1. 

\[ \text{HNO}_3 \quad \text{H}_2\text{SO}_4 \]

2. (a) 

(b)- Phenols are very activated for electrophile aromatic substitution, thus are good substrates for the polymerization.
4. For Pyridine systems C-3 attack is favored due to the “bad” resonance structure present in C-2 attack. For Thiophene systems C-2 attack is favored due to the number of different resonance structures that can be drawn.
5. Bromination and Nitration occur at the 1 position to preserve resonance stability (an allylic cation rearrangement), whereas Friedel-Crafts acylation occurs at the 2 position due to the relatively hindered 1 position (ie. the electrophile’s gargantuan size).

6. The acidic media protonates the aryl amine, thus turning it from an electron rich ortho-para director to a relatively electron deficient meta director.

7.
8.

\[
\begin{align*}
\text{O} & \quad \text{a-} \text{NaNO}_2, \text{HCl} \\
\text{OH} & \quad -\text{CO}_2, -\text{N}_2 \\
\end{align*}
\]

9. Only six \( \square \) electrons are in conjugation, the other two electrons are in the plane of the aromatic ring, orthogonal to the aromatic system.

10.

\[
\begin{align*}
\Theta & \quad \text{OH} \\
\end{align*}
\]