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	Batch-5	7
Q	Explain the concept of breakdown in capacitors. Calculate the maximum potential difference before breakdown for a Cylindrical & plate capacitors. Using this, calculate the voltage of a lightning strike.	
	the maximum hotential difference before brookdown loss	
	Cylindrical & plate capacitors. Using this calculate the	
	voltage of a lightning strike.	
	_ 0 0 0 1	
	In a high voltage environment, free electrons in an insulator [there are always some present] gain energy from electric	
	infulator [there are always some present] gain energy from electric	
	field. These high energy electrons can ionize Tknockoutelectroni	1
	field. These high energy electrons can ionize Trackoutelectrons the rate molecules of the insulator which causes the inculator	
	to become a conductor and hence "breakdown".	
	Var Each as Var bad-av	
	This breakdown is known as sparking.	
	Every dielectric material has two constants Dielectric constant Dielectric units Strength Ym	THE REAL PROPERTY.
	U Dielectric constant Dielectric units	
	(k) Strenger Vm	
•	For a parallel plate capacitor [Dilectric constant= k]	
	Dielectric & material's dielectric strength = Lo	
	Area charge density	
	$C = Q \qquad E = K \sigma \qquad V = Ed = \sigma d - Qd \Rightarrow c = A \varepsilon$ $V = Ed = \sigma d - Qd \Rightarrow c = A \varepsilon$	E
	2 Vo = End @ => Vo=kod	
	toximum Vo = Eod @ = > Vo=kod	
•	For a cylindrical plate capacitor	
	quistan = E - Kil A=Q	
	RA (TRIN	and the
7	1= JEdx => V= KQ [1] = KQ [1] []	W. 1844
	2×80 82 × L(2×80)	*******
7	C=Q 27LEOK 76= E02 = 1/2 20	
Manager sales and a second districts of the second	V In [1/2] Maring 200	

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and the clouds
m
m f Air - 3×108 Ym
D Ym
MIOH
/ · · · · · · · · · · · · · · · · · · ·

Vo = Eo In R2 | Moscimum? R1

Now we appune the earth's purface a parallel plate capacitor.

mme-clouds 10km = d = 104 10 km Dielectric Strength o

Earth

Vo=Eod => Vo = (3×108) $=3\times10^{12} \text{ V}$

difference · During a lightning strike the voltage b/w earth & cloud is 3×1012 V