NAME _____ CLASS _____

CHALLENGE: COMPLEX NETWORKS

For three or more resistors in parallel, use the reciprocal formula: $1/R_T = 1/R_1 + 1/R_2 + 1/R_3$. Work out the right-hand side, then flip the answer.

This works for any number of parallel resistors. Check your answer is smaller than the smallest resistor.

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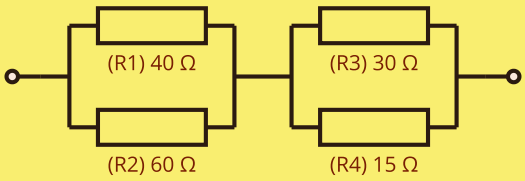
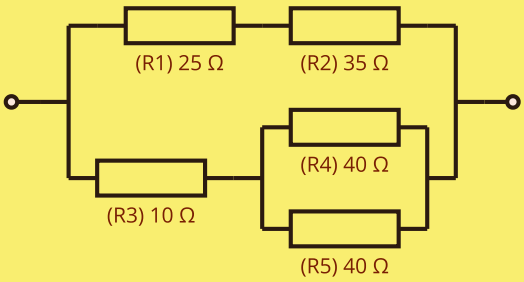
1 Calculate R_T for each network. 12 marks

A



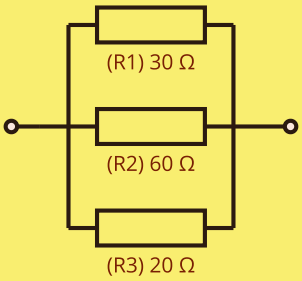
WORKING

B



WORKING

C



WORKING

CHALLENGE: DESIGN PROBLEMS

Engineers often know the total resistance they need and must choose resistors to make it. Real resistors only come in certain standard values, such as 10, 22, 47, 100, 220, 330, 390 and 470 Ω.

Use **V = I × R** where you need it. Remember: 1 mA = 0.001 A.

2 Using only 100 Ω resistors, show how to make a total of (a) 300 Ω, (b) 50 Ω and (c) 150 Ω. Sketch each circuit. 6 marks

A 300 Ω

B 50 Ω

C 150 Ω

3 A 9 V battery is connected to a 220 Ω resistor and a 230 Ω resistor in series. Calculate the total resistance, then the current. (I = V ÷ R) 4 marks

4 An LED should have no more than 20 mA flowing through it. It drops 2 V, so the resistor must drop the remaining 7 V from a 9 V battery. Calculate the smallest resistor that can be used. (R = V ÷ I) 4 marks

5 Two resistors in parallel give 8 Ω. One is 24 Ω. Find the other. 3 marks