1) (8 pt). Draw a mechanism for the nitration of benzene by nitric and sulfuric acids.
2) (9 pt). Consider the C₆H₆ isomers benzene and Dewar benzene. The structure of benzene was correctly proposed by Kekule in 1865. The benzene isomer Dewar benzene was first proposed by James Dewar in 1867 but was not synthesized until 1963 by E. E. Van Tamelen.

\[
\begin{align*}
\text{Dewar benzene} & \quad \text{benzene} \\
\end{align*}
\]

a. Draw the possible isomers of dibromobenzene.

b. Draw the possible isomers of Dewar benzene that contain two bromines.
3) (8 pt). The following benzene derivatives have common names that are often derived from their natural sources. Provide acceptable chemical names for each of these compounds.

a) thymol (from oil of thyme)

b) salicylic acid (from the willow tree)

c) vanillin (from vanilla bean)

d) isodurene (coal tar)