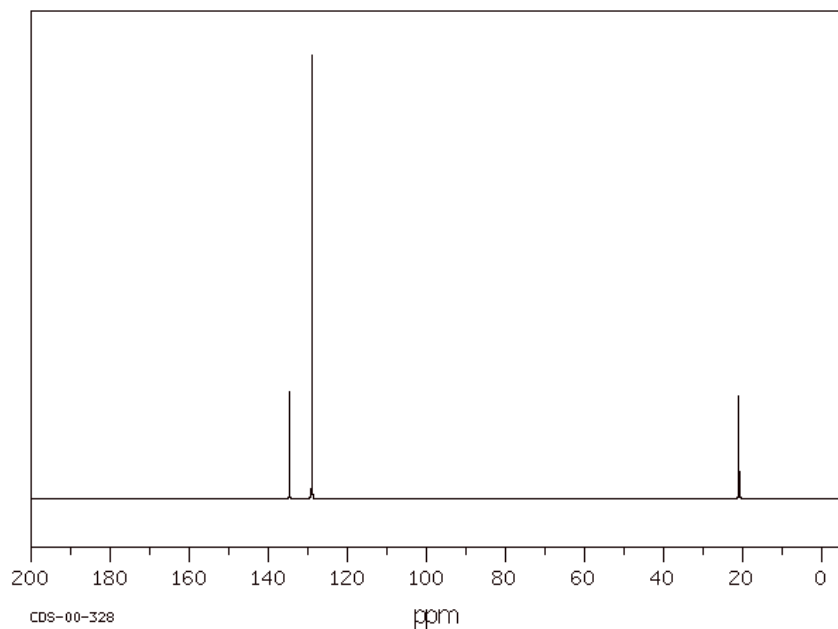
A = 1,4-dimethylbenzene or *p*-xylene

B = 1,2-dimethylbenzene or *o*-xylene

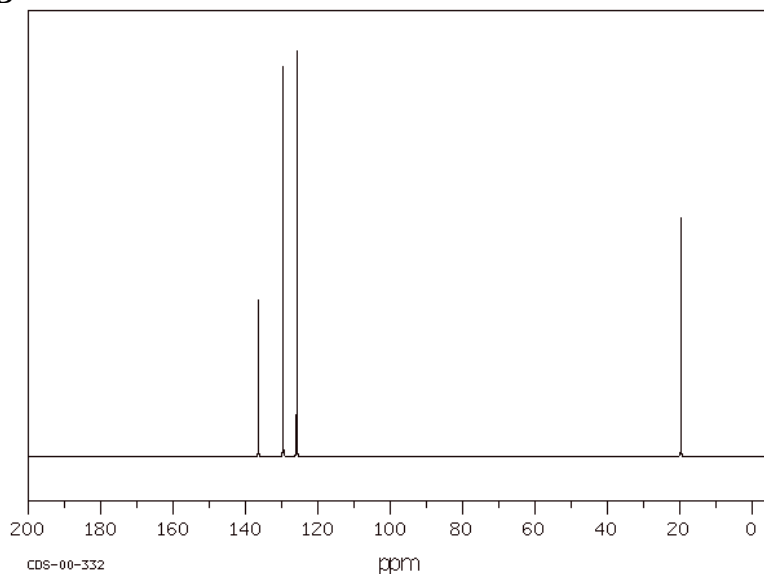
Explain your logic. You may do so by doing a summary chart of each and correlating it to the structure.

By now you should be adept at summary tables and so will just go through the logic of making the assignments. *p*-xylene should yield only 3 peaks, *o*-xylene 4 peaks, and *m*-xylene & toluene 5 peaks each. Since only one spectrum each has 3 peaks (A) and 4 peaks (B), those assignments are made first. Toluene (D) should have a relatively small CH₃ carbon peak because there is only one methyl group present. Also, there should be two large aryl peaks (ortho & meta) and one shorter one (para), plus the quaternary. *m*-Xylene (C) in contrast should have a large CH₃ peak, and only one larger aryl peak because of symmetry. The quaternary peak would also be a bit larger than in toluene because there are two identical ones present.

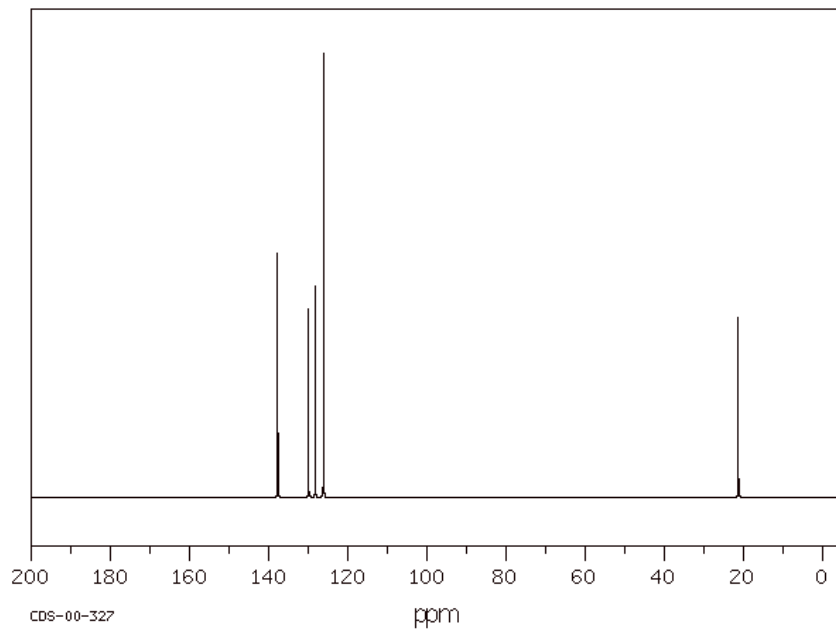
Spectrum A



Spectrum B



Spectrum C



Spectrum D

