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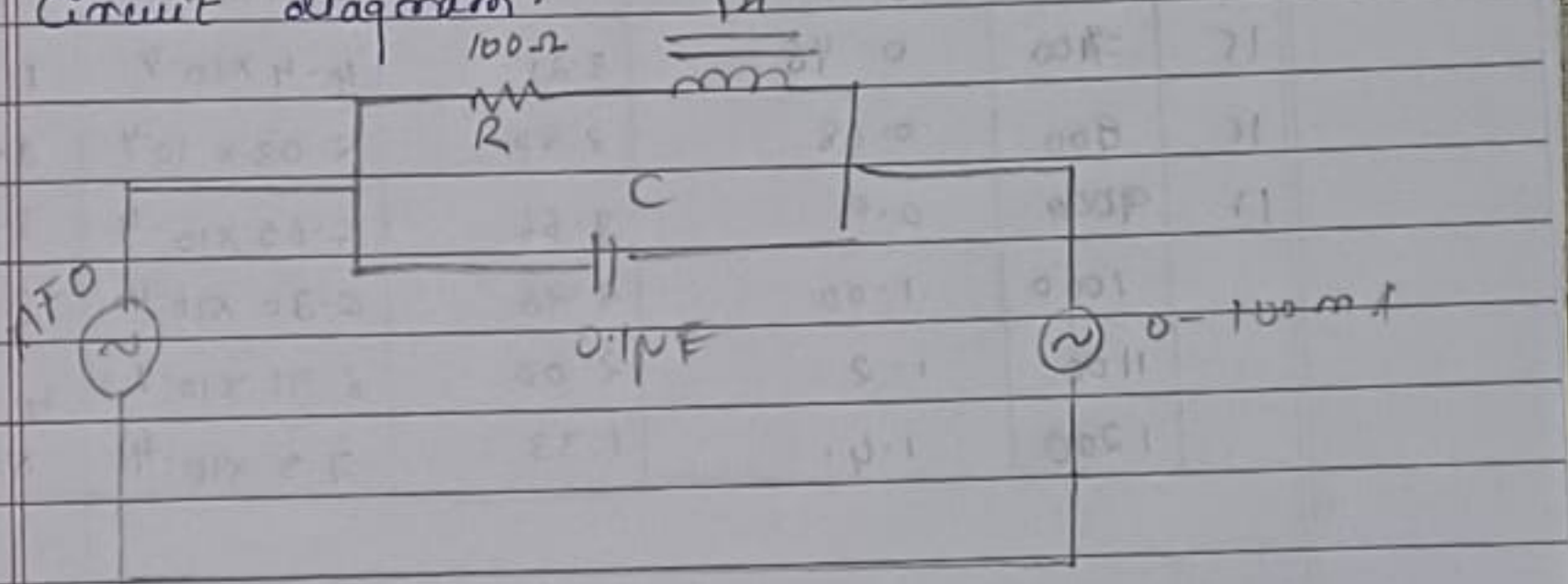
Experiment NO 4

Analysis of Parallel resonance concept

Aim :- To practically observe the behavior of a parallel resonance circuit and to plot the performance curve.

Circuit diagram:



Tabulation:

Sl No	Freq	Ammeter reading	$Y_1 = 1/z_1 = 1/(R+jX_L)$	$Y_2 = 1/z_2 = 1/-jX_C$	$Y = Y_1 + Y_2$
1	50	5·14	3.03×10^{-3}	3.14×10^{-5}	0.010
2	100	2.5	1.57×10^{-3}	6.20	0.04
3	150	1.80	1.06×10^{-3}	9.42	6.889
4	200	1.26	7.93×10^{-4}	1.26	0.15F
5	250	0.90	6.35×10^{-4}	1.57	0.0297
6	300	0.66	5.3×10^{-4}	1.88	0.356
7	350	0.44	4.54×10^{-4}	2.2×10^{-4}	0.454

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7	400	0.2L	3·98	2.43 × 10⁻⁴	0.632
8	450	0·1	3.54	2·89 × 10⁻⁴	0·8
9	460	0·07	3·46	2·95 × 10⁻⁴	0·836
10	470	0·05	3·38	3·02 × 10⁻⁴	0·813
11	480	0·03	3·54	3·08 × 10⁻⁴	0·910
12	~~500~~ 490	0·02	3·46	3·08 × 10⁻⁴	0·948
13	500	0·03	3·38	3·14 × 10⁻⁴	0·987
14	600	0·28	3·37	3·77 × 10⁻⁴	1·417
15	700	0·48	3·25	4·4 × 10⁻⁴	1·42
16	800	0·68	3·80	5·03 × 10⁻⁴	2·51
17	900	0·9	3·66	5·65 × 10⁻⁴	3·17
	1000	1·00	2·28	6·20 × 10⁻⁴	3·95
	1100	1·2	2·00	6·91 × 10⁻⁴	4·76
	1200	1·4·	1.33	7·5 × 10⁻⁴	5·65

Specimen calculation

$$f_0 = \frac{1}{2\pi}\sqrt{\frac{1}{LC} - \frac{R^2}{L^2}}$$

$$= f_0 = 0.159 \times \sqrt{10^7 - 10000}$$

$$= 0.159 \times \sqrt{9990000}$$

$$= 502.550 \text{ Hz}.$$

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Current vs frequency