JUAS 2016 – RF tutorial (solutions)

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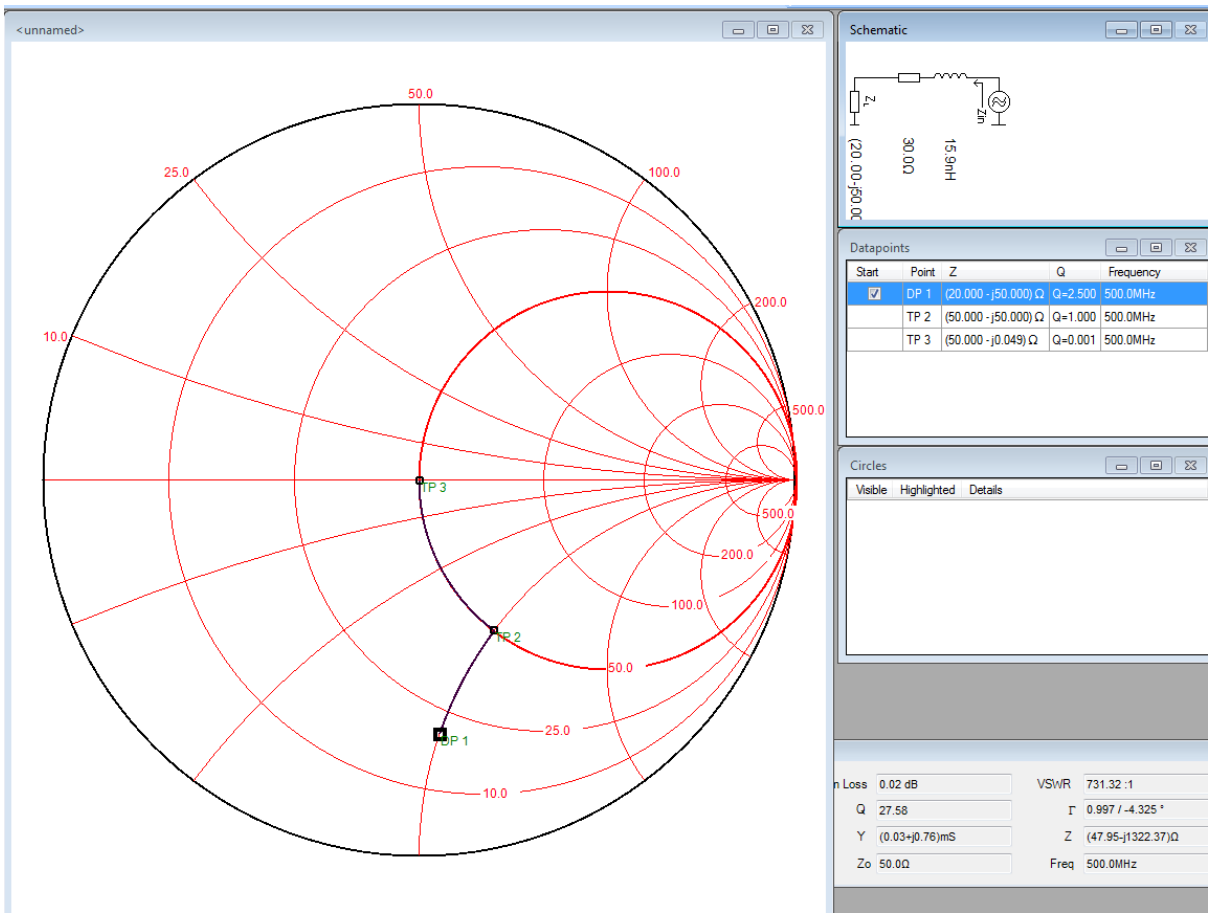
Smith chart

1.)

Z_L	C Series	L Series	R Series
Z = (50 + j25) Ω	12.7 pF	-	-
Z = (50 - j25) Ω	-	8 nH	-
Z = (4 + j21) Ω	15.2 pF	-	46.1 Ω
Z = (20 – j50) Ω	-	15.9 nH	30 Ω

Screenshot of the last solution:



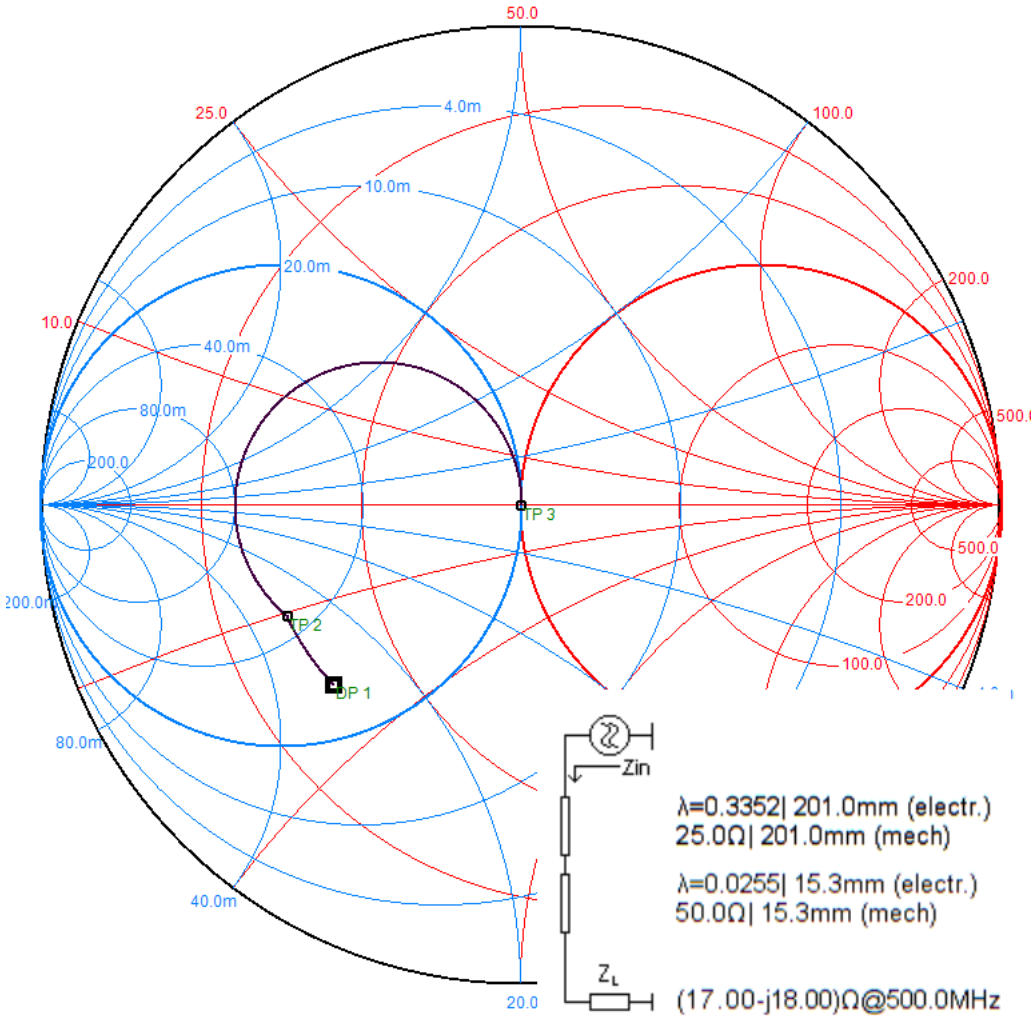
2.)

Z_L	C Shunt	L Shunt	R Shunt
Z = (50 + j25) Ω	2.5 pF	-	257 Ω
Z = (50 - j25) Ω	-	39.8 nH	257 Ω
Z = (4 + j21) Ω	14.6 pF	-	89.8 Ω
Z = (20 – j50) Ω	-	18.5 nH	76 Ω

3.) Multiple solutions are possible. The first element (closest to Z_L) is marked with a *.

Z_L	C Series	L Series	C Shunt	L Shunt
Z = (32 – j66) Ω	-	24.5 nH	-	101.3 nH*
Z = (13 – j9) Ω	24.5 pF*	-	-	9.5 nH
Z = (37 + j34) Ω	26 pF*	-	3.8 pF	-
Z = (78 + j78) Ω	4.4 pF	-	-	108 nH*

4.) Multiple solutions are possible.



5. Smith Chart + RLC circuit

C_{shunt} = 6.4 pF

L_{shunt} = 15.8 nH

$R_{critical}$ = 1 kΩ