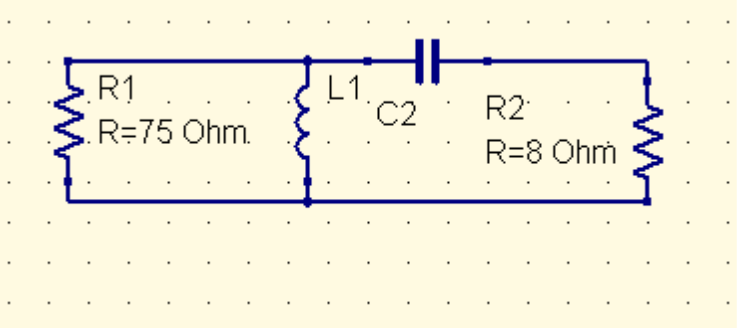
EE411 Homework # 2 Solutions

1)

a-



The figure above shows the high pass L match topology Rs= 8 ohm and Rp= 75 ohm

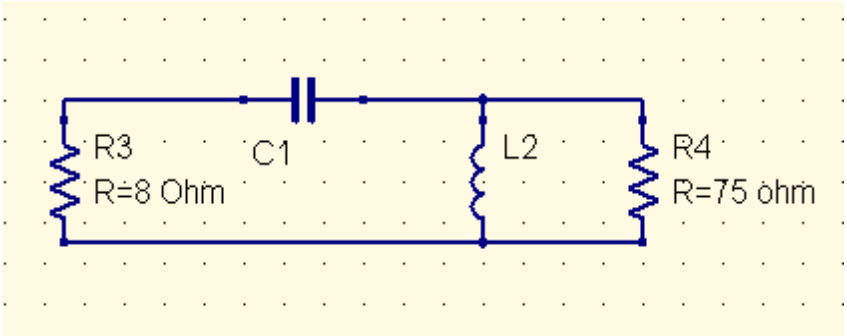
Q^2=(Rp/Rs)-1 gives Q≈2.9 , Q= Xs/Rs and Q=Xp/Rp putting values in for Rs and Rp

we get **Xs=-j 23.2 and Xp =j 25.86**

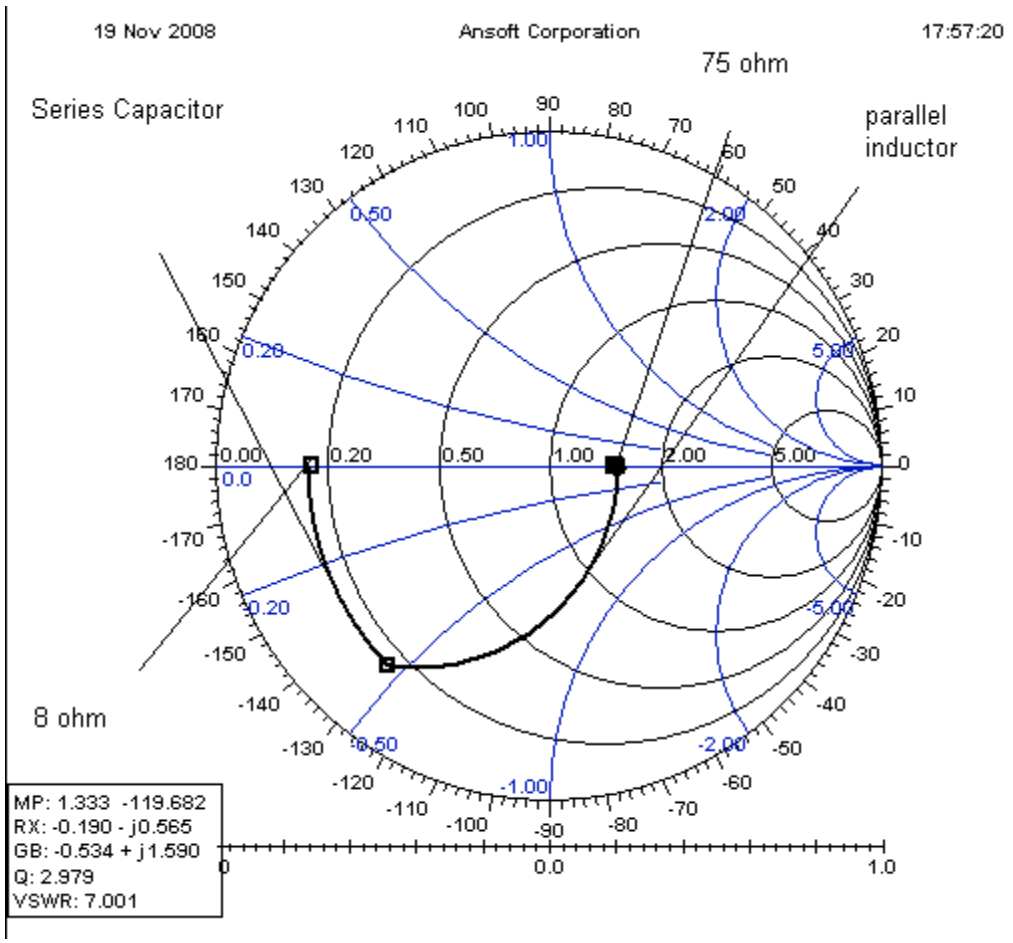
b-

at 100 Mhz 1/wC=23.2 gives C≈68pF and wL=25.86 gives L≈ 40 nH

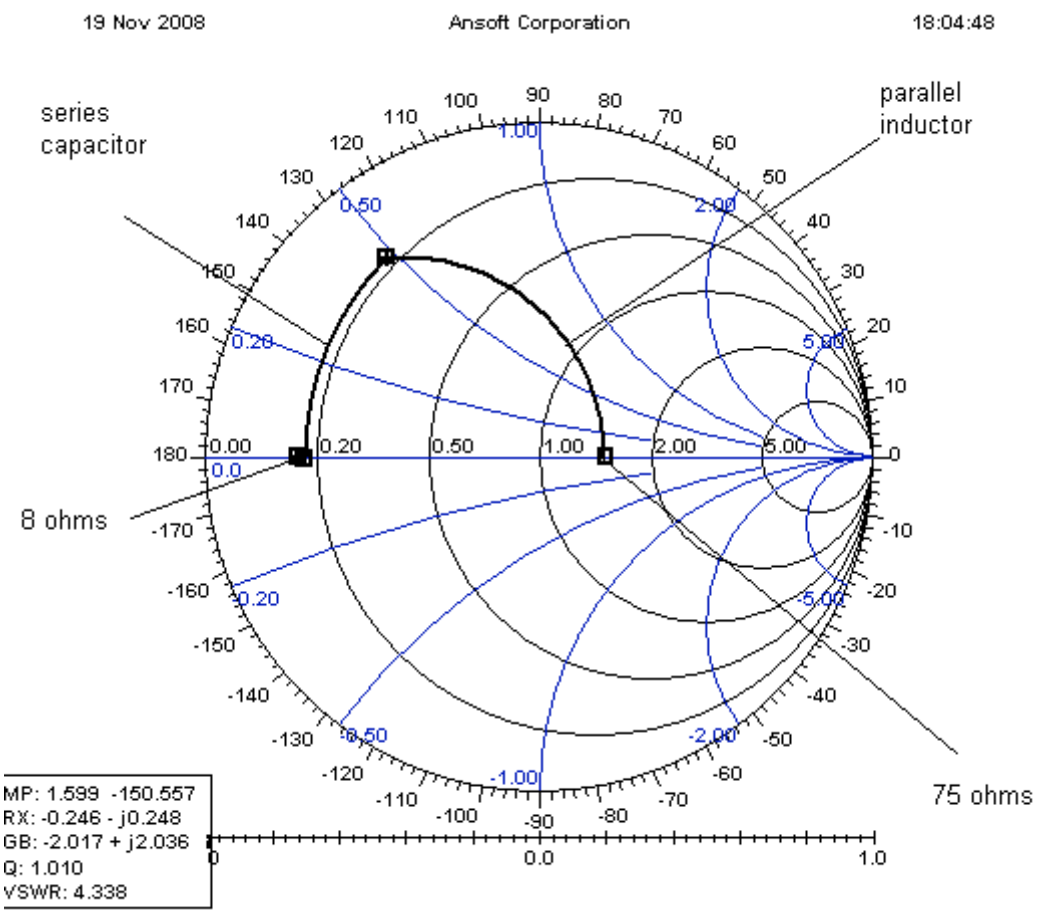
c and d) If the circuit given above matches 8 ohms to 75 ohm if the L match circuit is flipped the matching should be from 75 ohms to 8 ohms. The matching circuit below does the job.



The impedences are the same C=68 pF and L= 40 nH below thw matching can be seen on the smith chart.



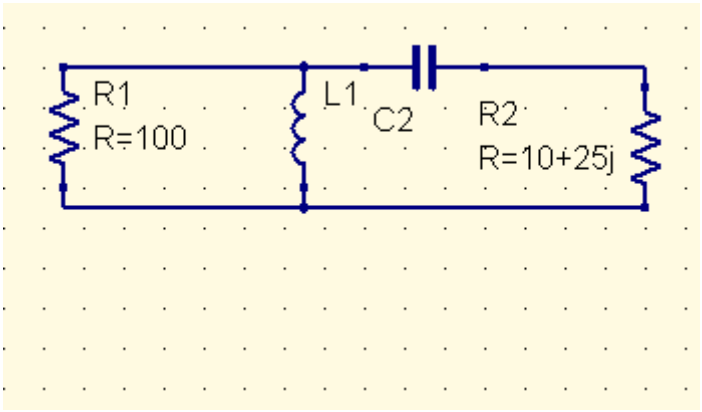
8 ohm to 50 ohm match



75 ohm to 8 ohm match

2)

a-

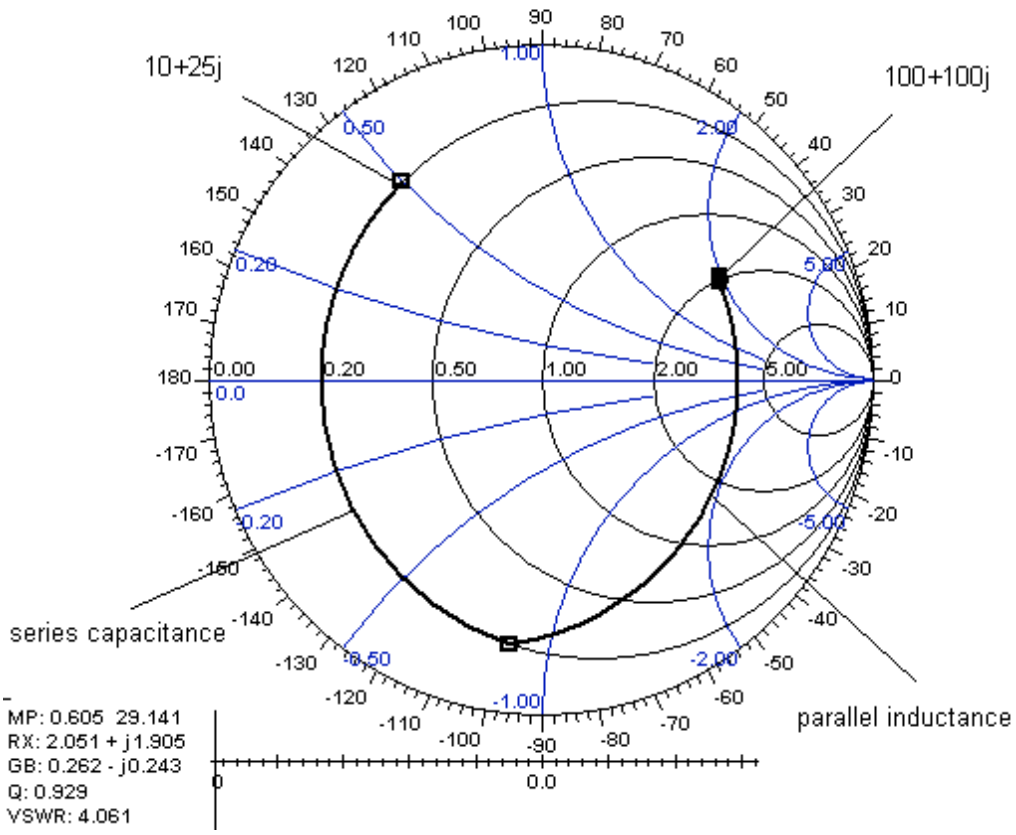


We have to get rid of the 25 j using the capacitor. Thus taking Rs=10 Rp=100 We get Q^2=(Rp/Rs)-1

Q=3, Xs/Rs=Q and Rp/Rs=Q gives Xs= -30j and Xp=33.33.j but we have to include the j25 of the load in the serial match component **Xs=-30j-25j=-55j and Xp =33.33j**

b- The match should be performable with Q=2, Xs=-20j-25j and Xp=25j

c- Xs≈-1.36j Xp≈0.75j


10+25j
100+100j
series capacitance
parallel inductance
MP: 0.605 29.141
RX: 2.051 + j1.905
GB: 0.262 - j0.243
Q: 0.929
VSWR: 4.061