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February

Saturday

Oscillators

07 WEEK

48-321

Oscillators

The oscillators circuit is basically an amplifier with +ve feedback. The +ve feedback enables the oscillator to sustain output without any input.

Tank circuit -

A circuit often used in oscillators is LC circuit. An LC circuit often oscillates at its natural resonant frequency.

$$f_r = \frac{1}{2\pi\sqrt{LC}}$$

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Barkhausen Criterion -

07 WEEK

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Oscillators will not be sustained unless at the oscillator frequency, the magnitude of the product of the transfer gain of the amplifier and the magnitude of the feedback factor is atleast one.

$$\text{i.e., } -A\beta = 1$$

$$\Rightarrow |A\beta| = 1$$

and phase of $-A\beta = 0$.

Evening

$$\therefore A_{vf} = \frac{A_v}{1 + \beta A_v} = \frac{A_v}{1 - 1}$$

$$\Rightarrow A_{vf} \rightarrow \infty$$

February 04
M T W T F S S M T W T F S S
i.e., an output exists even in the absence of externally applied signal voltages

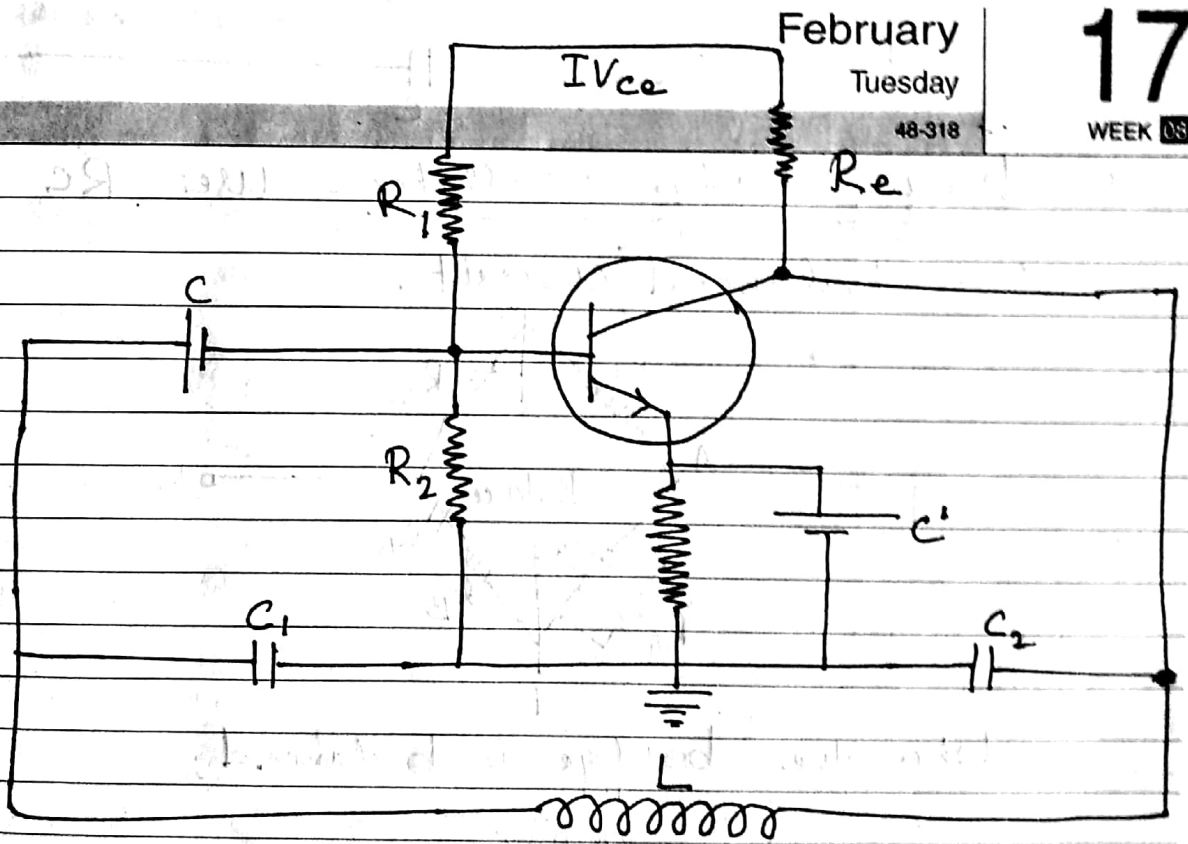
practical Considerations :-

In every practical oscillator the loop gain is slightly larger than unity and the amplitude of oscillations is limited by the onset of linearity.

Circuits of Various Oscillators

1. Colpitts Oscillator :- It uses a split capacitor to provide feedback

$$f = \frac{1}{2\pi\sqrt{LC}} \quad ; \quad C = \frac{C_1 C_2}{C_1 + C_2}$$



M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
22	23	24	25	26	27	28	29	30	31											