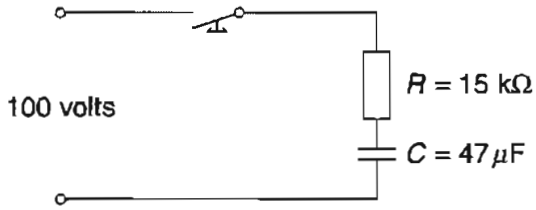
Question 20 (5 marks)

An electrical circuit is shown.



Calculate, showing all working:

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

$T = RC$

$= 15 \times 10^3 \times 47 \times 10^{-6}$

$= 0.705$ secs

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

$I = \frac{V}{R} = 6.6$ mA

$= \frac{100}{15 \times 10^3}$

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

$36.25 \times 10^3 \times 47 \times 10^{-6}$

$= 1.705$

$\therefore$ 20.25 Ω needs to be added to increase time constant by one second.