1	A	magnet OR magnetised	F	B1
	B	magnet OR magnetised	F	B1
	C	iron OR unmagnetised	C	B1
	D	aluminium	C	B1
				4

2	**(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)	

3	**(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]	

4	**(a)**	current = power/voltage or 150/12	**C1**		
		value is 12.5 A	**A1**		**2**
	(b) (i)	sum of currents at junction = current after junction/12.5 A = 5.0 A + I	**C1**		
		value is 7.5 A	**A1**		
	(ii)	power = VI or is 7.5 x 12 e.c.f from **(i)**	**C1**		
		value is 90 W	**A1**		
	(iii)	resistance = voltage/current or 12/7.5 e.c.f. from **(i)** but not from **(a)**	**C1**		
		value is 1.6Ω	**A1**		**6**
					[8]

5	a(i) steel		1	A1	
	(ii) insert bar in coil (switch on, leave, switch off)		1	B1	
	(iii) to control/measure current or stop circuit/coil overheating		1	B1	3
	b(i) R = 12/4			C1	
	= 3 ohms*		2	A1	
	(ii) P = 12 x 4			C1	
	= 48 W*		2	A1	
	(iii) E = 48 x 5			C1	
	=240 J*		2	A1	6
	c(i) 5 (V)		1	A1	
	(ii) sum of p.d.'s = circuit supply p.d.			C1	
	above + detail eg across each component/ in closed circuit etc		2	A1	3
				QT	12

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