

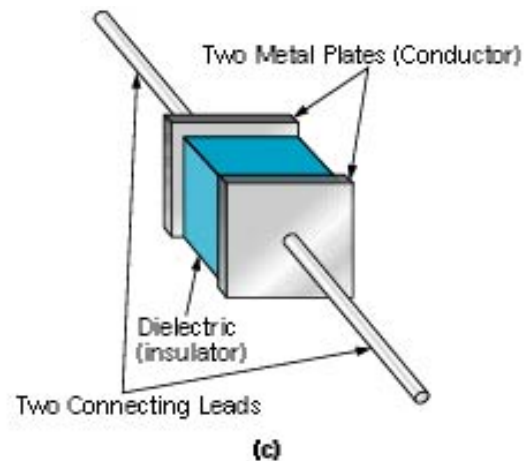
Capacitance and Capacitor

Jee-Hwan Ryu

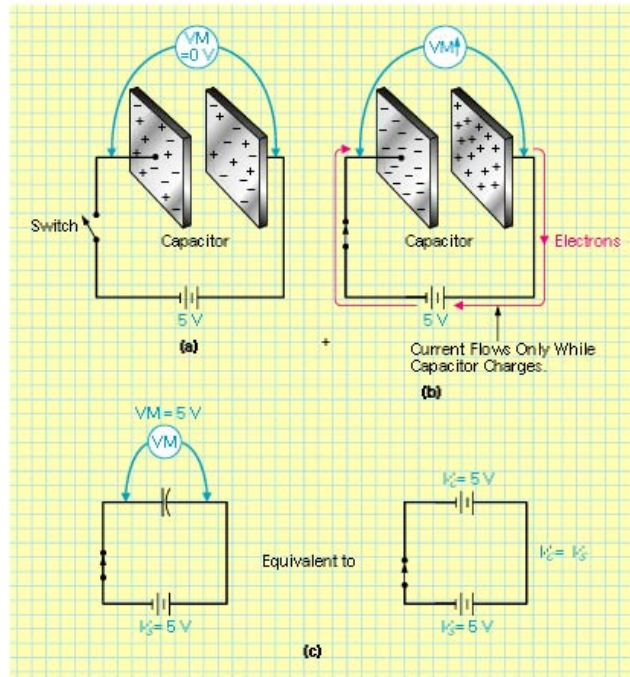
School of Mechanical Engineering
Korea University of Technology and Education

커패시터 (Capacitor)

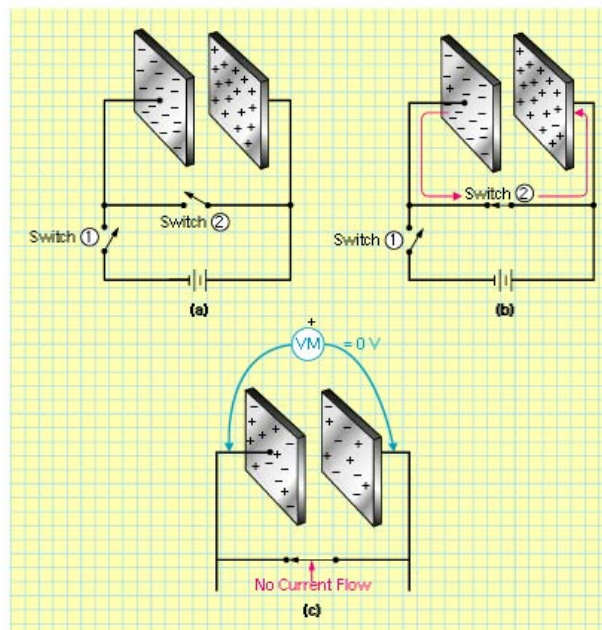
- 전기에너지를 축적하는 장치



커패시터의 충전

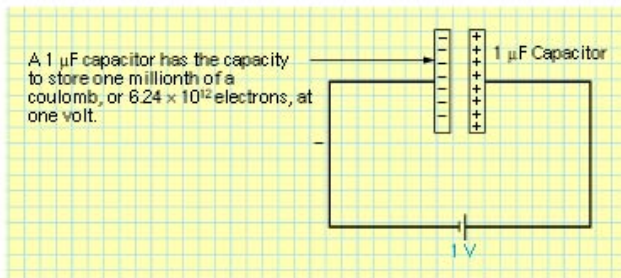
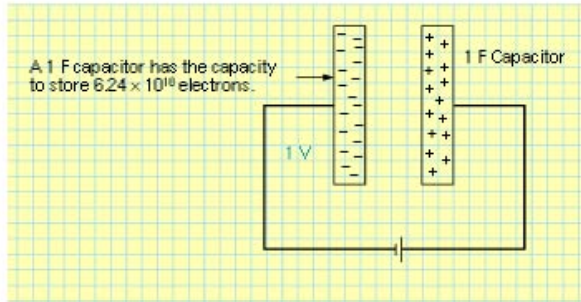


커패시터의 방전



커패시턴스 (Capacitance)

- 커패시턴스: 커패시터가 전하를 축적할 수 있는 능력
- 단위: 패럿 (farad), Coulomb/Volt



$$C = \frac{Q}{V}$$

$$C = \frac{8.85 \times 10^{-12} \times K \times A}{d}$$

C = capacitance, farad

K = 유전률

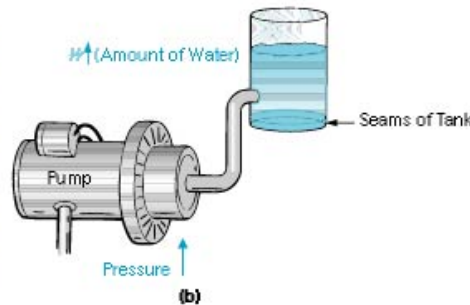
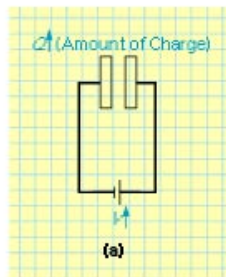
A = 금속판의 면적

d = 금속판간의 거리

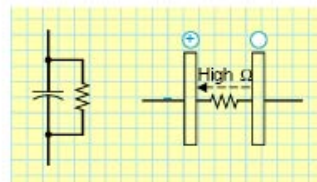
Kore

유전체의 절연파괴 및 누설 (leakage)

절연파괴 전압: 유전체 또는 절연체에서 절연파괴가 일어나는 전압



누설전류(Leakage Current): 절연체 또는 유전체를 통해 흐르는 원치 않는 작은 전류



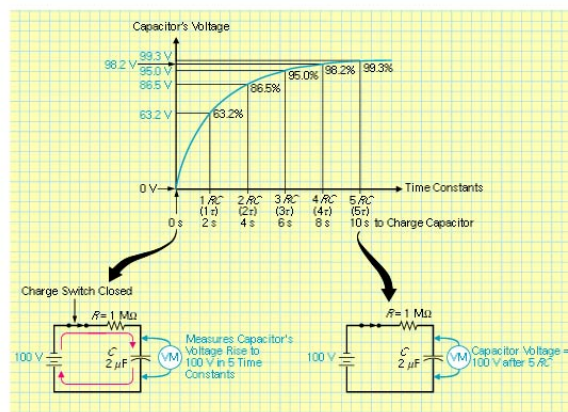
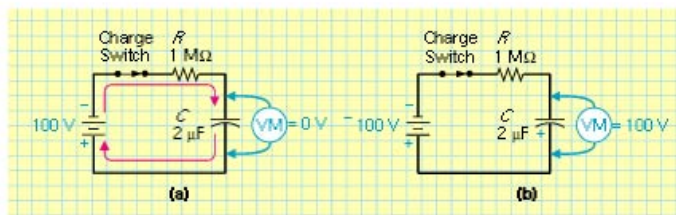
커패시터 값의 부호

- 주로 micro or pico 단위
 - 소수점 존재 -> micro
 - 소수점 없으면 -> pico
- 소수점 없고 3개의 숫자존재
 - 마지막 숫자 0 -> 표시된 숫자의 pico
 - 마지막 숫자 1~9 -> 승수
- 220 -> 220 pF
- 104 -> 10*10⁴ pF

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커패시터 시정수-직류충전

$$\tau = R \times C$$

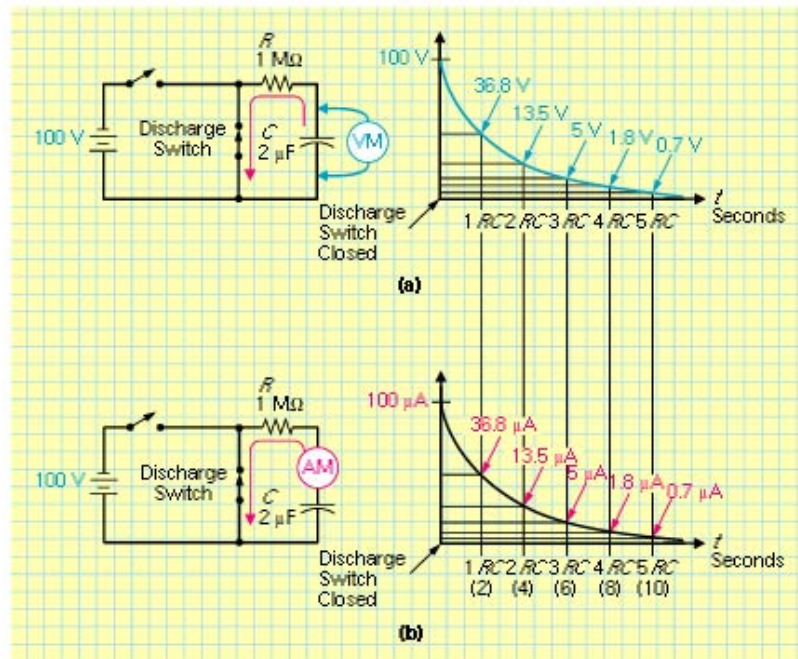


$$i = \frac{V_s - V_c}{R}$$

충전됨에 따라 전류감소

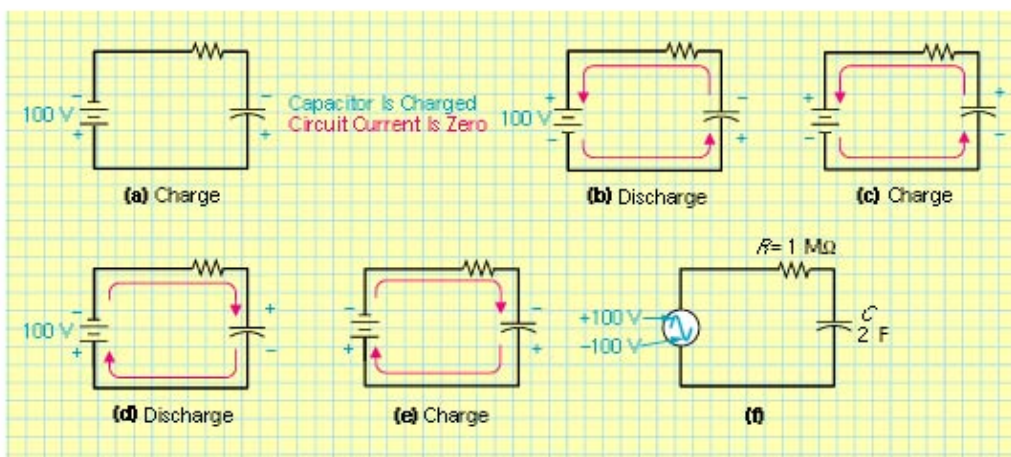
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직류 방전



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교류 충전과 방전



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커패시터의 직, 교류 특성

