E2.5

UNIT E2 · WORKSHEET

# Combined circuits and LED resistors

UNIT PROGRESS

## Core BUILD THE BASICS

**C1** 6 V supply, LED 2 V. **State** the voltage across the series resistor. **[1]**

**C2** **Calculate** the resistor for C1 if the LED current is 20 mA. **[2]**

**C3** Two 6 Ω in parallel, in series with 3 Ω. **Calculate** $R_t$. **[2]**

**C4** **State** why an LED needs a series resistor. **[1]**

**C5** 9 V supply, LED 2 V. **State** the voltage across the series resistor. **[1]**

**C6** **Calculate** the resistor for C5 if the LED current is 20 mA. **[2]**

**C7** Two 10 kΩ in parallel, in series with 5 kΩ. **Calculate** $R_t$. **[2]**

## Stretch GO FURTHER

**S1** 12 V supply, LED 3.2 V at 20 mA. **Calculate** R and choose an E12 value. **[3]**

**S2** In the combined circuit in the notes, **calculate** the current in one 4.7 kΩ branch. **[2]**

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**S3** 12 V across 2 kΩ in series with 3 kΩ ∥ 6 kΩ. **Calculate** the total current. **[3]**

**S4** **Calculate** the voltage across the parallel part in S3. **[2]**

**S5** 5 V supply, LED 2.1 V at 15 mA. **Calculate** R and choose an E12 value (... 150, 180, 220, 270 ...). **[3]**

## Exam Ready QUALIFICATIONS SCOTLAND STYLE

**E1** Three LEDs (2.0 V each) are in series with a resistor on a 9.0 V supply. The current must be 10 mA. **Calculate** the resistor. **[3]**

**E2** A 2.0 kΩ resistor is in series with 3.0 kΩ ∥ 6.0 kΩ on 12 V. **Calculate** the voltage across the parallel pair. **[3]**

**E3** **Explain** why you choose the next E12 value up, not down, for an LED resistor. **[2]**

**E4** A sign at Glenmorie Distillery (fictional) uses four LEDs (2.0 V each) in series with a resistor on 12 V. The current is 20 mA. **Calculate** the resistor. **[3]**

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**E5** **Describe** the first step when solving a series–parallel circuit. **[1]**

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