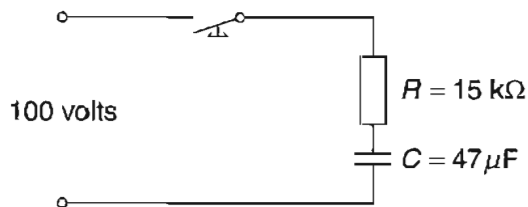


Question 20 (5 marks)

An electrical circuit is shown.



Calculate, showing all working:

- (a) the time constant for the circuit;

2

$$T = RC$$

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

$$= 0.705 \text{ seconds}$$

$$= 705 \text{ ms}$$

- (b) the maximum circuit current;

1

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

$$= \frac{100}{15 \times 10^3} = 0.006 \dot{6} \text{ A} = 6.6 \dot{6} \text{ mA}$$

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

2

$$T = RC$$

$$R = \frac{T}{C} \quad R = \frac{1}{47 \times 10^{-6}}$$

$$= 21276.59574 \Omega$$

$$- \text{Present } R \Omega = -15000 \Omega$$

$$= 6276.59574 \Omega$$

$$= 6.3 \text{ k}\Omega$$