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QU	•		CARGET GRADE	
1.	(a)	(i) greater	F	M1
		(ii) P.E. (or equiv.) has increased OR work done lifting case	e F	A1
	(b)	(i) greater	F	M1
	5	(ii) it is moving OR now has K.E. (or equiv.)	F	A1 4
2.	(a)	insulator	F	B1
	(b)	radiation	F	B1
	(c)	conductor	F	B1
	(d)	convection	F B	B1 4
3.	(a)	arrow(s) clockwise	С	B1
	(b)	3 circles (by eye) around wire (need not be concentric, ignore other line	es) F	В1
		circles concentric with wire (by eye)	C	B1 3
4.	(a)	(i) 1020 - 610	F	C1
		410 (g)	$\mathbf{F}^{w_{i,j}}$	Å1
		(ii) mass/volume	F	C1
		his (i)/500	F	C1
4		0.82 e.c.f.	F	A1
		g/cm ³	С	B1
		(iii) use measuring cylinder/pipette/narrower jug/burette	C	B1
	(b)	level shown below oil level	C	B1 _8

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5.	(a)	changes into a different nucleus /substance / isotope/nuclide OR loses/emits part of itself / particles OR loses/emits an alpha/beta particle/gamma ray	F		
		OR Mass decreases or different mass no.			
	(b)	evidence of 2 half-lives	C	C1	
		56 (years)	C	Al.	
				3	
6.	(a)	temperature Northing Else	F	B1	
		solid turns to liquid OR liquid turns to solid	F	B1	
	(b)	last 2 both ticked	С	B1	
	(c)	(i) horizontal straight line (nothing else)	F	B1	
		(ii) B.P. correctly marked at horizontal line (condone extras)	С	<u>B1</u>	
		allow 180°C MUST BE CLEAR	297	<u>5</u>	
7.	(a)	rub them together	F	B1	
	(b)	G.L.E. OR pick up fluff etc OR crackles when discharged	74		
	/eaf	OR makes hair rise etc	F	B1	
	(c)	region (or equiv.)	С	B1	
		where electric charge experiences a force attraction repulsion	С	B1	
	(d)	(i) moves away/repel/deflects/spins	F	M1	
		(ii) like charges (NOT poles) repel	F	A1	
	(e)	copper is a conductor (or similar comment) copper can't be changed	C	<u>B1</u>	
N		BO for conductor of leat	924	7	
8.	(a)	volt OR volts OR V	F	B1	3 - 4 - 5
14.	(b)	resistance = p.d./current in any form, allow symbols or mixtur	e 2F	B2	
		(allow B1 for just p.d./ current)			
	(c)	4.7 = V/0.5	F	C1	
		2.35 (V)	F	A1	
3.	(d)	(i) increases OR is a raximum	F	B1	
	-	(ii) decreases condone to zero q	F	B1	
	(e)	10 - 4.7	С	C1	
		5.3 (Ω)	C (22	A1	
			* E	9	

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	9.	(a)	avoid problems with echoes	С	
		` ,	time would have been too small to measure (with stopwatch) of to give a greater time interval of for accuracy	С	B1
		(c)	tape-measure OR trundle wheel OR metre rule OR range-finder OR calibrated strides	F	B1
		(d)	light travels fast/ instantaneously/ at 3 x 108 m/s	С	B1
		41	sound travels slowly/ slower/ at 330 (±30) m/s	F	B1
2		(-)	(Note: "sound travels <u>much</u> slower than light" OR "light travels <u>much</u> faster than sound"s "sound travels slower than light" etc. gets B1, B0 speed = distance/time allow s = 2d/4		
ON:		(e)	teri	F	C1
			238/0.7	F	C1
N. W. B	5 1		340	F ne	Al
			m/s	С	B1
		(f)	effect of air movement OR take average OR repetition to check NOT "for a ccuracy", unless adequately explained	k C	B1 10
	10.	(a)	(i) moves (ignore any direction) NoT vibates	F	B1
allow asswers			(ii) conductor experiences force in magnetic field	С	B1
in form of current in world	7		current-carrying conductor	C	B 1
experiences a			(iii) moves in opposite direction to (i)	F	B1
·		(b)	(i) commutator OR split ring allow commuter	С	B1
	<u>ri</u>	13	Not slip rings brush OR contact Not spring	F	B1
			magnet OR pole	F	B1
			(ii) commutator OR split ring e.c.f. from (i)	C	B1
			(iii) rotates other way / to the left rotates anticlockwise	F	<u>B1</u> 9

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F B1 C B1	
11. (a) current causes magnetic field	
iron reeds magnetised	
magnetised in same direction OR adjacent ends opposite polarity C B1	
(ends)attract each other C B1	l
(b) temperature rises F B1	l
resistance decreases F B1	l
(eventually) enough current to close relay C B1	l
current flows in lamp circuit or equiv. C B1	
12. (a) (i) ray refracted down at A Condone dispersion; F M mark worst rag	1
not below normal C A	1
refracted down at 2nd surface \mathcal{I} F B	l
(ii) refracted or deviation F B	1
(b) violet greater refraction than red (at A)	1
2 rays diverging all the way to the screen from A C B condone repetition of errors in (i)	1
(c) spectrum (or equiv.) OR colours OR rainbow F B	1
(d) (i) X marked position of red F B	1
(ii) not in visible spectrum OR invisible C B	1
(iii) any example of a suitable I.R. detector NoT "IR/Next Sensor/detector" C B	