10. D.C. Circuits

10.3 Potential dividers

Paper 2

Marking Scheme

Q1.

(b)(iii)	(resistance of X increases so) the total resistance increases	**B1**
	current decreases	**B1**
	potential difference (across thermistor / Y) decreases	**B1**

Q2.

(d)(iii)	increase	**B1**

Q3.

(a)	V / 9.0 = 1800 / (1800 + 1200)	**C1**
	V = 5.4 V	**A1**
	or	
	I = 9.0 / (1800 + 1200) = 3.0 × 10^{-3} (A) V = 3.0 × 10^{-3} × 1800	**(C1)**
	= 5.4 V	**(A1)**
(b)(i)	L / 1.2 = 5.4 / 9.0 **or** XZ / 1.2 = 5.4 / 9.0	**C1**
	L = 0.72 m	**A1**
	or	
	L / 1.2 = 1800 / (1800 + 1200) **or** XZ / 1.2 = 1.8 / (1.8 + 1.2)	**(C1)**
	L = 0.72 m	**(A1)**

Q4.

(c)(iii)	decrease	**B1**

Q5.

(b)(i)	V / 8.0 = 6.0 × 10^3 / (4.0 × 10^3 + 6.0 × 10^3) **or** I = 8.0 / (4.0 × 10^3 + 6.0 × 10^3) = 8.0 × 10^{-4} V = 8.0 × 10^{-4} × 6.0 × 10^3	**C1**
	V = 4.8 V	**A1**

Q6.

(d)	lamp P: p.d. across lamp decreases to zero so goes 'out'	**B1**
	lamp Q: p.d. across lamp increases to 12 V so gets brighter	**B1**

Q7.

(c)(i)	1.2 / 1.8 = 0.30 / L	**C1**
	L = 0.45 m	**A1**
(c)(ii)	p.d. across XY decreases/p.d. across XP decreases	**B1**
	(so) P is moved towards Y/away from X/to the right	**B1**

Q8.

(c)(ii)	resistors connected in parallel labelled as 180 Ω and 90 Ω **and** the other resistor labelled as 30 Ω	**M1**
	V_{OUT} or 8.0 V labelled across the two resistors in parallel	**A1**

Q9.

(b)(ii)	the resistors connected in parallel labelled as 90 Ω and 45 Ω with the other resistor labelled as 20 Ω	**M1**
	V_{OUT} or 3.6 V labelled across the 20 Ω resistor	**A1**