edexcel
advancing learning, changing lives

IGCSE Physics 4420/1F
Mark Scheme (Results)
November 2008

IGCSE

IGCSE Physics (4420/1F)

Edexcel Limited. Registered in England and Wales No. 4496750
Registered Office: One90 High Holborn, London WC1V 7BH

A PEARSON COMPANY

The following acronyms are used

owtte	or words to that effect
ecf	error carried forward
dop	dependent on previous
nwn	no working necessary

Question Number	Correct Answer	Notes	Mark
1 (a)	infra-red		**(1)**

Question Number	Correct Answer	Notes	Mark
1 (b)	wavelength frequency speed		**1** **1** **1** **(3)**

Question Number	Correct Answer	Notes	Mark
1 (c)	cooking or satellite transmission	accept 'used to make food hot' **owtte**	**(1)**

Question Number	Correct Answer	Notes	Mark
1 (d)	internal heating of body tissue **owtte**	do not accept 'burns'	**(1)**

Question Number	Correct Answer	Notes	Mark
1 (e)	visible or radio		**(1)**

(Total 7 marks)

Question Number	Correct Answer	Notes	Mark
2 (a) (i)	distance and time labelled		**(1)**

Question Number	Correct Answer	Notes	Mark
2 (a) (ii)	D C A	accept word descriptions unambiguously positioned	**1** **1** **1** **(3)**

Question Number	Correct Answer	Notes	Mark
1 (b)	1 000 000 / million		**(1)**

(Total 5 marks)

Question Number	Correct Answer	Notes	Mark
3 (a)	convection radiation evaporation	Any two	**(2)**

Question Number	Correct Answer	Notes	Mark
3 (b)	reflector radiation		**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
3 (c) (i)	walls roof windows floor door chimney	Any two	**(2)**

Question Number	Correct Answer	Notes	Mark
3 (c) (ii)	any heat insulator e.g. air fibre glass	accept 'double glazing', 'carpets', 'curtains' etc	**(1)**

(Total 7 marks)

Question Number	Correct Answer	Notes	Mark
4 (a)	3 crosses or any 2 crosses (2) any 1 cross (1)		**(2)**

Question Number	Correct Answer	Notes	Mark
4 (b)	234 – 92 = 142	2nd mark scores both	**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
4 (c) (i)	protons neutrons/nucleons *independent marks*		**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
4 (c) (ii)	Both Hs		**(1)**

(Total 7 marks)

Question Number	Correct Answer	Notes	Mark
5 (a)	reduces halves	2nd point scores both marks	**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
5 (b)	increase voltage double / make it 9 V	**ecf** from (a) 2nd point scores both marks	**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
5 (c)	parallel		**(1)**

Question Number	Correct Answer	Notes	Mark
5 (d) (i)	diode	allow LED	**(1)**

Question Number	Correct Answer	Notes	Mark
5 (d) (ii)	in a correct place right way round to stop current *independent marks*		**1** **1** **(2)**

(Total 8 marks)

Question Number	Correct Answer	Notes	Mark
6 (a)	Road condition: Reaction time: ✓ Speed of car:		**(1)**

Question Number	Correct Answer	Notes	Mark
6 (b)	average speed = distance ÷ time		**(1)**

Question Number	Correct Answer	Notes	Mark
6 (c)	Road condition: ✓ Reaction time: Speed of car: ✓	Two correct 2 one correct 1	**(2)**

Question Number	Correct Answer	Notes	Mark
6 (d)	(travelling) faster		**(1)**

Question Number	Correct Answer	Notes	Mark
6 (e) (i)	plot points straight line		**2** **1** **(3)**

Question Number	Correct Answer	Notes	Mark
6 (e) (ii)	7.5 (m)	accept range 7.4 – 7.6	**(1)**

Question Number	Correct Answer	Notes	Mark
6 (e) (iii)	36 –12 = 24 (m)		**1** **1** **(2)**

(Total 11 marks)

Question Number	Correct Answer	Notes	Mark
7 (a)	parallel straight evenly spaced	Any two	**(2)**

Question Number	Correct Answer	Notes	Mark
7 (b)		position poles **dop**	**(2)**

Question Number	Correct Answer	Notes	Mark
7 (c)	induced		**(1)**

(Total 5 marks)

Question Number	Correct Answer	Notes	Mark
8 (a)	insulator friction		**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
8 (b)	opposite charges attract *independent marks*		**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
8 (c)	photocopier/inkjet printer		**(1)**

(Total 5 marks)

Question Number	Correct Answer	Notes	Mark
9 (a)	(A) a.c. (power supply) (B) (open) switch / switch which is off (C) (electric) motor (D) variable resistance / rheostat	do not credit just 'power supply' do not credit 'meter'	**1** **1** **1** **1** **(4)**

Question Number	Correct Answer	Notes	Mark
9 (b) (i)	voltmeter voltage/potential difference/p.d.	both parts required do not accept voltameter voltemeter voltagemeter etc	**(1)**

Question Number	Correct Answer	Notes	Mark
9 (b) (ii)	ammeter current/rate of flow of charge	both parts required do not accept ampmeter if the meters in both (i) and (ii) are correct award (1) mark	**(1)**

(Total 6 marks)

Question Number	Correct Answer	Notes	Mark
10 (a)	0.5 hertz/Hz	accept '½' accept '(waves) per second'	**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
10 (b)	light (or any particular named colour of light) (waves) S-waves secondary waves	or any member of the electromagnetic spectrum or waves on (slinky) s shaken/moved up an down	**(1)**

Question Number	Correct Answer	Notes	Mark
10 (c)	information	allow: data /signal	**(1)**

Question Number	Correct Answer	Notes	Mark
10 (d)	time between one … wave and the next … complete/full…	or 'time taken for each … wave to pass point)' credit 'time period is the inverse/ reciprocal of the frequency' with both marks	**1** **1** **(2)**

(Total 6 marks)

Question Number	Correct Answer	Notes	Mark
11 (a)	kinetic … thermal/heat … sound	do not credit just 'movement' 'wind' or 'mechanical' both required but either order	**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
11 (b)	(efficiency) = $\frac{\text{useful (energy) output}}{\text{total (energy) output/input}}$ (×100%)		 **(1)**

Question Number	Correct Answer	Notes	Mark
11 (c)	**either** 45 000 (2) joules/J (1) **or** 45 kilojoules/kJ (3)	**or** 50 × 15 × 60 (1) joules /J (1) **or** 15 minutes = 900 s (1) 50 x 15 = 750 (0) 750 J (1)	 **(3)**

(Total 6 marks)

Question Number	Correct Answer	Notes	Mark
12 (a)	rock or named rock e.g granite, sand etc space cosmic rays Sun nuclear waste radon food water medical sources etc etc	allow any reasonable response do not allow '(nuclear) power stations' or 'building materials'	**(1)**

Question Number	Correct Answer	Notes	Mark
12 (b) (i)	the <u>card</u> reduces (or stops) the radiation/emission/ count rate/reading	or words to that effect	**(1)**

Question Number	Correct Answer	Notes	Mark
12 (b) (ii)	the <u>metal</u> reduces (or stop) the radiation/emission/ count rate/reading	or words to that effect	**(1)**

Question Number	Correct Answer	Notes	Mark
12 (b) (iii)	(the card and) the metal will not reduce (or stop) the radiation/emission/count rate/reading from gamma /γ (radiation)	or words to that effect	**(1)**

Question Number	Correct Answer	Notes	Mark
12 (c)	25 (MBq)	credit (1) mark if unambiguous indication that one h equivalent to four half lives	**(2)**

(Total 6 marks)

Question Number	Correct Answer	Notes	Mark
13 (a)	water is a good conductor (so increases chance of) (electric) shock /current in the body /heart failure	**or** wet skin has a low (electrical) resistanc (than dry skin)	**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
13 (b)	(large) current/flow of charge in earth wire melts fuse (wire) (in plug) and cuts off the supply/electricity/current	 both required for this mark	**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
13 (c)	200 (V)	allow (1) mark for ju (V =) 0.02 × 10 000	 **(2)**

(Total 6 marks)

Question Number	Correct Answer	Notes	Mark
14 (a)	B		**(1)**

Question Number	Correct Answer	Notes	Mark
14 (b)	electromagnet		**(1)**

Question Number	Correct Answer	Notes	Mark
14 (c)	to prevent shorting/a short circuit /to prevent current (accept electricity) from going directly from one turn to the next	accept '… from one coil to the next' do not credit any reference to safety/electric shock/heat insulation	**(1)**

Question Number	Correct Answer	Notes	Mark
14 (d)	gravity	accept 'weight (of the iron sphere)	**(1)**

Question Number	Correct Answer	Notes	Mark
14 (e)	**either** clockwise moment = anticlockwise moment **or** weight × 1.5 = 900 × 0.1 (1) weight = 90 ÷ 1.5 (1) = 60 (1)	 or (weight =) 60 (N) (3) **nwn**	**(3)**

(Total 7 marks)

Question Number	Correct Answer	Notes	Mark
15 (a)	area of edge (of the blade) is smaller (for a sharp knife) **either** (so) for the same force the pressure (under the blade) will be greater **or** (so) a smaller force required to give the same pressure (under the blade)	**or** the converse for a blunt knife	**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
15 (b) (i)	two arrows both acting towards the point and no arrows acting away from the point both the same length (as the original line) all right angles **dop**	do not credit anything other than 2 arrows as judged by eye to be a fair attempt	**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
15 (b) (ii)	(that the body of the) gas is not moving /stationary/at rest		**(1)**

Question Number	Correct Answer	Notes	Mark
15 (c)	Use of $\Delta p = m \times g \times \Delta h$ (1) 25 x 1025 x 10 (1) = 256 250 (Pa) (1) **or** 251 125 (Pa) **or** 251 381 (Pa)	 **or** answer in kilopascals e.g. 256.25 kPa 25 x 1025 (0)	 **(3)**

(Total 8 marks)