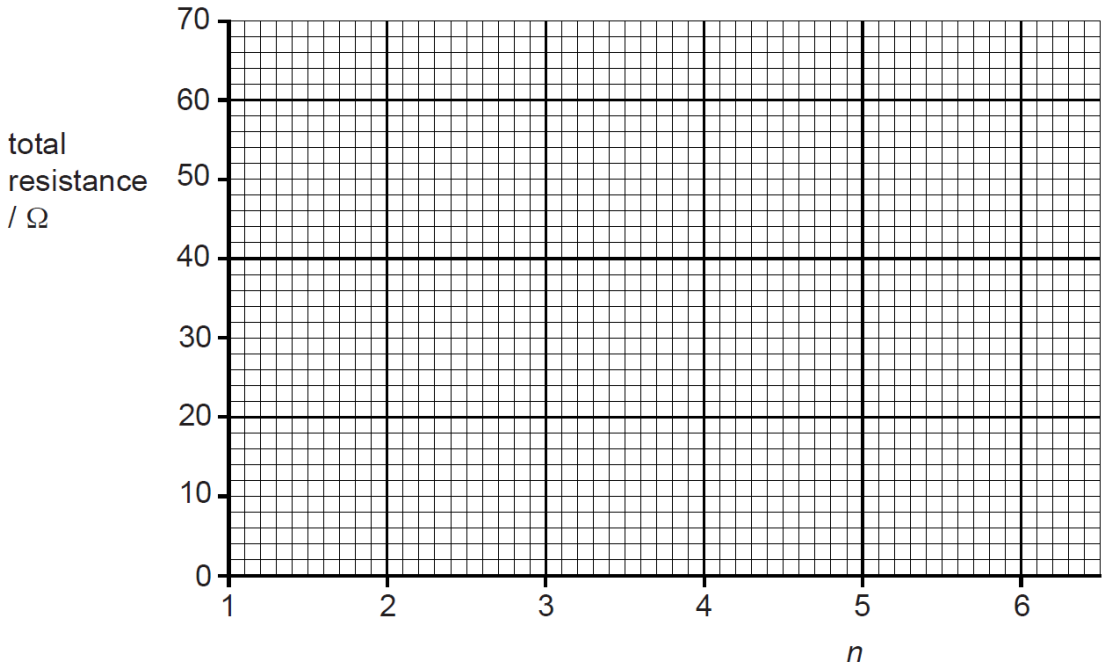
6 **(a)** **(i)** **1.** Give an expression for the total resistance of *n* resistors, each of resistance 10 Ω, connected in **series**, where *n* is the number of resistors.

resistance = ... Ω [1]

2. On Fig. 6.1, plot a graph showing the values of the total resistance for *n* = 1, 2, 3, 4, 5 and 6. Label the line S.



[2]

Fig. 6.1

(ii) **1.** Give an expression for the total resistance of *n* resistors, each of resistance 10 Ω, connected in **parallel**, where *n* is the number of resistors.

resistance = ... Ω [1]

2. On Fig. 6.1, plot a graph showing the values of the total resistance for *n* = 1, 2, 3, 4, 5 and 6. Label the line P.
[2]

(b) **(i)** Fig. 6.2 shows a network of 16 resistors, each of resistance 10 Ω connected in four parallel lines of four resistors in series.

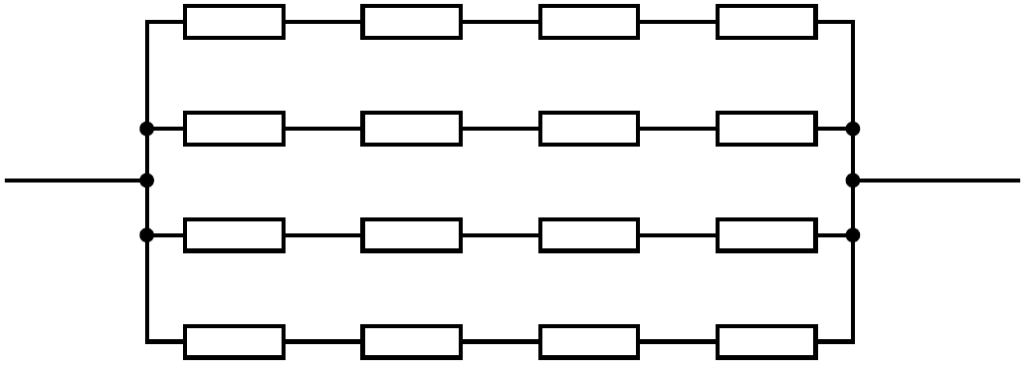


Fig. 6.2

Calculate the total resistance of the network.

total resistance = ... Ω [1]

(ii) State the total resistance of a network of *n* parallel lines of *n* resistors in series where every resistor has a resistance of 10 Ω.

resistance = ... Ω [1]

(iii) Explain one practical advantage of using many individual resistors in this way, rather than using a single resistor.

.....

.....

[1]

[Total: 9]