CAPACITOR

1 Two capacitors of 2 μF and 8μF are joined are series and a potential difference of 300 volts is applied. Find the charge and potential difference for each capacitor. [240 V and 60 V]

2 A capacitor of100 pF is charged to a potential difference of 50V. If the plates are then connected in parallel to another capacitor and it is found that the potential difference between its plates falls to 35 volts, what is the capacitance of the second capacitor?. [43 pF]

3. Two parallel plates of an air-filled capacitor are 1.0 mm apart. What must the plate area be of the capacitance is 1 nano-farad? [Ans 0.11 m^2]

4. A parallel plate capacitor has the plates 10cm x 10m separated y a distance 2.5 cm. It is initially filled with air. What will be the increase in the capacitance if a dielectric slab of the same area and thickness 2.5cm is placed between the two plates? $\in_r = 2$. [Ans = 3.54 X 10-12 F]

5 A heart defibrillator delivers 8×10^2 J of energy by discharging a capacitor initially at 2×10^4 V. What is its capacitance? [4 μ F]

6 A capacitor has a capacitance of 50F and it has a charge of 100V. Find the energy that this capacitor holds. [2.5 x 10^5 J]

7 Calculate the change in the energy stored in a capacitor of capacitance 1500 μF when the potential difference across the capacitor changes from 10 V to 30 V [0.3 J]

8 When a capacitor is connected to a source of 240 V, it stores a charge of 50 mC. Calculate the energy stored in the capacitor. [hint $V = V_o e^{-(t/RC)}$] [6 J]

9 A capacitor of 1000 μF is with a potential difference of 12 V across it is discharged through a 500 Ω resistor. Calculate the voltage across the capacitor after 1.5 s [0.6 V]

10 Calculate the time for the potential across a 100 μF capacitor to fall to 80 per cent of its original value if it is discharged through a 20 kΩ resistor. [0.5 s]

11 A 4000 μF capacitor is charged through a 2.5 kΩ resistor using a 15 V supply. Calculate the potential difference across the plates after 5s [5.9 V

12 A 2000 μF capacitor is charged through a 1 kΩ resistor using a 6 V supply. Calculate charge on the plates after 2.5

[hint $Q_0 = CV = 2000 \times 10^{-6} \times 6 = 0.012$ C, $Q = Q_0 = (1 - e^{\frac{-t}{RC}})$, Ans =0.0086 C]