Series circuits and Kirchhoff's 2nd law

Core BUILD THE BASICS

C1 **State** what happens to the current at different points in a series circuit. **[1]**

C2 $R_1 = 100\ \Omega$, $R_2 = 220\ \Omega$ in series. **Calculate** R_t. **[1]**

C3 $V_s = 6$ V. $V_1 = 2.5$ V. **Calculate** V_2 (two resistors). **[1]**

C4 Three 1 kΩ resistors in series across 6 V. **State** the voltage across each. **[1]**

C5 $R_1 = 470\ \Omega$, $R_2 = 330\ \Omega$ in series. **Calculate** R_t. **[1]**

C6 $V_s = 9$ V, $V_1 = 4$ V, $V_2 = 3$ V. **Calculate** V_3. **[1]**

C7 **State** Kirchhoff's 2nd law. **[1]**

Stretch GO FURTHER

S1 $R_1 = 3$ kΩ and $R_2 = 6$ kΩ across 18 V. **Calculate** I, V_1 and V_2. **[3]**

S2 In S1, R_2 is increased to 9 kΩ. **Describe** the effect on V_1. **[2]**

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S3 V_s = 9 V, I = 3 mA, R_1 = 1 kΩ. **Calculate** R_2. **[3]**

S4 12 V across 1 kΩ and 3 kΩ in series. **Calculate** V_2. **[3]**

S5 **State** which resistor has the larger voltage across it in S4, and why. **[1]**

Exam Ready QUALIFICATIONS SCOTLAND STYLE

E1 A string of 20 identical LEDs in series runs from 48 V. **Calculate** the voltage across each LED. **[2]**

E2 **Explain** why all the lights in a series string go out when one fails. **[2]**

E3 A 12 V supply, a 0.5 kΩ resistor and a lamp are in series. The current is 8.0 mA. **Calculate** the voltage across the lamp. **[3]**

E4 A bike light (fictional brand Glenlight) has a 6 V battery, a 100 Ω resistor and an LED in series. The LED has 2 V across it. **Calculate** the current. **[3]**

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E5 **Describe** what happens to the current in a series circuit if another resistor is added. **[1]**

Total: 30 marks. Use the Data Booklet. Show your working and give units.