

10 D.C. circuits – Part 1 — Answers

Answers

10.1 $V = \varepsilon - Ir = 1.5 - (0.50)(0.40) = 1.3 \text{ V}.$

10.2 $3.0 + 1.5 = 4.5 \text{ A}$ flows out.

10.3 By Kirchhoff's second law the two drops add to the e.m.f.: $9.0 - 5.0 = 4.0 \text{ V}.$

10.4 $V_{\text{out}} = \frac{R_2}{R_1 + R_2} V_{\text{in}} = \frac{1.0}{4.0} \times 12 = 3.0 \text{ V}.$

10.5 It increases. $V_{\text{out}} = \frac{R_2}{R_1 + R_2} V_{\text{in}}$, so a larger R_2 takes a bigger share of the supply voltage.

10.6 As the temperature rises the thermistor's resistance (R_1) falls, so R_2 takes a larger share of the supply — the output voltage across R_2 rises. (This is how a temperature-sensing circuit works.)