Questions with Answer Keys MathonGo Will mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo Two identical capacitors have same capacitance C. One of them is charged to the potential V and other to the potential 2 V. The negative ends of both are connected together. When the positive ends are also joined together, the decrease in energy of the combined system is: (1) $\frac{1}{4}$ CV^2 nongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo (2) $2CV^2$ (3) $\frac{1}{2}$ CV² (4) $\frac{3}{4}$ CV^2 rongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo Q2 - 2024 (01 Feb Shift 2) A galvanometer (G) of 2Ω resistance is connected in the given circuit. The ratio of charge stored in C_1 and C_2 is, mathongo ///. mathongo (1) $\frac{2}{3}$ mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo (4) $\frac{1}{2}$ mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo /// mathongo /// mathongo /// mathongo /// mathongo Q3 - 2024 (01 Feb Shift 2) In an electrical circuit drawn below the amount of charge stored in the capacitor is μC . μC . //. mathongo ///. mathongo ///. mathongo ///. mathongo 10μF R_3

Questions with Answer Keys MathonGo Q4 - 2024 (27 Jan Shift 1) mathongo ///. mathongo ///. mathongo ///. mathongo The charge accumulated on the capacitor connected in the following circuit is μC (Given $C = 150 \mu F$) R_sgo /// mathongo /// mathongo /// mathongo /// mathongo Raygo ///. mathongo ///. mathongo ///. mathongo Q5 - 2024 (29 Jan Shift 1) mathongo /// mathongo /// mathongo /// mathongo A capacitor of capacitance $100\mu F$ is charged to a potential of 12 V and connected to a 6.4mH inductor to produce oscillations. The maximum current in the circuit would be: (1) 3.2 Ahongo /// mathongo /// mathongo /// mathongo /// mathongo (2) $1.5~\mathrm{A}$ mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo (3) 2.0 A(4) 1.2 Ahongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo Q6 - 2024 (29 Jan Shift 1) A 16Ω wire is bend to form a square loop. A 9 V battery with internal resistance 1Ω is connected across one of its sides. If a 4μ F capacitor is connected across one of its diagonals, the energy stored by the capacitor will be $\frac{x}{2}\mu$ J. where $x = \underline{}$ Q7 - 2024 (30 Jan Shift 1) mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo A capacitor of capacitance C and potential V has energy E. It is connected to another capacitor of capacitance 2C and potential 2 V. Then the loss of energy is $\frac{x}{3}E$, where x is _____ Q8 - 2024 (31 Jan Shift 1) A parallel plate capacitor with plate separation 5 mm is charged up by a battery. It is found that on introducing a dielectric sheet of thickness 2 mm, while keeping the battery connections intact, the capacitor draws 25%

Questions with Answer Keys MathonGo more charge from the battery than before. The dielectric constant of the sheet is

Do you want to practice these PYQs along with PYQs of JEE Main from 2002 till 2024?

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Answer Ke	y ///.									
Q1 (1) athongo										
Q5 (2) athongo		Q6 (81)		mathongo	Q7 (2)mathongo		m Q8 (2)go		
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Solutions MathonGo mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo $m V_{C} = rac{q_{net}}{C_{net}} = rac{CV + 2CV}{2C}$ mathongo /// mathongo /// mathongo /// mathongo $V_{\mathrm{C}} = \frac{3 \, \mathrm{V}}{2}$ $^{\prime}$ C $^{\prime}$ 2 $^{\prime}$ mathongo | ///. math $=\frac{1}{2}\text{CV}^2+\frac{1}{2}\text{C}(2\text{ V})^2$ or $\frac{1}{2}\text{2C}\left(\frac{3\text{ V}}{2}\right)^2$ mathongo /// mathongo /// mathongo $\frac{1}{4}\left(n\frac{CV_{0}^{2}}{4}\right)$ ngo /// mathongo /// mathongo /// mathongo /// mathongo Q2 mathongo /// mathongo /// mathongo /// mathongo mathongo /// mathongo /// mathongo /// mathongo /// mgthongo /// mathongo /// mathongo /// mathongo /// mathongo $\mathrm{Req}\,=12\Omega$ P.D = 3 V mathongo /// mathongo /// mathongo /// mathongo /// mathongo P.D acoross $C_2 = 4 \text{ V}$ $q_1 = C_1 V_1 = 12 \mu C$ mathongo /// mathongo /// mathongo /// mathongo /// mathongo $\mathrm{q}_2=\mathrm{C}_2\;\mathrm{V}_2=24\mu\mathrm{C}$ $\frac{q_1}{q_2} = \frac{1}{2}$ hongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo ngo /// mathongo /// mathongo /// mathongo /// mathongo Do you want to practice these PYQs along with PYQs of JEE Main from 2002 till 2024?

Solutions MathonGo

In steady state there will be no current in branch of capacitor, so no voltage drop across $R_2=5\Omega$

$$I_1 = I_3 = \frac{1}{4+6} = 1 \text{ A}$$

$$V_{R_3} = V_{co} + V_{R_2} / V_{R_2} = 0$$
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$$I_3R_3=V_c$$

$$V_c=1\times 6=6~volt$$
 mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

$$V_A + rac{10}{3}(1) - 6(1) = V_B$$
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$$V_A - V_B = 6 - \frac{10}{3} = \frac{8}{3} \text{volt}_{ngo}$$
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$$\frac{8}{150} \times \frac{8}{3} = 400 \mu \text{C}$$
 mathongo ///. mathongo ///. mathongo ///. mathongo

$$\frac{1}{2}CV^2 = \frac{1}{2}LI_{max}^2$$
 mathongo /// mathongo /// mathongo /// mathongo /// mathongo

$$I_{max} = \sqrt{\frac{C}{L}} V$$
 mathongo /// matho

$$= \frac{12}{8 \text{ mathongo}} = \frac{3}{8 \text{ mathongo}} = \frac{1.5 \text{ A}}{1.00 \text{ ma$$

Solutions MathonGo

$$4\Omega$$
 4Ω 4Ω 4Ω

$$M_{\Omega}$$
 /// mathongo /// mathongo /// mathongo /// mathongo

$$R_{eq}$$
 R_{eq} R_{eq}

$$V_A - V_B = I_1 \times 8 = \frac{9}{16} \times 8$$

$$I_1 = \frac{9}{4} \times \frac{4}{16} = \frac{9}{16} \quad \text{mathongo} \quad \text{ma$$

$$U = \frac{81}{2} \times 1$$

$$U = \frac{81}{2} \mu J$$
 /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

$$\therefore x = 81$$

$$x=81$$
 mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

$$x = \frac{x}{\sqrt{2}}$$
 mathongo /// mathongo /// mathongo /// mathongo /// mathongo

Without dielectric

$$\mathrm{Q}=rac{\mathrm{A}\in_0}{\mathrm{A}}\;\mathrm{V}$$

$$Q = \frac{1}{a}$$

$$Q = \frac{A \epsilon_0 V}{d^- t + \frac{t}{K}} \qquad \qquad \text{mathongo} \qquad \text{math$$

$$\frac{A \in_0 V_{\text{od}}}{d-t+\frac{t}{K}} \stackrel{\text{def}}{=} (1.25) \frac{A \in_0 V}{d} \text{ mathongo} \quad \text{mathongo} \quad \text{m$$

$$\Rightarrow 1.25 \left(3 + \frac{2}{K}\right) = 5$$
 athongo /// mathongo /// mathongo /// mathongo

$$\Rightarrow$$
 K = 2

$$\Rightarrow$$
 K = 2
///. mathongo