Question 20 (5 marks)

An electrical circuit is shown.

100 volts

$R = 15\ k\Omega$

$C = 47\ \mu F$
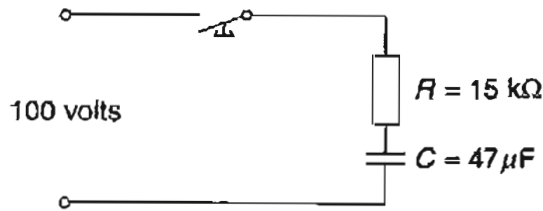
Calculate, showing all working:

(a)   the time constant for the circuit;   **2**

$R = Ct$

$\dfrac{15}{0.47} = \dfrac{0.47 \times t}{0.47}$ $\cancel{47.4B = t}$

$t = 31.91s$

(b)   the maximum circuit current;   **1**

$I = V/R$ $100/15 = 6.6667$

(c)   the value of resistance to be added to change the time constant to one second.   **2**

$R = Ct$

$R = 0.47 \times 1$

$R = 0.47 + 15$

$R = 15.47\Omega$