Design a second-order band-pass filter having $f_o$ = 5000 Hz, bandwidth = 2500 Hz, and $G_o$ = 0.5.

With $G_o$ < 1, it appears that this should a passive filter. You can use either a series or parallel arrangement. Use $L$ = 15 mH in your design. Then try to choose resistors and the capacitor with standard values, and meet the specs within ±5%.

Confirm your design with a SPICE (PSPICE or LTSPICE) frequency response simulation. Then run a second simulation, but include a 5-Ω resistor in series with the inductor to simulate the parasitic resistance of the inductor. (In LTSPICE, you can add a parasitic resistance directly to the inductor model itself.) Note the the differences caused by the parasitic resistance.