

5 Fig. 5.1 shows a circuit containing a battery, two fixed resistors X and Y, and a light-dependent resistor (LDR) Z.

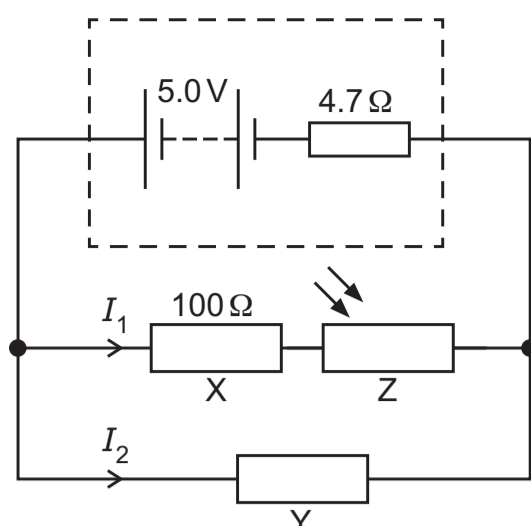


Fig. 5.1

The battery has electromotive force (e.m.f.) 5.0V and internal resistance 4.7Ω. The current in X is  $I_1$  and the current in Y is  $I_2$ .

The resistance of X is 100Ω. The resistance of Z varies with the intensity of light incident on it as shown in Fig. 5.2.

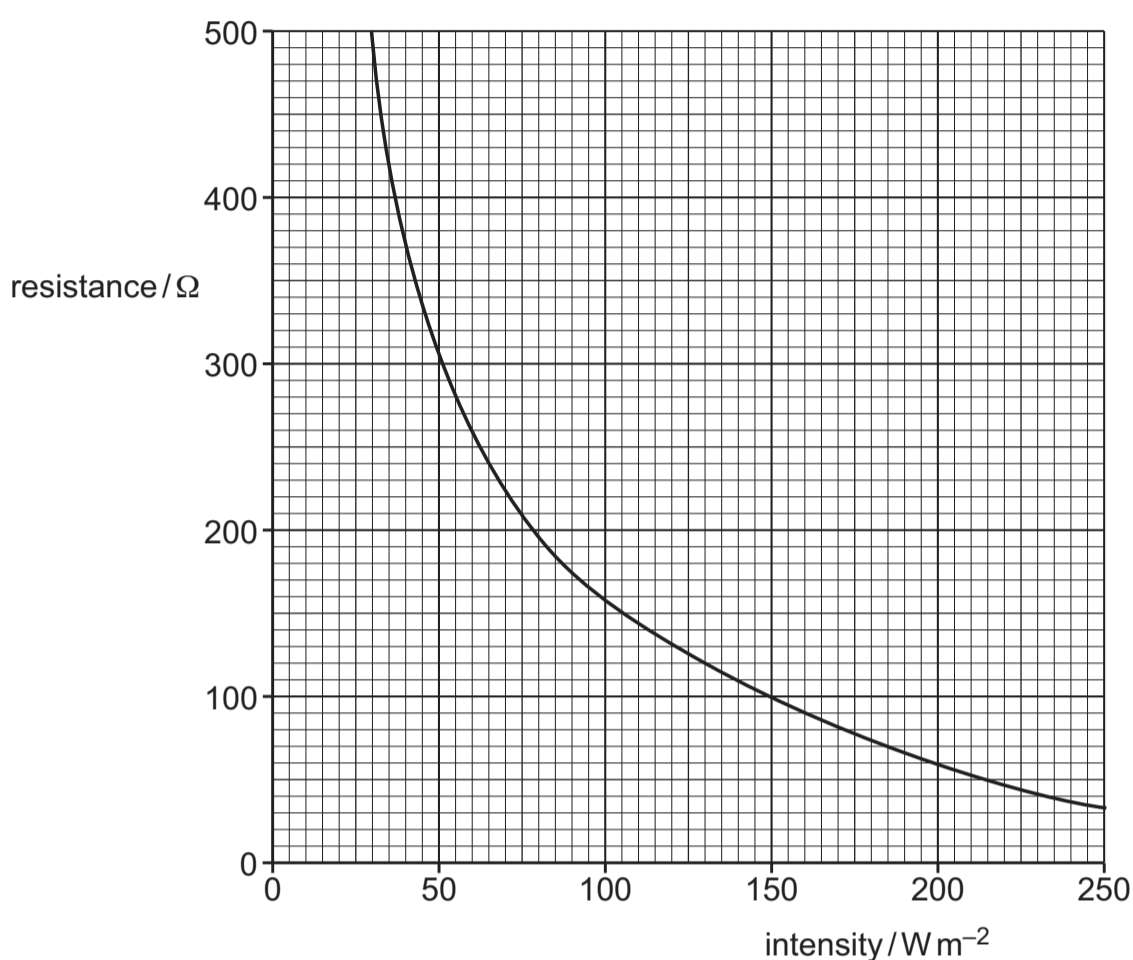


Fig. 5.2

(a) State Kirchhoff's first law.

.....  
 ..... [1]

(b) The intensity of light incident on Z is  $130 \text{ W m}^{-2}$ . The current in the battery is 38 mA.

(i) Show that the terminal potential difference of the battery is 4.8V.

[2]

(ii) Calculate the current  $I_2$  in Y.

$I_2 = \dots\dots\dots \text{ A}$  [3]

(iii) Calculate the power dissipated in Y.

power =  $\dots\dots\dots \text{ W}$  [2]

(iv) The intensity of the light incident on Z decreases.

State and explain the effect on the terminal potential difference of the battery.

.....  
 .....  
 .....  
 .....  
 ..... [3]