

TOPIC 2 : CAPACITORS & DIELECTRICS

2.1 CAPACITANCE AND CAPACITORS IN SERIES & PARALLEL

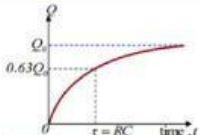
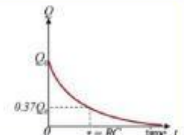
Capacitance : $C = \frac{Q}{V}$ where C is capacitance (F)
Q is charge (C)
V is _____



	SERIES	PARALLEL
Charge, Q	$Q_1 = Q_2 = Q_3$	
	$V = V_1 + V_2 + V_3$	
Capacitance, C		$C_{eff} = C_1 + C_2 + C_3$

Energy stored in capacitor : $U = \frac{1}{2} \frac{Q^2}{C} = \frac{1}{2} CV^2 =$

2.2 CHARGING AND DISCHARGING OF CAPACITORS

	CHARGING 	DISCHARGING 
Charge, Q	$Q = Q_0 (1 - e^{-\frac{t}{RC}})$	$Q = Q_0 e^{-\frac{t}{RC}}$
Current, I		
Definition time constant, τ		

2.3 CAPACITORS WITH DIELECTRICS

Capacitance of air-filled parallel plate capacitor: $C = \epsilon_0 \frac{A}{d}$ where ϵ_0 is permittivity of free space
A is _____
d is distance between two plates

Dielectric constant : $\epsilon_r = \frac{C}{C_0} = \frac{\epsilon}{\epsilon_0} = \frac{V_0}{V} = \frac{E_0}{E}$

	BATTERY IS DISCONNECTED 	BATTERY STILL CONNECTED 
Effects of inserting dielectric on parallel plate capacitor	 constant	 constant

CAPACITANCE INCREASE