NAME _____ CLASS _____

SERIES AND PARALLEL CIRCUITS

In a **series** circuit the components are joined one after another in a single loop. There is only one path for the current. If one lamp breaks, the loop is broken and they all go out.

In a **parallel** circuit each component is on its own branch. The current splits between the branches. If one lamp breaks, the others stay on. The sockets in your home are wired in parallel.

1 Tick the correct column for each statement. 6 marks

STATEMENT	SERIES	PARALLEL
There is only one path for the current		
If one lamp blows, the others stay lit		
Total resistance is found by adding the resistors		
The current splits up between branches		
Total resistance is less than the smallest resistor		
Used for the lights and sockets in a house		

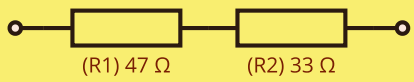
2 Fairy lights used to be wired in series. Explain why this was annoying. 2 marks

SERIES
$R_T = R_1 + R_2 + R_3 + \ldots$

PARALLEL (TWO RESISTORS)
$R_T = (R_1 \times R_2) \div (R_1 + R_2)$

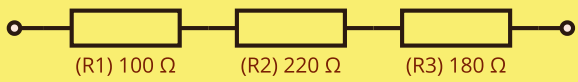
3 Calculate the total resistance (R_T) of each circuit. Show your working. 8 marks

A



WORKING

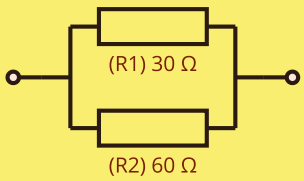
B



WORKING

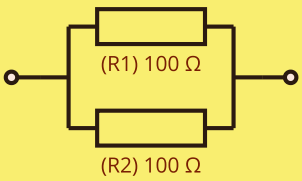
3 *(continued)*

C



WORKING

D



WORKING

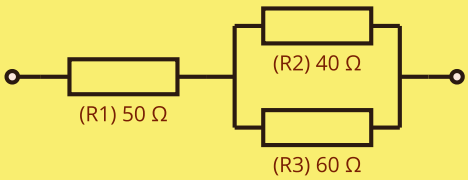
COMBINED CIRCUITS

Some circuits mix series and parallel. Work them out in stages: **first** find the total of each group, **then** combine the groups.

Always write the formula, put the numbers in, then give the answer with its unit (Ω). This is how you get full marks.

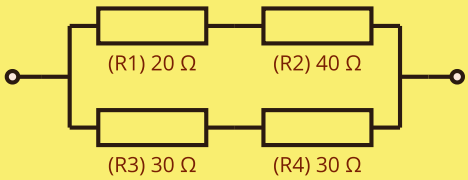
4 Calculate R_T for each circuit. 8 marks

A



WORKING

B



WORKING

5 The torch you will build has two LEDs in parallel. If one LED fails, what happens to the other one? Explain. 2 marks

6 CHALLENGE Two resistors are in parallel. One is 12 Ω and the total resistance is 4 Ω. Find the other resistor. (Hint: try some values!) 3 marks