ELECTRIC FIELD & CAPACITOR
MODEL SOLUTION

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1. Charge, $Q_1 = CV$
$= 2.0\mu \times 50$
$= \underline{1.0 \times 10^{-4}\ C}$

Charge, $Q_2 = CV$
$= 3.0\mu \times 100$
$= \underline{3.0 \times 10^{-4}\ C}$

Energy, $W_1 = \frac{1}{2} CV^2$
$= \frac{1}{2} \times 2.0\mu \times 50^2$
$= \underline{2.5 \times 10^{-3}\ J}$

Energy, $W_2 = \frac{1}{2} CV^2$
$= \frac{1}{2} \times 3.0\mu \times 100^2$
$= \underline{1.5 \times 10^{-2}\ J}$

$C_{total} = C_1 + C_2$
$= [2.0 + 3.0]\ \mu F$
$= \underline{5.0\ \mu F}$

Total charge
$= 1.0 \times 10^{-4} + 3.0 \times 10^{-4}$
$= \underline{4.0 \times 10^{-4}\ C}$

$E_{total} = \frac{1}{2} [Q^2 / C]$
$= \frac{1}{2} [\{4.0 \times 10^{-4}\}^2 / \{5.0 \times 10^{-6}\}]$
$= \underline{0.016\ J}$

There's loss of stored energy when the capacitors are connected due to gain in internal energy during electrical work

OR

There's loss of stored energy when the capacitors are connected because of the heating in the wires resulting in the dissipation of thermal heat.

OR

There's loss of stored energy when the capacitors are connected due to work done in charges

OR

There's loss of stored energy when the capacitors are connected because energy is needed to overcome resistance in wires.

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