Q- An electronic flashgun has a 1000 -μF capacitor that is charged to 100 V.

a. How much energy is stored by the capacitor?

The energy stored in the capacitor is given by

$U = \frac{1}{2}CV^2 = 0.5*1000*10^{-6}*(100)^2 =$ **5.00 J**

b. What is the charge on the capacitor?

The charge on the capacitor is given by

$Q = CV = 1000*10^{-6}*100 =$ **0.1 C**

c. When the photographer takes a picture, the flash fires for 1/2000 s. What is the average current through the flashtube?

The current is the rate of the flow of charge and hence average current is given by

$I = \Delta Q/\Delta t = 0.1/(1/2000) = 200$ A

Hence the average current in the tube is **200 A**

d. Find the power delivered to the flashtube?

The power delivered is the rate at which the energy is supplied and is given by

$P = \Delta U/\Delta t = 5.00/()1/2000) = 10000$ W = $\mathbf{10^4}$ **W**

e. After a picture is taken, the capacitor has to be recharged by a power supply that delivers a maximum current of 10 mA. How long will it take to charge the capacitor?

The total charge required for the capacitor is 0.1 C and the current is 10 mA hence the time taken to charge the capacitor will be

$\Delta t = \Delta Q/I = 0.1/(10*10^{-3}) =$ **10 s**.