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IGCSE Physics 4420 1F
Mark Scheme (Results)
Summer 2008

IGCSE

IGCSE Physics 4420 1F

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IGCSE PHYSICS 4420-1F MARK SCHEME

Abbreviations used in mark schemes:
OWTTE - or words to that effect
dop - depending on previous
ecf - error carried forward
ora - or reverse argument
sfs - start from scratch
UP - unit penalty

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
1 (a)(i)	P	p		**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
1 (a)(ii)	Q	q		**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
1 (a)(iii)	Q and R	q and r either order		**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
1 (b)(i)	sloping straight independent marks but sloping and horizontal scores (0)		sloping and horizontal	**1** **1** **(2)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
1 (b)(ii)	horizontal ignore 'straight'			**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
1 (c)	less distance (travelled in section R than in section P)			**(1)**

(Total 7 marks)

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
2 (a)(i)	long	allow answers to (i) and (ii) in either order		**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
2 (a)(ii)	frayed			**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
2 (b)	stray wire(s)			**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
2 (c)(i)	plastic (casing)			**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
2 (c)(ii)	small/low current			**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
2 (d)	* circuit breaker * double insulation	either one		**(1)**

(Total 6 marks)

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
3 (a)	energy information	in either order		**1** **1** **(2)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
3 (b)	D C		wrong order	**1** **1** **(2)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
3 (c)(i)	cycles/waves second/unit time		wrong order	**1** **1** **(2)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
3 (c)(ii)	speed	velocity (time) period time to travel a wavelength		**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
3 (d)(i)	longitudinal			**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
3 (d)(ii)	20 Hz – 20 000 Hz			**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
3 (d)(iii)	less than			**(1)**

(Total 10 marks)

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
4 (a)(i)	microphone			**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
4 (a)(ii)	kettle/iron/heater/ (electric) fire/ toaster/hairdryer/ soldering iron	there are many other examples credit if the useful energy transfer is from electricity to heat		**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
4 (b)	any falling body		do not credit examples where both falling and rising occur e.g. child's swing or bungee jump unless falling is specified	**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
4 (c)	heat	sound		**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
4 (d)	total energy input total energy output	in either order scores 2 or 0		**(2)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
4 (e)	kinetic kinetic			**1** **1** **(2)**

(Total 8 marks)

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
5 (a)(i)	100 000			**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
5 (a)(ii)	500 000	100 000 × 5 for (1) mark		**2 (2)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
5 (b)(i)	330	400 – 70 for (1) mark		**2 (2)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
5 (b)(ii)	background (count/radiation) random/variable/not constant			**1** **1 (2)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
5 (c)	cosmic rays/rocks/medical etc	any two (1) each		**(2)**

(Total 9 marks)

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
6 (a)	yellow green	1 mark if colours reversed		**1** **1** **(2)**

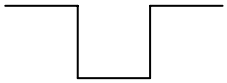
Question Number	Correct Answer	Acceptable Answers	Reject	Mark
6 (b)(i)	A infra-red B ultra violet		answers reversed	**1** **1** **(2)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
6 (b)(ii)	B / ultra violet			**(1)**

(Total 5 marks)

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
7 (a)(i)	continuously	continually		**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
7 (a)(ii)	1 0	both either way round accept 'on' and 'off' accept 'high' and 'low'		**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
7 (b)	first horizontal line in high position  next horizontal line in low position next horizontal line in high position	ignore any missing vertical lines		**1** **1** **1** **(3)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
7 (c)	easier to build/design/regenerate/amplify /clean up/ less noise /carry more information.			**(1)**

(Total 6 marks)

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
8 (a)	boiling	evaporation		**(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
8 (b)	four particles shown smaller spacing than gas shown free movement shown			**1** **1** **1** **(3)**

(Total 4 marks)

Question Number	Correct Answer	Acceptable Answers	Mark
9 (a)(i)	0.8 (seconds)	4/5 second 8/10 second	**1** **(1)**

Question Number	Correct Answer	Acceptable Answers	Mark
9 (a)(ii)	3.2 (seconds)	3 1/5 allow **ecf** from (i) 4.0 – previous answer	**1** **(1)**

Question Number	Correct Answer	Acceptable Answers	Mark
9 (a)(iii)	*one line* horizontal line beyond 0.8 less steep slope down (to the *x* axis) **dop**	 *two separate lines or one of these lines* labelled 1 mark for each correct	 **1** **1** **(2)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
9 (b)(i)	air (resistance) mass of car speed (of the car) brakes tyre pressure area of tyre streamlining	drag weight (force of) gravity size shape velocity (of car)	wind (resistance) temperature	**1** **(1)**

Question Number	Correct Answer	Reject	Mark
9 (b)(ii)	intentionally straight vertical arrow pointing downwards from, above, below or through point X	arrow from middle of car	**1** **(1)**

(Total 6 marks)

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
10 (a)(i)	infra red *allow* phonetic spelling	i.r. IR	microwaves ultraviolet	**1** **(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
10 (a)(ii)	gamma (rays/radiation)	γ gama	X-rays	**1** **(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
10 (b)(i)	same speed (in a vacuum) same velocity (in a vacuum) *or* (travel at) speed of light (travel at)velocity of light	travel through a vacuum or empty space	transverse	**1** **(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
10 (b)(ii)	water (waves)/waves on water/tidal waves/sea waves/ocean waves	waves on (slinky) spring shaken/moved up and down or side to side waves on a rope moved up and down or side to side S waves *ignore* 'seismic' mexican wave	P waves analogue wave waves on a CRO	**1** **(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
10 (b)(iii)	90˚ energy *independent marks*	normal/ perpendicul right angles information or data wavefront/front	 crest/vibration/direction/ pattern	**1** **1** **(2)**

(Total 6 marks)

Question Number	Correct Answer	Acceptable answers	Reject	Mark
11 (a)(i)	voltage = current × resistance *or* current = voltage/resistance *or* resistance = voltage/current	V = IR I=V/R R=V/I	V = C x R	**1** **(1)**
11 (a)(ii)	4.5 **nwn** volts or V or J/C or JC^{-1} or AΩ			**1** **1** **(2)**

Question Number	Correct Answer	Acceptable Answers	Mark
11 (b)	decrease increase	 Increase decrease scores 1 decrease decrease scores 1 increase increase scores 1	**1** **1** **(2)**

(Total 5 marks)

Question Number	Correct Answer	Reject	Mark
12 (a)(i)	(semiconductor)diode	LED light emitting diode	**1** **(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
12 (a)(ii)	50 50	both required		**1** **(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
12 (a)(iii)	one cell is connected the wrong way some of the voltage is across/used up by diode/component Y/ ammeter(s)/(connecting) wire /switch	two cells cancel one another/not all facing the same way reference to resistance of these components /cells / whole circuit	battery voltage used up by/voltage across *voltmeter/lamp* voltmeter does not have infinite resistance *ignore* reference to current and energy	**1** **1** **(2)**

Question Number	**Correct Answer**	Acceptable Answers	Mark
12 (b)	*any <u>three</u> points* current increases increases temperature increases resistance line or slope becomes less steep	 voltage increases increases heat ***I*** molecular movement non-ohmic / *I* not proportional to *V*/ decrease rate of increase /current levels off	 **1** **1** **1** **(3)**

(Total 7 marks)

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
13 (a)(i)	not moving (or vibrating) none zero	no <u>kinetic</u> energy no momentum	a response which suggests any kind of movement	**1** **(1)**

Question Number	Correct Answer	Acceptable Answers	Mark
13 (a)(ii)	-273 (˚C)	minus 273 -273.15	**1** **(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
13 (a)(iii)	373 (K)	373.15(K)	373˚C	**1** **(1)**

Question Number	Correct Answer	Reject	Mark
13 (b)	particles knock /jostle /collide	diffusion	**1**
	smaller/invisible /air/water particles		**1**
	cause a change of direction **dop** only as 3rd mark		**1**
			(3)

(Total 6 marks)

Question Number	Correct Answer	Acceptable Answers	Mark
14 (a)(i)	electrons electrons	both required	**1** **(1)**

Question Number	Correct Answer	Acceptable Answers	Reject	Mark
14 (a)(ii)	*points in either order* polythene is an (electrical) insulator (so) slow to discharge /retains charge	 poor / bad (electrical) conductor 'charge (or electrons)leak away /move slowly (to earth)'	 poor conductor of heat	 **1** **1** **(2)**
14 (a)(iii)	copper is an (electrical) conductor (so charge is earthed)		copper is a good conductor of heat	**1** **(1)**

Question Number	Correct Answer	Reject	Mark
14 (b)	spark/sparking	flame	**1** **(1)**

(Total 5 marks)

Question Number	Correct Answer	Acceptable Answers	Mark
15 (a)	clear indication on the graph that a suitable interval has been chosen 1 ½ (hours) 90 (minutes)	 i.e. an interval between a value and half that value 87 93 or 96 **ecf** conversion of previous answer to minutes	**1** **1** **1** **(3)**

Question Number	Correct Answer	Reject	Mark
15 (b)	*any <u>two</u> points* (isotope) ingested / swallowed/eaten /taken in /injected (gamma) radiation emitted trace / track / detect (radiation) / follow progress	 X-rays alpha beta	 **1** **1** **1** **(2)**

(Total 5 marks)

Question Number	Correct Answer	Acceptable Answers	Mark
16 (a)	induced magnetic field responses only in this order	 flux (linkage)	**1** **1** **(2)**

Question Number	Correct Answer	Acceptable Answers	Mark
16 (b)	(number of) primary turns _____ (number of) secondary turns	primary coils _____ secondary coils = I_S / I_P	**1** **(1)**

Question Number	Correct Answer	Mark
16(c)(i)	Just before the transmission line	**1** **(1)**

Question Number	Correct Answer	Mark
16c)(ii)	Just after the transmission line	**1** **(1)**

(Total 5 marks)

PAPER TOTAL 100 MARKS