

Mark Scheme (Results) November 2010

IGCSE

IGCSE Physics (4420) Paper 1F



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IGCSE PHYSICS 4420/1F - November 2010

The following abbreviations have been used

aps accept phonetic spelling

dna do not allow

dop dependent on previous

ecf error carried forward

owtte or words to that effect

Question	Acceptable Answers	Extra Information	Mark
Number			
1(a)	7		1
	7		1
	7		1
			(3)

Question Number	Acceptable Answers	Extra Information	Mark
1(b)	protons		1
	neutrons		1
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
2(a)	straight		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
2(b)	15(mm)		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
2(c)	outside range of readings/table		1
	beyond elastic limit/Hooke's Law not obeyed /spring might break		1
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
2(d)(i)	not a straight line/line is curved		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
2(d)(ii)	rubber (band) elastic (band)	any polymer	
			(1)

			1
Question Number	Acceptable Answers	Extra Information	Mark
3(a)(i)	line drawn from 'metal' to pins, screws, fuse ends		
			(1)
0	A	Fator Information	AAI -
Question Number	Acceptable Answers	Extra Information	Mark
3(a)(ii)	earth wire top left		1
	fuse bottom right		1
			(2)
Question Number	Acceptable Answers	Extra Information	Mark
3(a)(iii)	plastic casing/ double insulation		
			(1)
Question	Acceptable Answers	Extra Information	Mark
Number	/ receptable / illsweis	Extra information	Mark
3(a)(iv)	gets hot	independent marks	1
	melts/blows /breaks		1
			(2)
Question	Acceptable Answers	Extra Information	Mark
Number	7.000p 44.07.07.07.0		1112111
3(a)(v)	stop cable (or wires) being pulled out /grip cable (or wires)		
			(1)

Extra Information

Mark

(1)

Question Number 3(b)

Acceptable Answers

get shock / electrocuted

Question Number	Acceptable Answers	Extra Information	Mark
4(a)(i)	constant speed constant velocity constant motion no acceleration		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
4(a)(ii)	stationary at rest stopped not moving		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
4(b)	C time going backwards		1 1
	E distance from entrance reducing/going backwards		1 1
			(4)

Question	Acceptable Answers	Extra Information	Mark
Number			
5(a)	D		1
	E		1 (2)
			(2)
Question Number	Acceptable Answers	Extra Information	Mark
5(b)(i)	longitudinal		
3(0)(1)	torigitadiriat		(1)
			1 (-/
Question Number	Acceptable Answers	Extra Information	Mark
5(b)(ii)	sound/P-wave	ecf from (i)	
			(1)
O a a tila a	Accordable Accorda	Futus lafamastica	Marel
Question Number	Acceptable Answers	Extra Information	Mark
5(c)(i)	cycles per second	owtte	
			(1)
Question	Acceptable Answers	Extra Information	Mark
Number	Acceptable Allswers	Extra information	Maik
5(c)(ii)	kilohertz	aps	
		·	(1)
Question Number	Acceptable Answers	Extra Information	Mark
5(d)	(wave) speed = $f \times \lambda$	allow any transposed version	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
6(a)(i)	cold air dropping dop		1
	dropping dop		(2)
Question Number	Acceptable Answers	Extra Information	Mark
6(a)(ii)	conduction radiation evaporation	any two in any order	1 1
			(2)
Question Number	Acceptable Answers	Extra Information	Mark
6(b)	non-conducting insulator	either way round allow 'insulating' 'non-conductor'	1 1
	fibre-glass		1
			(3)
Question Number	Acceptable Answers	Extra Information	Mark
7(a)	density = mass/volume	allow symbols	
			(1)
Question Number	Acceptable Answers	Extra Information	Mark
7(b)(i)	balance weighing scales	allow newton meter dna 'scales'	1 1
	rule		
			(2)
Question Number	Acceptable Answers	Extra Information	Mark
7(b)(ii)	8.0(g/cm ²)		(1)
		I	(1)
Question Number	Acceptable Answers	Extra Information	Mark
7(c)(i)	measuring cylinder		
			(1)
Question Number	Acceptable Answers	Extra Information	Mark
7(c)(ii)	floats (in water)		
			(1)

Question	Acceptable Answers	Extra Information	Mark
Number	Acceptable Allswers	Extra information	Mark
8(a)(i)	voltage on secondary		
	greater than voltage on primary		
			(1)
Question	Acceptable Answers	Extra Information	Mark
Number			
8(a)(ii)	alternating current		
			(1)
Question	Acceptable Answers	Extra Information	Mark
Number			
8(b)	number of turns		1
	on primary coil dop		1 (2)
			(2)
Question	Acceptable Answers	Extra Information	Mark
Number			
8(c)	outside power station	before pylon	
	/after generation	/transmission	(1)
			(1)
Question	Acceptable Answers	Extra Information	Mark
Number			
9(a)(i)	not continuous/		
	two values only		(1)
			(1)
Question	Acceptable Answers	Extra Information	Mark
Number			
9(a)(ii)	continuing signal starts at intersection		1
	of signal and dotted line		
	any linking lines are vertical		1
	signal going between		1
	signal going between only the two horizontal levels shown		1
	only the two horizontal levels shown		

Extra Information

Mark

(1)

Question Number 9(b)

Acceptable Answers

easier to design/process/regenerate

Question Number	Acceptable Answers	Extra Information	Mark
10(a)	voltage = current x resistance	or any transposed version allow symbols	
	V = I x R		
			(1)

Question	Acceptable Answers	Extra Information	Mark
Number			
10(b)(i)	charge/electrons / coulombs	dna 'ions'	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
10(b)(ii)	lower/less/smaller / weaker / not as strong	dna 'slower' or 'slows down'	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
10(c)(i)	variable resistor/rheostat	dna just 'resistor'	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
10(c)(ii)	ammeter Y 0.8 (A)		1
	ammeter Z 1.2 (A)		1
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
10(d)(i)	parallel		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
10(d)(ii)	 any one of lights can be switched on/off independently if a light fails the others will remain on lights may not fade as extra light switched on 	dna same brightness	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
11(a)(i)	 any one of (left to right) decreasing wavelength right to left, increasing wavelength 	 (left to right) increasing frequency right to left, decreasing frequency 	
			(1)
Question Number	Acceptable Answers	Extra Information	Mark
11(a)(ii)	(same) speed (in a vacuum/in space/in air) can travel through vacuum	speed of 300 million m/s allow same velocity	
	can all be reflected/refracted/polarised/ diffracted/interfere can all transmit energy		
			(1)
Question Number	Acceptable Answers	Extra Information	Mark
11(b)	microwaves internal heating	all correct (3)	
	infra-red skin burns	any two correct (2)	
	ultraviolet damage to surface	any one correct (1)	
	gamma mutations and		
			(3)
Question Number	Acceptable Answers	Extra Information	Mark
11(c)	(satellite)/(tele) communications	transmit data	
	heating <u>if qualified</u>	dna signals in fibre	
	mobile phone network / GPS /radar	optics	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
12(a)(i)	electron		
			(1)
Question Number	Acceptable Answers	Extra Information	Mark
12(a)(ii)	not regular/irregular/not constant /erratic/not steady /unpredictable / no set pattern	Allow emit different number of nuclei every time	
			(1)
Question Number	Acceptable Answers	Extra Information	Mark
12(a)(iii)	Geiger Muller/GM tube/counter / cloud chamber / gamma camera / spark counter	allow Geiger counter/detector	
			(1)
Question Number	Acceptable Answers	Extra Information	Mark
12(b)	time from two appropriate activities shown clearly on the graph		1
	200 (million years)	or ± 10 (million years	1
			(2)

uestion Number	Acceptable Answers	Extra Information	Mark
13(a)(i)	chemical		
			(1)
Question Number	Acceptable Answers	Extra Information	Mark
13(a)(ii)	kinetic		
			(1)
Question Number	Acceptable Answers	Extra Information	Mark
13(b)(i)	125 (2) watts/W / J/s (1)	allow (1) for clear	
		indication that	
	7500 W (2)	4 minutes = 240 seconds	
	7500 (1)		
			(1)
Question Number	Acceptable Answers	Extra Information	Mark
13(b)(ii)	efficiency	Allow 'directly	
	= <u>useful (energy) (output)</u> (× 100%)	proportional'	
	total (energy) (output)	Allow 'power'	
			(3)

Question Number	Acceptable Answers	Extra Information	Mark
14(a)(i)	0.1 (s) or 1/10 (s)	allow (1) for clear indication that the time interval is for five spaces	
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
14(a)(ii)	730 mm/s	allow ecf from part ai allow (1) for clear indication that (average) speed = distance ÷ time (taken)	
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
14(b)	centre of X at the start of the downwards arrow	judge by eye	
			(1)

Question Number	Acceptable A	Answers	Extra Information	Mark
15	N S N S (1)	S N S N (1)	on either diagram	
				(2)

Question Number	Acceptable Answers	Extra Information	Mark
16(a)(i)	either -273 (°C) or minus 273 (°C)	do not credit just '273'	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
16(a)(ii)	293	or ecf ai + 20 and addition correct credit with (1) either 273 + 20 or positive integer from ai+20	
			(2)

Question	Acceptable Answers	Extra Information	Mark
Number			
16(b)(i)	speed/velocity/kinetic energy/KE /	dna	
	/movement (energy)/momentum	pressure/temperature/	
	/collisions	volume/energy / vibration	
			(1)

Question	Acceptable Answers	Extra Information	Mark
Number			
16(b)(ii)	increases/gets bigger		1
	stays the same/does not change		1
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
17(a)(i)	(total) clockwise moment(s) = (total) anticlockwise moment(s)	allow 'turning effect' for 'moment' dna sum of clockwise = sum of anticlockwise allow 'force × distance' is the same on both sides of the fulcrum/turning point/line allow moment same on both sides dna 'turning force' for 'moment'	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
17(a)(ii)	18 (kN)	allow (1) for clear indication that weight (of concrete block) x 8 = 24 x 6	
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
17(b)(i)	weight = mass $\times g$ W = mg	or any correctly transposed version	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
17(b)(ii)	either 2 600 (2) kg (1)	allow (1) for clear indication that	
	or 2.6 tonnes /t (3)	mass = weight ÷ 10 any weight	
	2 400 kg scores (2)		
			(3)

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