Special Problem 4.E-4

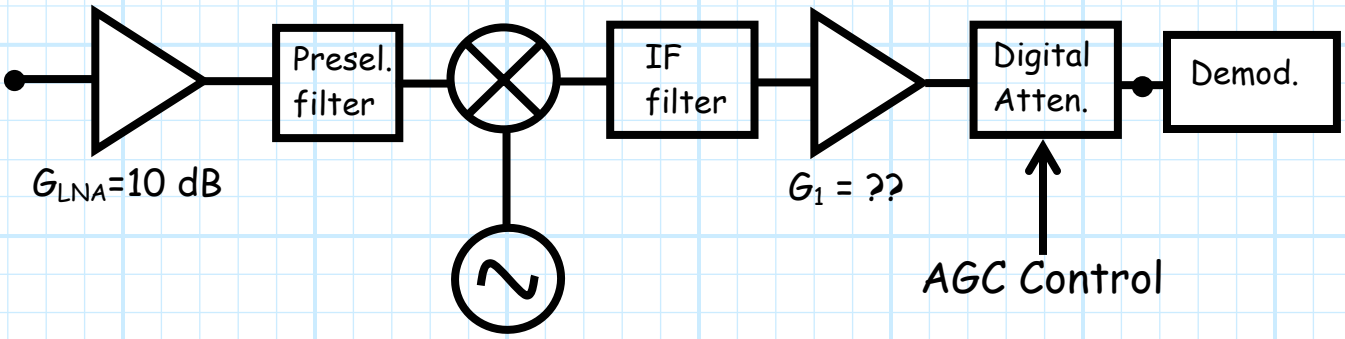
In the receiver below, we know that:

1. The dynamic range of the **receiver** extends from -100.0 dBm to + 5.0 dBm

2. The dynamic range of the **demodulator** (demod.) extends from -60.0 dBm to -10.0 dBm.

3. The **gain** of **LNA** is 10 dB, the **conversion loss** of the **mixer** is 6 dB, and the **insertion loss** of each **filter** is 0 dB.

4. The digital attenuator has a **minimum** attenuation of 4 dB, and a **maximum** attenuation of 70 dB.



The designer of this receiver has yet to select the **fixed** gain G_1 of an **amplifier** in the IF section. For this design, there is actually a **range** of fixed amplifier gain values that will work (i.e., allow **any** signal within the receiver dynamic range to be accurately demodulated).

Determine this range of **all** acceptable amplifier fixed gain values G_1 (for example, 6 dB < G_1 < 14 dB) that will work for this receiver design.