Q.1

For the inductor model given below:

a-) Calculate the parallel resonance frequency
b-) Calculate the impedance of the inductor
   c-) At resonance
   d-) At half of the resonant frequency
   e-) At twice of the
   iv-) Calculate the effective inductance and
       capacitance of the inductor at (iii) and (iii)

\[ L = 400 \text{ nH} \]

\[ C_w = 68 \text{ pF} \]

\[ R_p = 5 \text{ K} \]

where

\[ C_w \text{ is the interwinding capacitance} \]

\[ R_p \text{ is the effective parallel loss of the inductor} \]

Q.2

Repeat the same question for the capacitor model given below:

\[ C = 2 \text{ nF} \]

\[ \begin{array}{c}
\text{a} & \text{b} \\
25 \text{ m\Omega} & 0.7 \text{ nH}
\end{array} \]

Q.3

Design a 5 V power supply decoupling circuit using Kemet spice with the following specification:

- Overall impedance is less than 5 \Omega at 2.2 GHz
- \( \approx 0.7 \) at 250 MHz
- \( \approx 150 \text{ m}\Omega \) at 2 MHz

Please print the frequency response