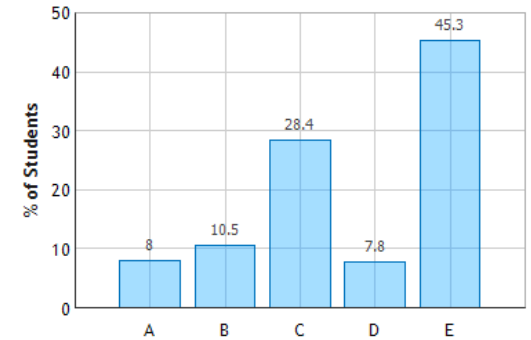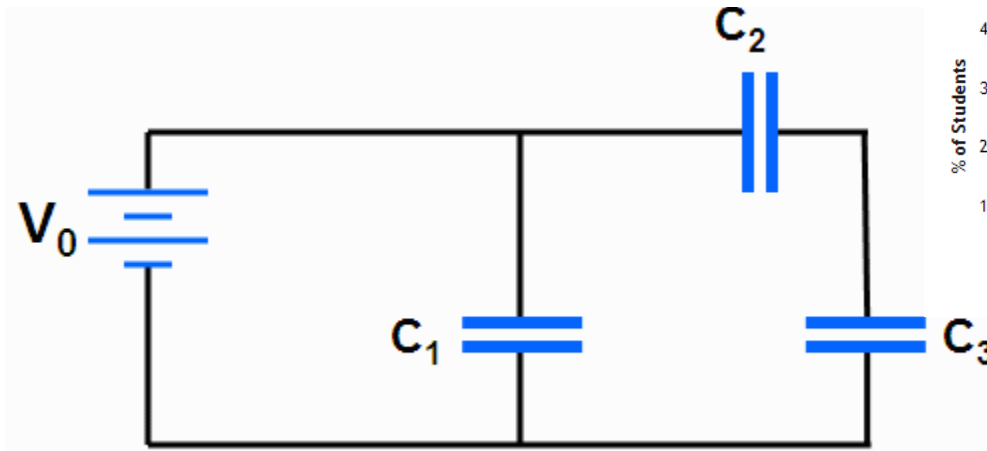A circuit consists of three unequal capacitors C_1, C_2, and C_3 which are connected to a battery of voltage V_0. The capacitance of C_2 is twice that of C_1. The capacitance of C_3 is three times that of C_1. The capacitors obtain charges Q_1, Q_2, and Q_3.

A. $Q_1 > Q_3 > Q_2$ ❌   **B.** $Q_1 > Q_2 > Q_3$ ❌   **C.** $Q_1 > Q_2 = Q_3$ **D.** $Q_1 = Q_2 = Q_3$ **E.** $Q_1 < Q_2 = Q_3$

1. See immediately: $Q_2 = Q_3$ (capacitors in series)

2. How about Q_1 vs. Q_2 and Q_3? Calculate C_{23} first.

$$\frac{1}{C_{23}} = \frac{1}{C_2} + \frac{1}{C_3} = \frac{1}{2C_1} + \frac{1}{3C_1} = \frac{5}{6C_1}$$

$$\Rightarrow \quad C_{23} = \frac{6}{5}C_1$$

$$Q_1 = C_1 V_0$$

$$Q_{23} = Q_2 = Q_3 = C_{23}V_0 = \frac{6}{5}C_1 V_0$$