7 Fig. 7.1 shows the variation with light intensity of the resistance of an LDR.
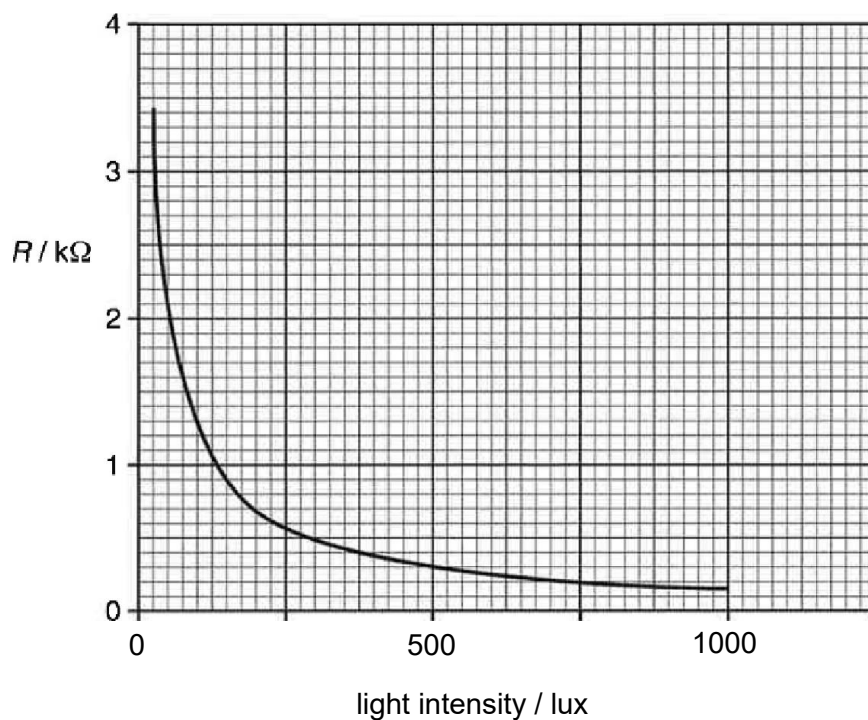

Fig. 7.1

(a) State the resistance of the LDR when the light intensity is 500 lux.

resistance = …….…... Ω [1]

(b) The LDR is to be used as a light sensor in a potential divider circuit shown in Fig. 7.2.
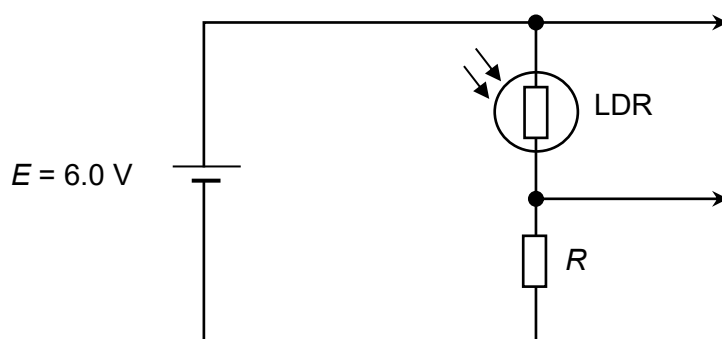

Fig. 7.2

It is required that the potential difference across the LDR be 2.4 V at a light intensity of 500 lux.

(i) Calculate the value of the fixed resistor R to achieve this.

R = ... Ω [2]

(ii) Explain how the potential difference across the LDR changes if the light intensity incident on the LDR falls below 500 lux.

....

....

....[2]

(c) Fig. 7.3 shows the I-V characteristics of an LED. The LED starts to conduct when the potential difference across it is 2.0 V.
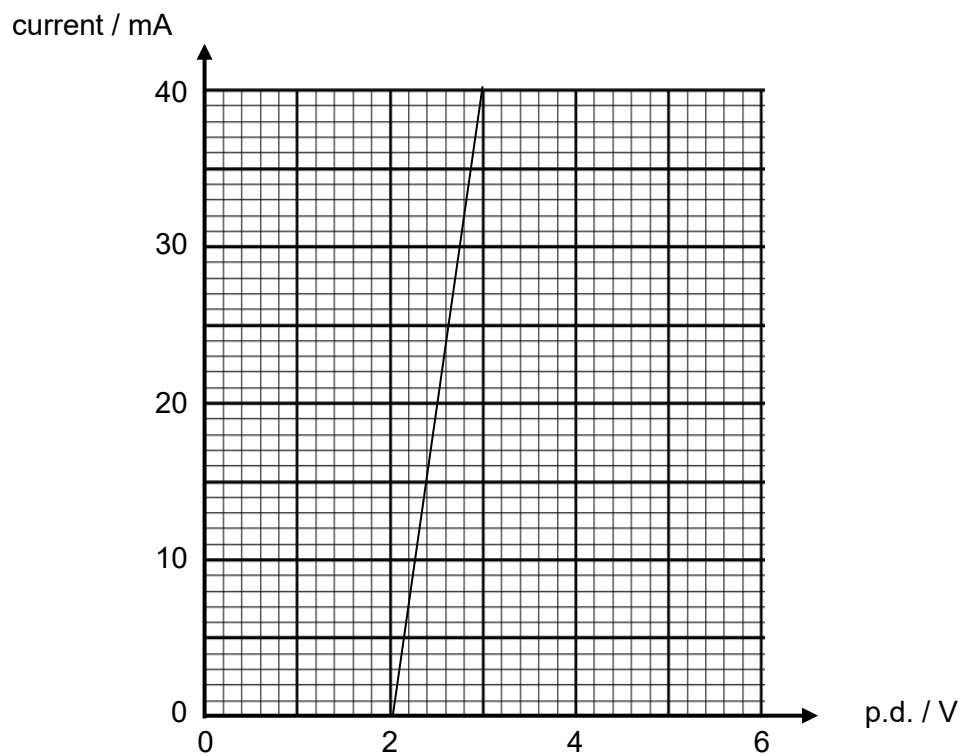

Fig. 7.3

Calculate the resistance at 3.0 V.

Resistance =.............................. Ω [1]

[Turn over

(d) The LDR in Fig. 7.2 is now replaced with component X. Component X consists of the same LDR in parallel with the LED in **(c)**.

The light intensity incident on the LDR remains constant at 500 lux. The resistance of the LDR follows Ohm's law when the intensity of light incident on it is constant.

On Fig. 7.4, draw the I-V characteristics of

(i) the LDR. Label your line as L. [1]
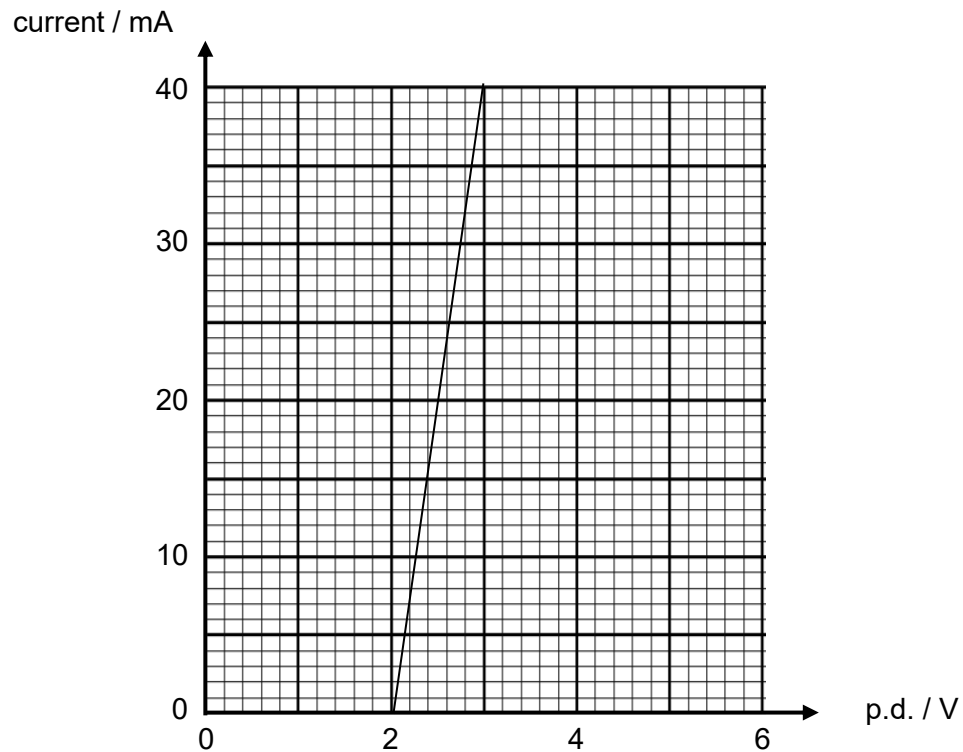
(ii) component X. Label your line as X. [1]

current / mA

Fig. 7.4

(iii) Hence, determine the current from the 6.0 V battery.

current = ……………….. A [2]

[Total: 10]