Fixed voltage dividers

Core BUILD THE BASICS

C1 **State** what is meant by a voltage divider. **[1]**

C2 R_1 = 2 kΩ and R_2 = 8 kΩ are in series across 10 V. **Calculate** the total resistance. **[1]**

C3 For the circuit in C2, **calculate** the current and then V_{out}. **[3]**

C4 Two equal resistors are in series across 12 V. **State** V_{out}. **[1]**

C5 V_s = 10 V, $R_1 = 4R_2$. State V_{out}. **[1]**

C6 V_s = 12 V, R_1 = 1 kΩ, R_2 = 3 kΩ. **Calculate** V_2. **[2]**

C7 **State** which resistor in a divider has the larger voltage across it. **[1]**

Stretch GO FURTHER

S1 A divider has V_s = 12 V, R_1 = 10 kΩ and V_{out} = 4 V. **Calculate** R_2. **[3]**

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S2 Use the ratio method. V_s = 5.0 V, R_1 = 1 kΩ and R_2 = 4 kΩ. **Calculate** V_1 and V_2. **[2]**

S3 A divider has V_s = 9 V and $R_1 = R_2$ = 1 kΩ. R_2 is changed to 2 kΩ. **Describe** the effect on V_{out} and on the current. **[2]**

S4 V_s = 9 V, R_1 = 6 kΩ, V_{out} = 3 V across R_2. **Calculate** R_2. **[3]**

S5 **Calculate** V_{out} for V_s = 6 V, R_1 = 2.2 kΩ, R_2 = 3.3 kΩ. **[2]**

Exam Ready QUALIFICATIONS SCOTLAND STYLE

E1 A sensor board at Glenbrae Distillery (fictional) uses a 12 V supply. R_1 = 6.8 kΩ and R_2 = 3.3 kΩ. **Calculate** V_{out}. **[3]**

E2 **Explain** why the same current flows through R_1 and R_2. **[2]**

E3 In a 9 V divider, a voltmeter across R_1 = 15 kΩ reads 7.5 V. **Calculate** R_2. **[3]**

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E4 A battery monitor at Eilean Corr lighthouse (fictional) uses 47 kΩ (top) and 10 kΩ (bottom) on a 13.8 V battery. **Calculate** V_{out}. **[3]**

E5 **Explain** what happens to V_{out} in E4 if the battery voltage falls. **[2]**

E6 **State** the formula for a voltage divider from the Data Booklet. **[1]**

Total: 36 marks. Use the Data Booklet. Show your working and give units.