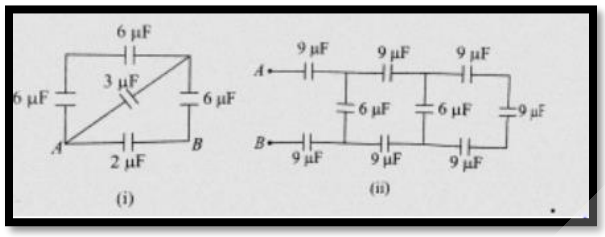
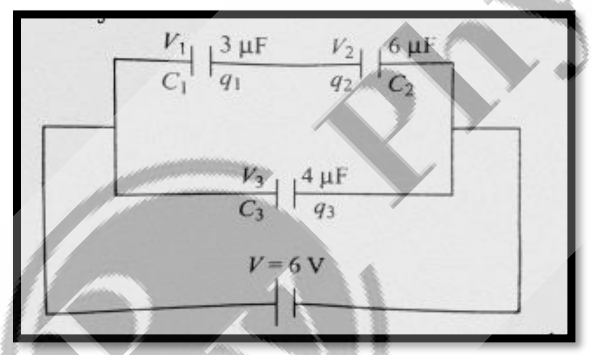
Ch—02 Electrostatic Potential and Capacitance
Daily Practice Problem 07

Q1. In figure, different capacitors are arranged. Find the equivalent capacity across the points A and B.



Q2. Three capacitors of capacitances 3 μF, 6 μF, and 4μF are connected as shown across a battery of emf 6 V.

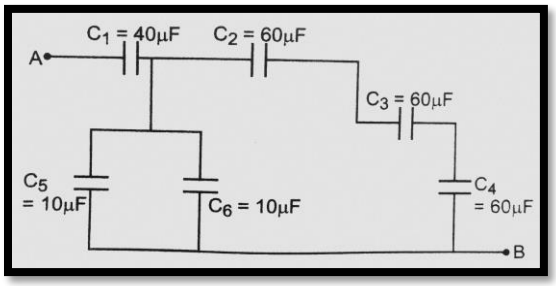


(i) Find the equivalent capacitance.
(ii) Find the potential difference and charge on each capacitor.
(iii) Find the energy stored in each capacitor and the total energy stored in the system of capacitors.

Q3. Three capacitors of equal capacitance, when connected in series have net capacitance C_1, and when connected in parallel have net capacitance C_2. What is the value of C_1/C_2?

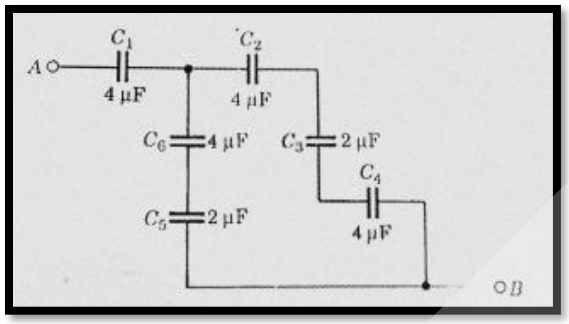
Q4. Two capacitors of capacitance of 6μF and 12 μF are connected in series with a battery. The voltage across the 6μF capacitor is 2 V. Compute the total battery voltage.

Q5. Find the equivalent capacitance of the combination of capacitors between the points A and B as shown in Fig.. Also calculate the total charge that flows in the circuit when a 100 V battery is connected between the points A and B.



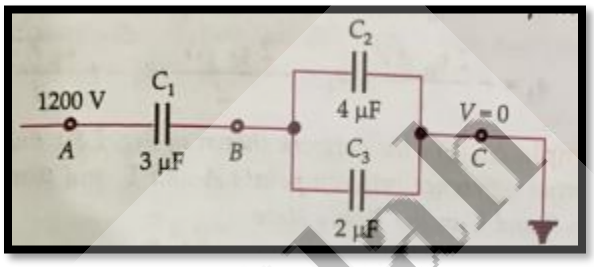
Q6. Seven capacitors, each of capacitance 2 μF are to be connected in a configuration to obtain an effective capacitance of 10 /11μF. Suggest a suitable combination to achieve the desired result.

Q7. Calculate the equivalent capacitance points A and B of the circuit given below

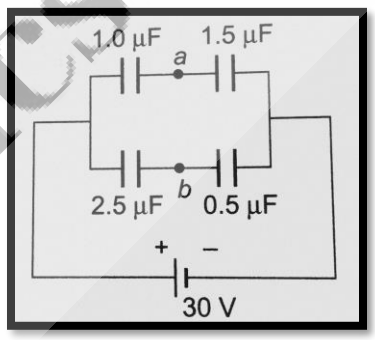


Q8. If C_1 =20 μF, C_2 =30 μF and C_3 =15μF and the insulated plate of C_1 be at a potential of 90 V, one plate of C_3 being earthed. What is the potential difference between the plates of C_2, three capacitors being connected in series?

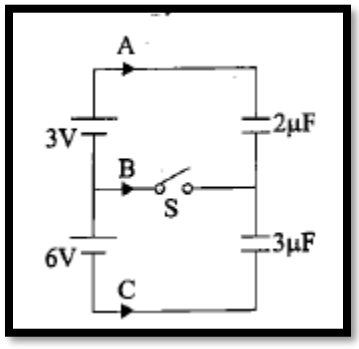
Q9. In the circuit shown if the point C is earthed and point A is given a potential of +1200 V, find the charge on each capacitor and potential at B.



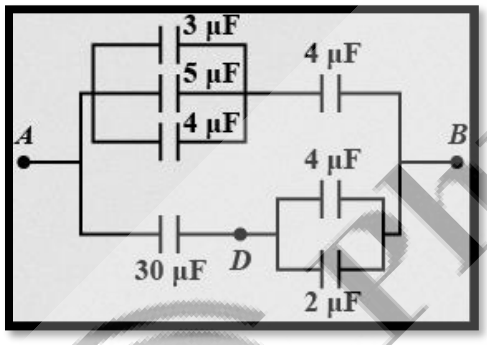
Q10. Four capacitors are connected as shown in figure to a 30 V battery. Find the potential difference between points a and b.



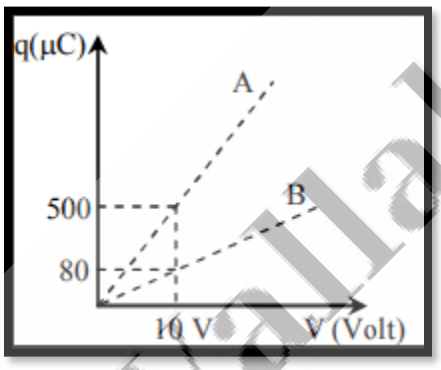
Q11. What charges will flow through section B of the circuit in the direction shown when switch S is closed.



Q12. Figure shows a network of seven capacitors. If charge on 5 μF capacitor is 10 μF, find the potential difference between points A and C



Q13. Figure shows charge (q) versus voltage (V) graph for series and parallel combination of two given capacitors. The capacitances are



a. 60 μF and 40 μF
b. 50 μF and 30μF
c. 20 μF and 30μF
d. 40 μF and 10μF

ANSWERS

1. (i) 5μF, (ii) 3 μF

2. (i) $6\mu F$ (ii) $V_1 = 4V, V_2 = 2V,$

$q_1 = 12\mu C, q_2 = 12\mu C, q_3 = 24\mu C$

(iii) $U_1 = 24\mu J, U_2 = 12\mu J, U_3 = 72\mu J$

$U = 108\mu J$

3. $\frac{C_1}{C_2} = \frac{1}{9}$

4. 3V

5. $C = 20\mu F, q = 2mC$

6. Parallel combination of 5 capacitors in series with the other 2 capacitors

7. $\frac{28}{19}\mu F$

8. 20V

9. $q_1 = 2.4 \times 10^{-3}C$, $q_2 = 1.6 \times 10^{-3}C$,

$q_3 = 0.8 \times 10^{-3}C$,

$V_B = 400V$

10. 13V

11.. 120 μC

12. 5.33 V

13. d