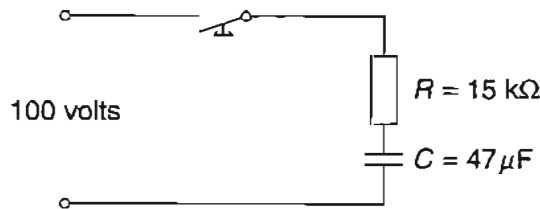


Question 20 (5 marks)

An electrical circuit is shown.



Calculate, showing all working:

- (a) the time constant for the circuit;

2

$$\tau = RC$$

$$= 15000 \times 0.000047$$

$$= 0.705 \text{ seconds}$$

$$R = 15 \text{ k}\Omega$$

$$= 15000 \Omega$$

$$C = 47 \mu\text{F}$$

$$= 0.000047 \text{ F}$$

- (b) the maximum circuit current;

1

$$I = \frac{V}{R} = \frac{100}{15000}$$

$$= 6.6 \text{ mA}$$

$$V = 100 \text{ V}$$

$$R = 15000 \Omega$$

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

2

$$\tau = RC$$

$$= 21276.6 \times 0.000047$$

$$= 1$$