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Mark Scheme (Results)
November 2010

IGCSE

IGCSE Physics (4420) Paper 1F

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November 2010

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

Question Number	Acceptable Answers	Extra Information	Mark
1(b)	protons neutrons		**1** **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 beyond elastic limit/Hooke's Law not obeyed /spring might break		**1** **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)

Question Number	Acceptable Answers	Extra Information	Mark
3(a)(i)	line drawn from 'metal' to pins, screws, fuse ends		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
3(a)(ii)	**earth wire** top left **fuse** bottom right		**1** **1**
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
3(a)(iii)	plastic casing/ double insulation		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
3(a)(iv)	gets hot melts/blows /breaks	*independent marks*	**1** **1**
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
3(a)(v)	stop cable (or wires) being pulled out /grip cable (or wires)		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
3(b)	get shock / electrocuted		
			(1)

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 E distance from entrance reducing/going backwards		**1** **1** **1** **1**
			(4)

Question Number	Acceptable Answers	Extra Information	Mark
5(a)	D E		**1** **1**
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
5(b)(i)	longitudinal		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
5(b)(ii)	sound/P-wave	**ecf** from (i)	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
5(c)(i)	cycles per second	**owtte**	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
5(c)(ii)	kilohertz	**aps**	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
5(d)	(wave) speed = f x λ	allow any transposed version	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
6(a)(i)	cold air dropping **dop**		**1** **1**
			(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 fibre-glass	either way round allow 'insulating' 'non-conductor'	**1** **1** **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 rule	allow newton meter **dna** 'scales'	**1** **1**
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
7(b)(ii)	8.0(g/cm^2)		
			(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 Number	Acceptable Answers	Extra Information	Mark
8(a)(i)	voltage on secondary greater than voltage on primary		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
8(a)(ii)	alternating current		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
8(b)	number of turns on primary coil **dop**		**1** **1**
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
8(c)	outside power station /after generation	before pylon /transmission	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
9(a)(i)	not continuous/ two values only		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
9(a)(ii)	continuing signal starts at intersection of signal and dotted line any linking lines are vertical signal going between only the two horizontal levels shown		**1** **1** **1**
			(3)

Question Number	Acceptable Answers	Extra Information	Mark
9(b)	easier to design/process/regenerate		
			(1)

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

Question Number	Acceptable Answers	Extra Information	Mark
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) ammeter Z 1.2 (A)		**1** **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 can all be reflected/refracted/polarised/ diffracted/interfere can all transmit energy	speed of 300 million m/s allow … same velocity	
			(1)
Question Number	Acceptable Answers	Extra Information	Mark
11(b)	microwaves … internal heating … infra-red ……. skin burns ultraviolet …… damage to surface gamma …… mutations and …	all correct (3) any two correct (2) any one correct (1)	
			(3)
Question Number	Acceptable Answers	Extra Information	Mark
11(c)	(satellite)/(tele) communications heating <u>if qualified</u> mobile phone <u>network</u> / GPS /radar	transmit data **dna** signals in fibre 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 200 (million years)	 or ± 10 (million years	**1** **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) 7500 W (2) 7500 (1)	allow (1) for clear indication that 4 minutes = 240 seconds	
			(1)
Question Number	Acceptable Answers	Extra Information	Mark
13(b)(ii)	efficiency = <u>useful (energy) (output)</u> (× 100%) total (energy) (output)	Allow '<u>directly</u> proportional' 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 Answers	Extra Information	Mark
15	N S S N N S S (1) 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 Number	Acceptable Answers	Extra Information	Mark
16(b)(i)	speed/velocity/kinetic energy/KE / /movement (energy)/momentum /collisions	**dna** pressure/temperature/ volume/energy / vibration	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
16(b)(ii)	increases/gets bigger stays the same/does not change		**1** **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 × *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) or 2.6 tonnes /t (3) 2 400 kg scores (2)	allow (1) for clear indication that mass = weight ÷ 10 *any weight*	
			(3)

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