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

$$f_x = |1000 - 600| = 400 \,\mathrm{kHz}$$
 (1)

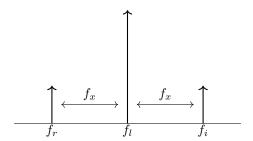


Figure 1: Diagram

From the above diagram, we can observe that:

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

Therefore the Image frequency is 1400 kHz

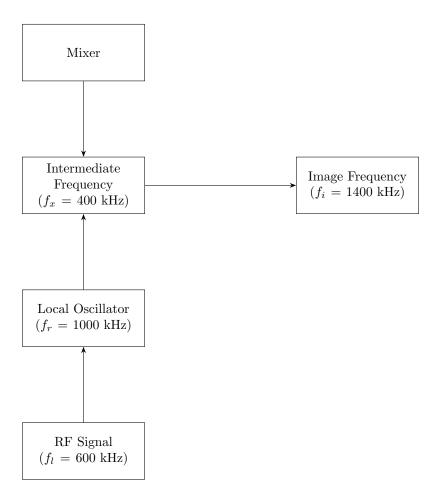


Figure 2: Superheterodyne Receiver Block Diagram