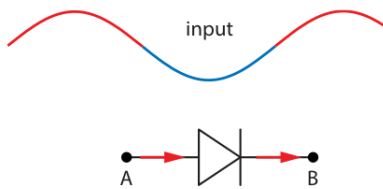




eduresourceza.com



upload current in one-direction.

Diodes allow current only in one-direction

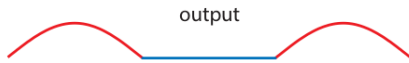
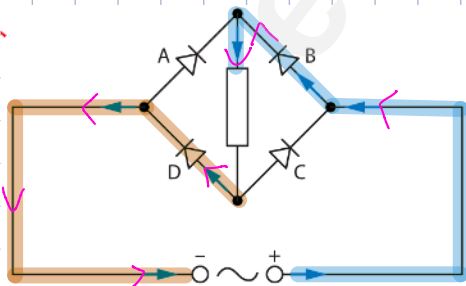
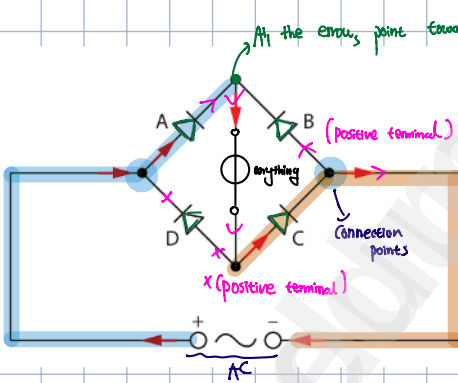
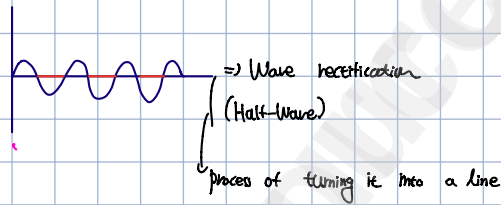
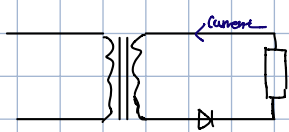
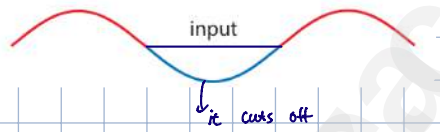
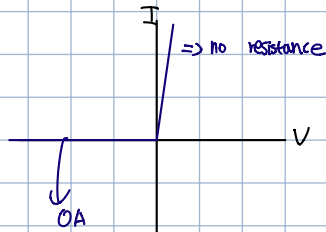
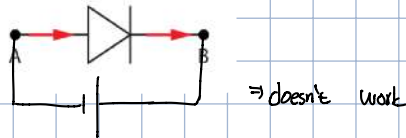
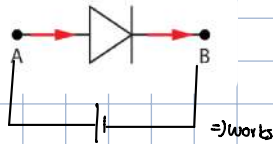
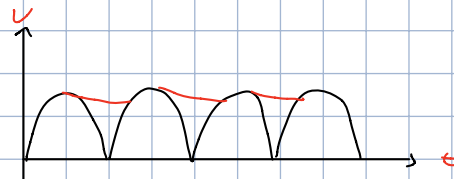
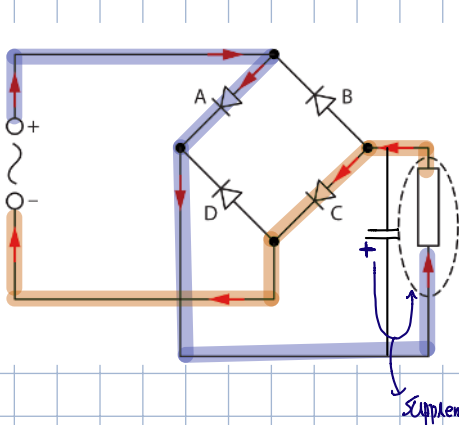
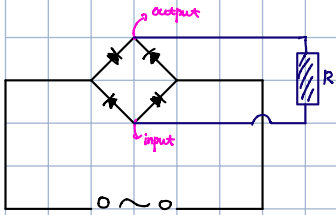


Figure 11.27 Half-wave rectification.

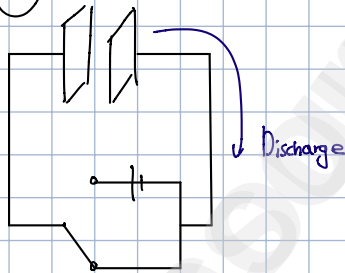
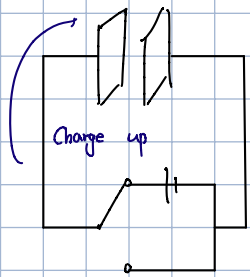
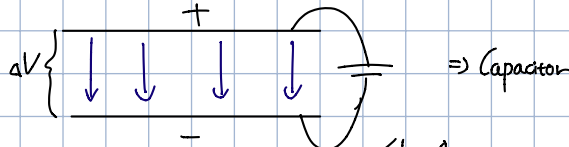




Better storage device $\Rightarrow$ move straight graph
 = Stores electrical E
 = Stores electrical charge

Supplements the current

Capacitance



Depends on [Size
Voltage]

C: capacitance

$$Q = C \times V$$

$$C = \frac{Q}{V} \text{ (Charge per unit Voltage it can store)}$$

$$C \propto A$$

$$C \propto \frac{1}{d}$$

$$C = \epsilon \times \frac{A}{d}$$

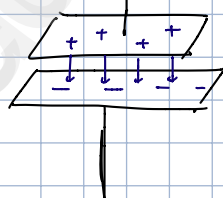
permittivity

ϵ_0 = permittivity of a vacuum (free space) = How Hard is it to make an E

$\epsilon \Rightarrow$ depends on material $> \epsilon_0$

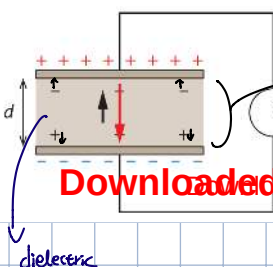
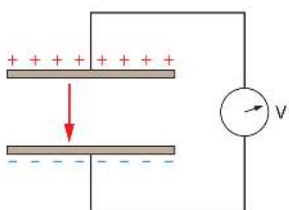
$$E = -\frac{\Delta V}{\Delta x} \Rightarrow \text{distance between the plates}$$

$$\epsilon \propto \frac{1}{d} \quad F \propto E$$



increase E $\Rightarrow$ Force $\uparrow \Rightarrow$ move charges
 attracts more charge
 counteract Repulsion F

Dielectric $\Rightarrow$ insulator w Higher permittivity
 $\Rightarrow$ increase C



Create its own electric field = Opposite

Electric fieldness $\Rightarrow$ Reduced

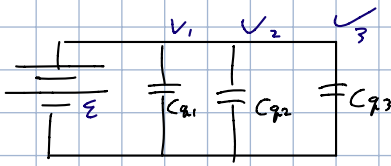
More Charge can be added
 Until V across Capacitor
 = ϵ

$$F = E \times q \quad W = F \times d \quad W \downarrow \Rightarrow V \downarrow$$

$$C = \frac{Q}{V} \quad C = \epsilon \times \frac{A}{d}$$

Downloaded from eduresourceza.com

1. Discharged $\Rightarrow$ Charging $I > 0$, q is moving to the plates $\Rightarrow$ fully charged (no more charge moving)
 $I > 0$ Current = 0



$$q_T = q_1 + q_2 + q_3$$

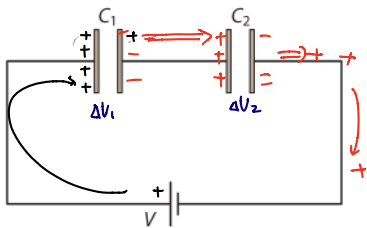
$$\Sigma = V_1 = V_2 = V_3 \quad C = \frac{q}{V}$$

Same as parallel resistors

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

$$\frac{q_T}{V_T} = \frac{q_1}{V_1} + \frac{q_2}{V_2} + \frac{q_3}{V_3} \Rightarrow \text{Dividing works cuz } V_T = V_1 = V_2 = V_3$$

$$C_T = C_1 + C_2 + C_3$$



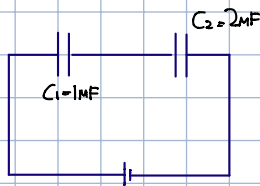
$$C = \frac{q}{V}$$

$$Q_T = Q_1 = Q_2$$

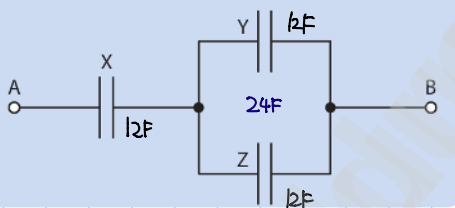
$$V_T = V_1 + V_2$$

$$\frac{V_T}{Q_T} = \frac{V_1}{Q_1} + \frac{V_2}{Q_2}$$

$$\frac{1}{C_T} = \frac{1}{C_1} + \frac{1}{C_2}$$

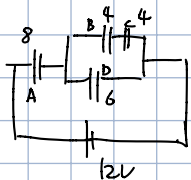


$$C_T = \frac{1}{\frac{1}{1 \times 10^{-6}} + \frac{1}{2 \times 10^{-6}}}$$



$$C = \frac{q}{V} = C \times V^{-1} = \frac{A \times S}{V} = F$$

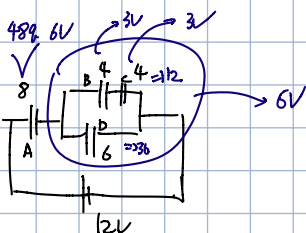
$$\frac{1}{12} + \frac{1}{24} = \frac{3}{24} = \frac{1}{C_T} \quad 8F = C_T$$



$$\frac{1}{4} + \frac{1}{4} = \frac{1}{2}$$

$$12V \times 4 = 48$$

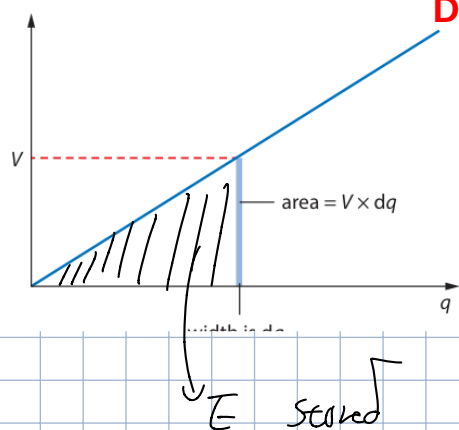
$$\frac{1}{8} + \frac{1}{8} = \frac{1}{4} \Rightarrow 4F = C_T$$



Downloaded from eduresourceza.com

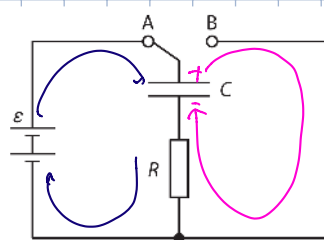
$$\text{Work} = V \times q$$

Downloaded from eduresourceza.com



$$E_{\text{stored}} = \frac{1}{2} qV = \frac{1}{2} CV^2 = \frac{1}{2} \times \frac{q^2}{C}$$

$$q = CV \quad V = \frac{q}{C}$$



to A, charging

to B, discharging

Downloaded from eduresourceza.com