1	**(a**	switch in correct position	B1	[1]
	(b) **(i)**	rheostat/variable resistance symbol drawn	B1	
	(ii)	dot and R in line to 12 W lamp	B1	[2]
	(c)	Question deleted		
	(d)	R = V/I or 12/.3 = 4Ω	C1 A1	[2]
	(e) **(i)**	parallel circuit/all lamps connected separately across the 12V	B1	
	(ii)	4 A	A1	[2]
				[Total: 7]

2	**(a)**	circuit which would work with supply and resistor voltmeter in parallel and ammeter in series with resistor variable resistor in series or means of changing p.d. across resistor	B1 B1 B1	**3**
	(b)	read ammeter and voltmeter adjust rheostat/supply	B1 B1	**2**
	(c)	I = V/R or V = IR or R = V/I or 0.5 = 6.0/3.0 + R R = 9(.0) Ω	C1 A1	
	(ii)	60 C	B1	
	(iii)	P = VI or = I^2R or P = v^2/R or (0.5 x 3.0) x 0.5 = 0.75 W	C1 A1	**5** **[10]**

3	**(a**		1.52 kW	**A1**		
	(b)	**(i)**	Each appliance is connected across 240 V supply or equivalent	**B1**		
		(ii)	Any 2: all work on same voltage or on 240 V or mains OR all have full/stated power OR each can be on or off OR one goes off/breaks others stay on	**B2**	**3**	
	(c)	**(i)**	Current = power/voltage or 200/240	**C1**		
			Current = 0.83 A	**A1**		
		(ii)	Energy = power x time or 1.2 x 3	**C1**		
			Energy = 3.6 kWh or 1.3 x 10^7 J	**A1**		
		(iii)	Current = 60/240	**C1**		
			R= V/I or 240/0.25	**C1**		
			R =960Ω	**A1**	**7**	
					[11]	

4	**(a)**		I = V/R or 12/8	**1**		
			= 1.5 A	**1**		
	(b)	**(i)**	10(Ω)	**1**		
		(ii)	2(Ω)	**1**	**2**	
	(c)		power = VI or I^2R or V^2/R	**1**		
			= 72W	**1**	**2**	
	(d)	**(i)**	12(V)	**1**		
		(ii)	6(V)	**1**	**2**	
	(e)	**(i)**	(resistance) less	**1**		
		(ii)	(resistance) less	**1**		
					(10)	

5	**(a)**	**(i)**	use of charge = It or I = 90/45	**C1**	
			current = 2 A	**A1**	
		(ii)	resistance = voltage/current or 6/2	**C1**	
			resistance is 3 ohm	**A1**	
		(iii)	energy = Vit or Vq or 6 x 90	**C1**	
			energy is 540 J	**A1**	**6**
	(b)		idea of energy transfer	**C1**	
			is (6) J/C	**A1**	**2**
					[8]