Consider a superheterodyne receiver tuned to 600 kHz. If the local oscillator feeds a 1000 kHz signal to the mixer, the image frequency (in integer) is _____ kHz. (GATE EC 2021)

Solution: Let f_x be the intermediate frequency given by $|f_l - f_r|$.

Parameter	**Symbol**	**Value**
Receiver Frequency	f_r	600 kHz
Local Oscillator Frequency	f_l	1000 kHz
Image Frequency	f_i	_____ kHz

Table 1: Given Parameters with Symbols

$$f_x = |1000 - 600| = 400\,\text{kHz} \tag{1}$$

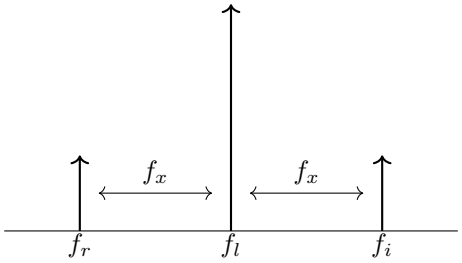

Figure 1: Diagram

From the above diagram, we can observe that:

$$f_i = f_r + 2(f_x) = 600 + 2(400) = 1400\,\text{kHz} \tag{2}$$

Therefore the Image frequency is **1400 kHz**

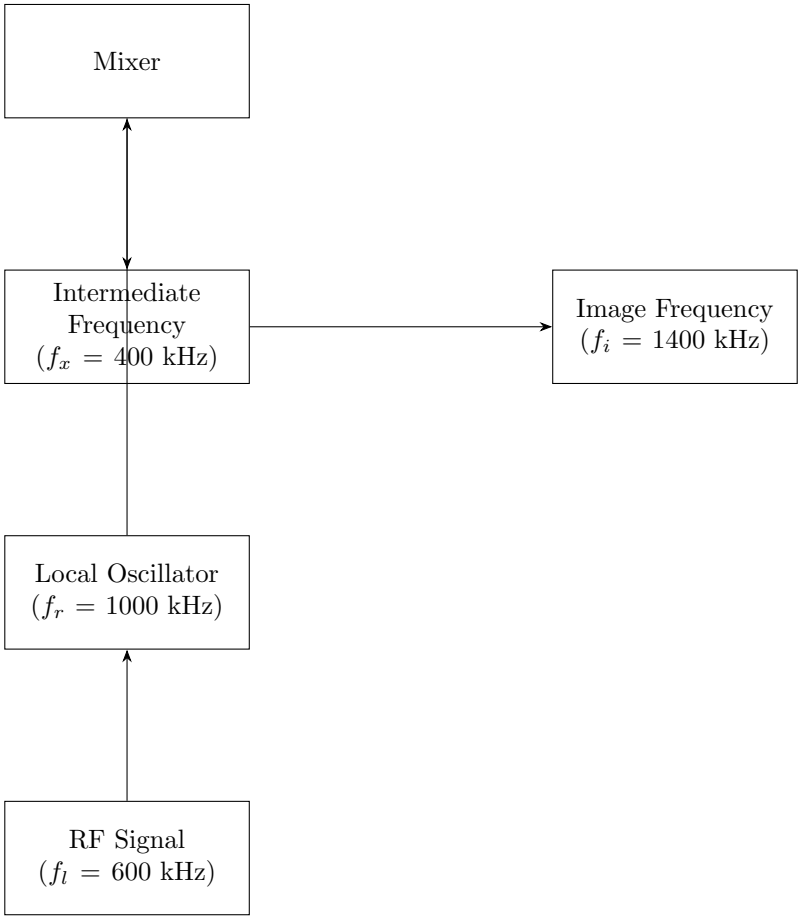

Figure 2: Superheterodyne Receiver Block Diagram