2 STAGE

COCKCROFT WALTON VOLTAGE MULTIPLIER

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Submitted to:-
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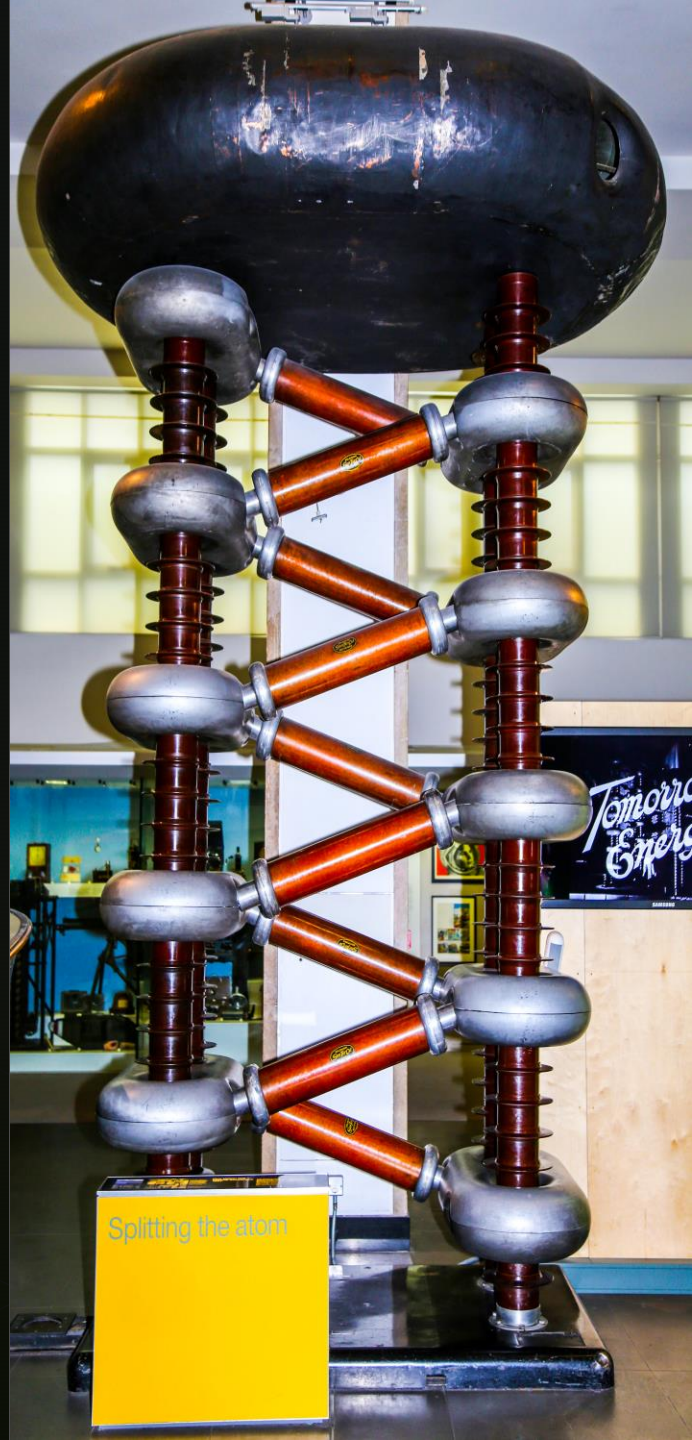
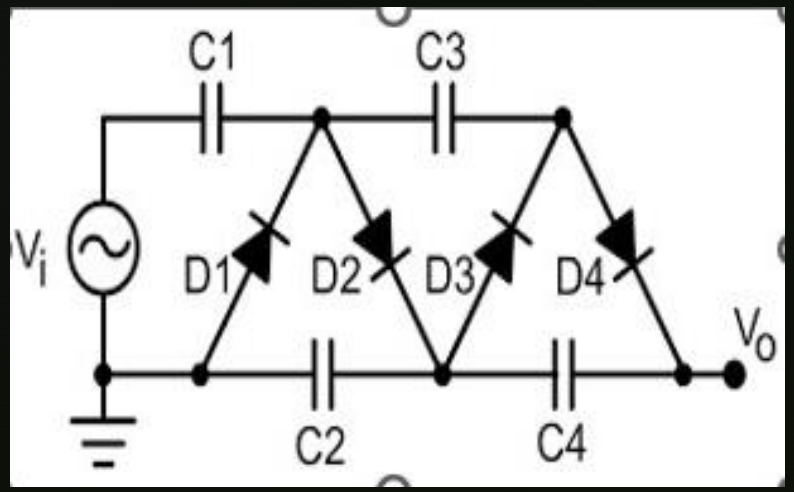
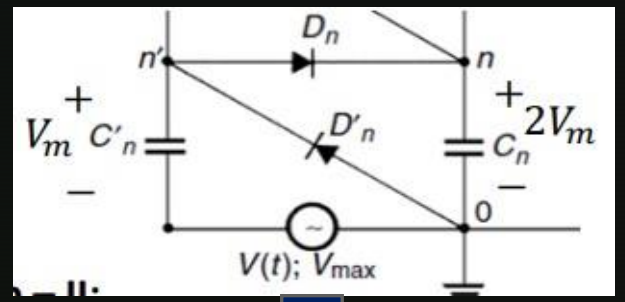


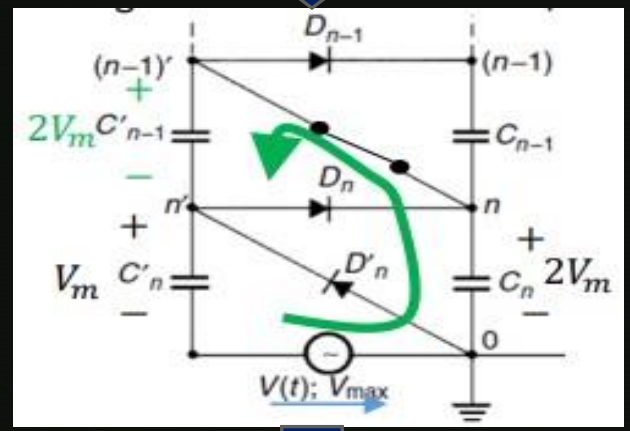
Theory

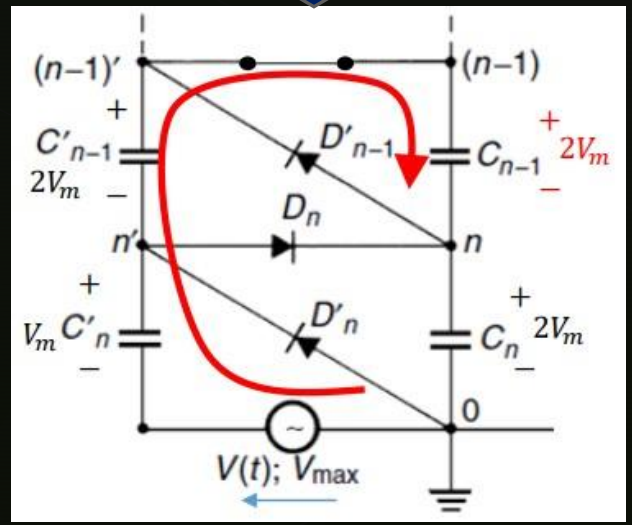
- About Cockcroft Walton Multiplier
- Working
- Reduction in Voltage



CIRCUIT DIAGRAM







Bottom stage charging is same as that of voltage doubler

Bottom stage diode will not activate, next stage diodes will activate

Positive half cycle

RATINGS AND CALCULATION

- CAPACITANCE(SMOOTHING COLUMN AND OSCILLATING COLUMN)

  = 470uF , 100 volt
- TRANSFORMER RATINGS = 16 Volt , 1 Amp
- LOAD CAPACITANCE= C5= 22uf ,100 volt + C6= 2.2 uF 160Volt
- LOAD RESISTANCE = 26 kohm
- DIODE= If= 1 A , Vrrm= 1000 Volt

Hardware Model

CALCULATIONS

Input Voltage =16 Volt

Let Ripple = 30% of No load Voltage = 2.75 Volt

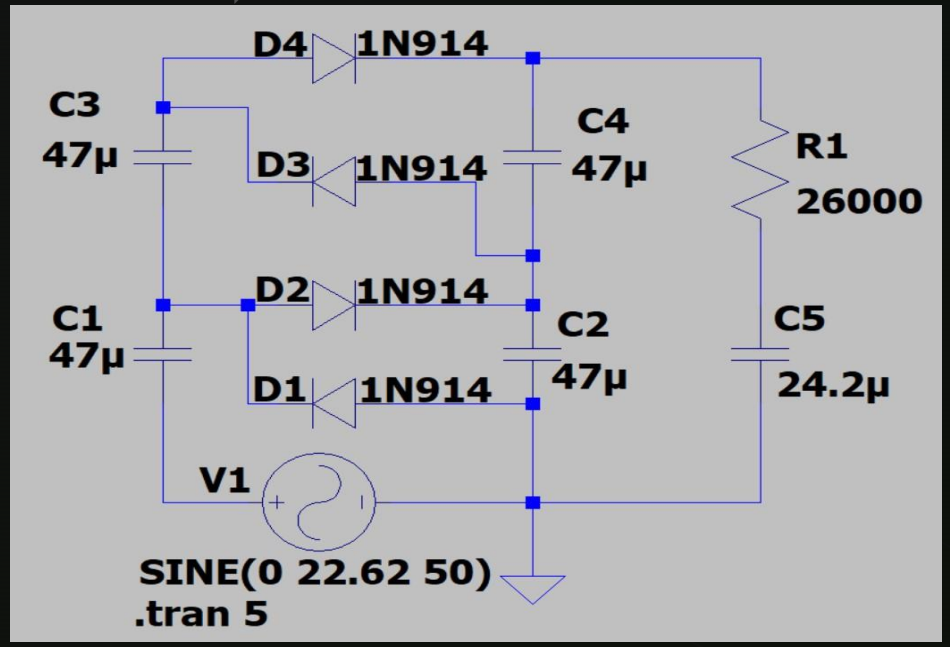
I (current)= Ripple * 2 * f * C = 2.757 * 2 * 50 * 47 * 10^-6 = 2. 16 mA

Reduction In Voltage = $\frac{I}{Pc}\left(\frac{n^3}{3}+\frac{n^2}{2}-\frac{n}{6}\right)$ = 6.434 V

Output Voltage = 2nVm - ∆Vm = 90 . 5 – 6.434 = 84.066

RIPPLE FACTOR= ∂V/Vmean = 0.081

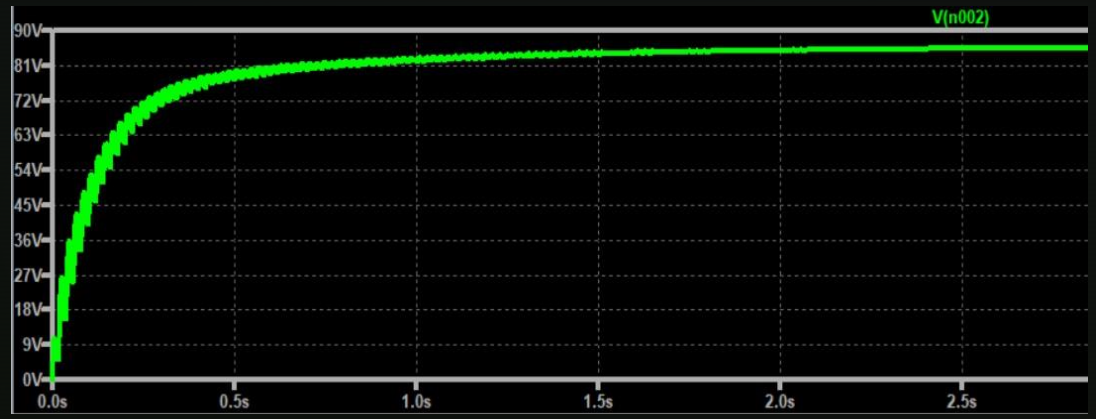
SIMULATION



CIRCUIT DIAGRAM

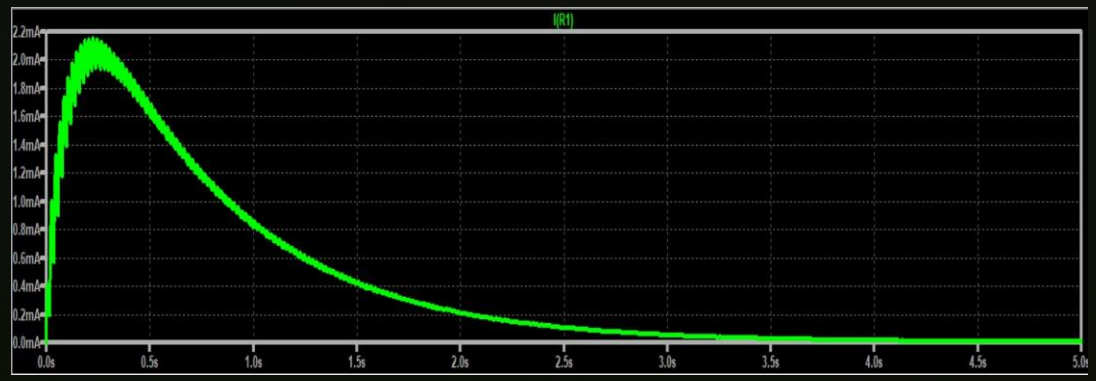
Input from transformer [Vrms= 16V
Vpeak=22.62}

Results and Discussion



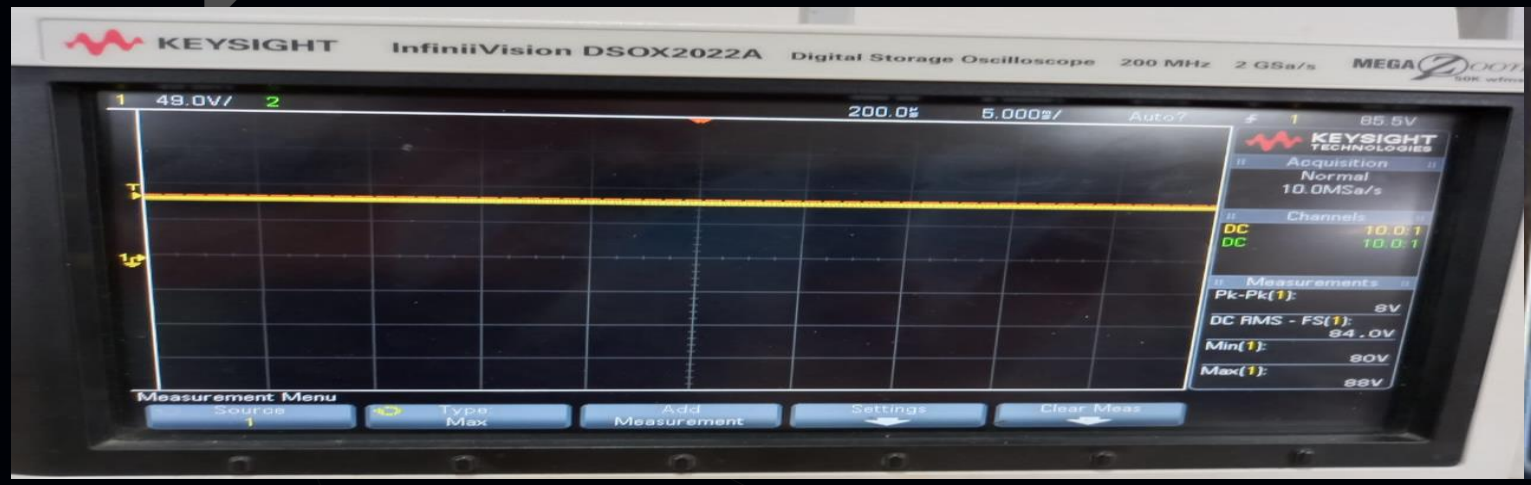
Output voltage =85.83 volt

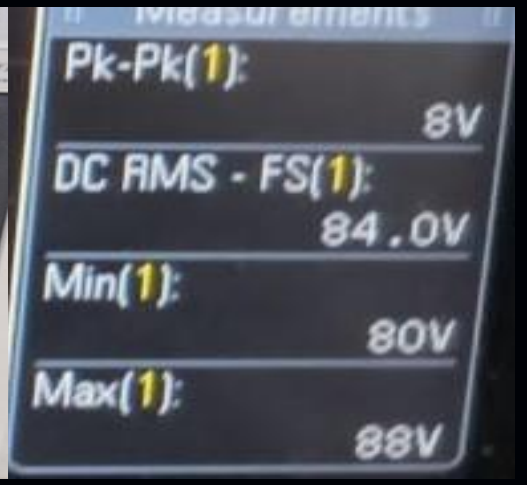
Negligible ripple of 0.02 volt after 3 sec



Output current , Imax= 2.16 mA

HARDWARE RESULTS AND DISCUSSION





VoutRms= 84 Volt and Ripple is minimal

SL.no	Parameters	simulation	Hardware
1	**Rms Output Voltage**	85.83 volt	84.0Volt
2	**Maximum Output current**	2.16 mA	2.18 mA
3	**Maximum Voltage Ripple**	7 volt	8 volt
4	**Ripple Factor**	0.081	0.095
5	**Reduced Voltage**	4.6 volt	6.5 volt
6	**Efficiency**	95.3 %	93.34%