

. (a) : $C_1 = 40 \mu\text{F}$, $V = 100 \text{ V}$, $K = 2$,

New capacitance, $C' = KC_1 = 2 \times 40 = 80 \mu\text{F}$

So, $\Delta q = (C' - C_1)V = (80 - 40) \times 100 \times 10^{-6} = 4000 \times 10^{-6} = 4 \text{ mC}$

$$\Delta U = \frac{1}{2}C'V^2 - \frac{1}{2}C_1V^2 = \frac{1}{2} \times (100)^2 (80 - 40) \times 10^{-6}$$

$$= 0.2 \text{ J}$$