Special Problem 3.F-1

Using **ideal** microwave switches and fixed attenuators, design a **digital attenuator** where we can select any attenuation from 0 dB to 22.5 dB in 1.5 dB steps (i.e., 0 dB, 1.5 dB, 3.0 dB, 4.5 dB, ……). This must be accomplished with the minimum number of switches and attenuators.

1. Provide a complete schematic of this digital attenuator, showing all switches and fixed attenuators, as well as how they are interconnected. Carefully and precisely label the attenuation values of each fixed attenuator. Label also the digital lines (e.g., A_0, A_1, A_2,….).

2. Determine the digital "word" required to provide an attenuation of **19.5 dB**.

3. Determine the digital "word" required to provide an attenuation of **12.0 dB**.