Chapter 6, Solution 26.

Three capacitors, $C_1 = 5$ μF, $C_2 = 10$ μF, and $C_3 = 20$ μF, are connected in parallel across a 150-V source. Determine:
  (a) the total capacitance,
  (b) the charge on each capacitor,
  (c) the total energy stored in the parallel combination.

Solution

(a) $C_{eq} = C_1 + C_2 + C_3 = \mathbf{35\mu F}$

(b) $Q_1 = C_1 v = 5 \times 150 \mu C = \mathbf{0.75mC}$
     $Q_2 = C_2 v = 10 \times 150 \mu C = \mathbf{1.5mC}$
     $Q_3 = C_3 v = 20 \times 150 = \mathbf{3mC}$

(c) $w = \dfrac{1}{2} C_{eq} v^2 = \dfrac{1}{2} \times 35 \times 150^2 \mu J$ $= \mathbf{393.8mJ}$