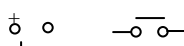
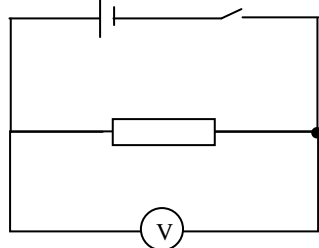


Experiment	Answers / Explanatory notes	Marks Available
2. (a)	<p>Circuit diagram:</p> <p>alternatives </p>  <p>All symbols correct (1) Correct circuit. (1)</p>	2
(b)	Reading to 2 d.p.	1
(c)	<p>Table: Titles and units (1) All series combinations used (1) Correct / consistent s.f.s (1) [allow 1 mistake] Repeats and means (1) Clear table [resistances calculated](1)</p>	5
(d)	Use of $R = \frac{V}{I}$ (1); subst for I and manipulation (1)	2
(e) (i)	<p>All readings used in $r = R\left(\frac{E}{V} - 1\right)$ (1) Calculations correct [ignore unit] (1)</p>	2
(ii)	Correct mean to 3 s.f.	1
(iii)	Uncertainty (1); units (1)	2
(iv)	<p>Sensible suggestion (1) and precaution (1) e.g. Battery discharging (✓) switch off between readings (✓) Variation of switch pressure (✓); use toggle switch (✓)</p>	2
(f)	<p>Use of $P = I^2 R$, $P = \frac{V^2}{R}$ or $P = IV$ (1) Correct values used [minimum number: 3.3 Ω and 4.7 Ω] (1)</p>	2
		[20]