Electric circuits

Mark Scheme 4

Level	IGCSE
Subject	Physics
ExamBoard	CIE
Topic	Electricity and Magnetism
Sub-Topic	Electric circuits
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 4

Time Allowed: 71 minutes

Score: /59

Percentage: /100

1 (a) (i)
$$1/R_p = 1/R_1 + 1/R_2$$
 OR $(R_p =) R_1R_2/(R_1 + R_2)$ in any form

(ii) 1.5Ω

B1 [2]

(b) (i) correct position, allow across ammeter as well

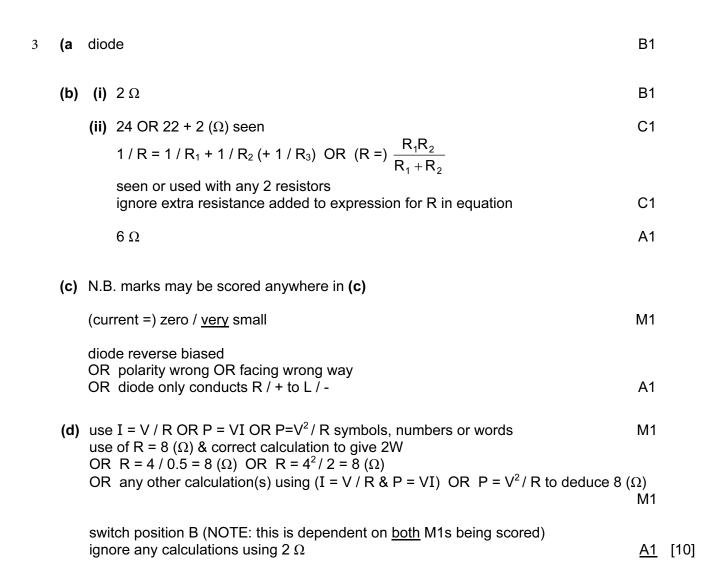
(ii) $\frac{\text{use of } V = IR \text{ in any form}}{2.4 \text{ V OR } 1.6 \times \text{ candidate's } R_p \text{ V}}$

C1 A1 [3]

(c) reduced accept current decreases

(b) (i)
$$6\Omega$$

(ii)
$$1/R = 1/3 + 1/6$$
 OR $(3 \times 6)/(3 + 6)$ C1 2Ω



4	(a	cap	acitor/capacitance/condenser			В1
	(b)		5 Ω			B1
		(ii)	5 and 20 both used OR 25			C1
			$1/R = 1/R_1 + 1/R_2$ OR $(R =) \frac{R_1 R_2}{R_1 + R_2}$ seen or used			C1
			4 Ω	K1 + K2		A1
	(c)		HER	OR		M1
		am	meter reading falls (to zero)	no current/reading		IVI I
		as	capacitor charges	P already charged/does not conduct d.c.		A1
	(d) Formula for calculation of I ($I = V/R$) OR P ($P = V^2/R$) Use of energy = power × time in any form 400 s					C C1 A1
					[Total:	: 10]
5	(a)			cated (any wave shape, repeated): nore than half width of hump, by eye.	B1	
	(b)	(i)	A (c.a.o.)		M1	
		(ii)	nothing wrong on this route	(i), not C or D : w on one downwards diode and rrow on one downwards diode and	B1 B1	[4]

6	(a)	(i)	O(A) / zero Unit penalty if wrong unit	B1	
		(ii)	12 V	B1	
	(b)	(i)	V/R OR $V = IR$ in any form, letters, words or numbers 0.5 A	C1 A1	
		(ii)	8 × candidate's (i) OR 8/24 × 12 4 V OR 4.0 V e.c.f.	C1 A1	
	(c)	5.3 12	$R_1 + 1/R_2 = 1/R$ OR $R = R_1R_2 / (R_1 + R_2)$ in any form $R_1 + 1/R_2 = 1/R$ OR $R_2 + 1/R_2 = 1/R$ OR $R_3 + 1/R_2 = 1/R$ OR $R_4 + 1/R_2 = 1/R$ in any form $R_4 + 1/R_2 = 1/R$ or $R_5 + 1/R_2 = 1/R_2 = 1/R$ OR $R_5 + 1/R_2 = 1/$	B1 C C1 A1	
		Alte	ernatively: 12/16 (= 0.75) OR 12/8 (= 1.5) 12/16 (= 0.75) AND 12/8 (= 1.5) Currents added 2.25 A c.a.o.	C1 C1 C1 A1	[10]
7	(a)	ma	4 lights in parallel with supply and none in series ster switch in a place where it will work (cannot score if no supply or if short suit)	B1 B1	
		one	e switch for 2 lights in living room AND one for bathroom AND one for bedroom	В1	
	(b)	(i)	$W = V \times I$ or $100 = 200 \times I$ in any form 0.5 A or 0.5 a	C1 A1	
		(ii)	I × t or 0.5 × 60 e.c.f. 30 C or 30 c e.c.f.	C1 A1	
	(c)	(i)	135 W	В1	
		(ii)	any power × any time (words or symbols or numbers) NOTE: 280 (W) is the total power of lamps in house, so counts as "power"	C1	
			486 000 J or 486 kJ or 0.135 kWh accept lower case units NOTE: 45 × 3600 = 162000 J gets e.c.f. from (i)	A1	[10]