

# Mark Scheme (Results) Summer 2010

IGCSE

## IGCSE Science (Double Award) (4437) Paper 3F

Edexcel is one of the leading examining and awarding bodies in the UK and throughout the world. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers.

Through a network of UK and overseas offices, Edexcel's centres receive the support they need to help them deliver their education and training programmes to learners.

For further information, please call our GCE line on 0844 576 0025, our GCSE team on 0844 576 0027, or visit our website at [www.edexcel.com](http://www.edexcel.com).

If you have any subject specific questions about the content of this Mark Scheme that require the help of a subject specialist, you may find our **Ask The Expert** email service helpful.

Ask The Expert can be accessed online at the following link:

<http://www.edexcel.com/Aboutus/contact-us/>

Alternately, you can speak directly to a subject specialist at Edexcel on our dedicated Science telephone line: 0844 576 0037

(If you are calling from outside the UK please dial + 44 1204 770 696 and state that you would like to speak to the **Science** subject specialist).

Summer 2010

Publications Code UG024315

All the material in this publication is copyright

© Edexcel Ltd 2010

IGCSE SCIENCE DOUBLE AWARD 4437/3F - SUMMER 2010

aps accept phonetic spelling

ecf error carried forward

dna do not allow

nwn no working necessary

owtte or words to that effect

Question Number	Acceptable Answers	Extra Information	Mark
1(a)(i)	faster quicker further		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
1(a)(ii)1	speed		
			(1)

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

Question Number	Acceptable Answers	Extra Information	Mark
1(b)	9 - 6 = 3 (m)	nwn no ecf	
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
1(c)(i)	ave speed = dist/time	Use of symbols s,d,t in any form	1
			(1)
1(c)(ii)	(6÷4 )= 1.5 m/s or mps	accept 1½ or 3/2 no ecf from (i)	1
			1
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
2(a)	each terminal connected to a wire end	either way round and short circuiting of wire ignore other circuit components such as switches and ammeters	
			(1)

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

Question Number	Acceptable Answers	<i>Extra Information</i>	Mark
2(c)	less wire ( <i>on front</i> ) more wire <u><i>on back</i></u>	Ignore references to current	
			(1)
2(d)	(thin) wire(s) over shoulder no padding over shoulders no ties between back and front no switch battery is outside warmer		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
2(e)	resistance		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
2(f)	ANY TWO from: toaster iron hairdryer oven fire microwave cooker (immersion) heater or shower washing machine kettle lamp radiator		
			(2)

Question Number	Acceptable Answers	Extra Information	Mark							
3(a)(i)	<table border="1"> <tr> <td>radio</td> <td>microwave</td> <td>IR</td> <td>visible</td> <td>UV</td> <td>X</td> <td>gamma ray</td> </tr> </table> <p>1 correct (1), 2correct (2), 4 correct (3)</p>	radio	microwave	IR	visible	UV	X	gamma ray		
radio	microwave	IR	visible	UV	X	gamma ray				
			(3)							

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

Question Number	Acceptable Answers	Extra Information	Mark
3(a)(ii)2	wavelength	aps	
			(1)

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

Question Number	Acceptable Answers	Extra Information	Mark
3(b)(i)	cooking heaters night vision equipment TV remote control burglar alarm		
			(1)
3(b)(ii)	skin burns		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
4(a)	reflection/reflect/reflected Incidence/incident	either order dna 'refraction'	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
4(b)(i)	continuation of ray to reflector reflected to B by 1 or 2 reflections		1 1
			(2)
4(b)(ii)	waves converge/focus	accept : 'largest amplitude'	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
4(c)	longitudinal	aps	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
4(d)	Increase in temperature quieter	gets hot/heats up/quiet	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
5(a)	= $\frac{\text{useful energy output}}{\text{total energy output}}$	= $\frac{\text{useful energy output}}{\text{total energy input}}$	
			(1)

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

Question Number	Acceptable Answers	Extra Information	Mark
5(b)(ii)2	inefficient		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
5(b)(ii)	$50 \div 10$ = 5 (J/s)		1 1
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
5(b)(iii)	Watt watt	aps accept W, w, watts, watte or $\text{N m s}^{-1}$ or $\text{kg m}^2 \text{s}^{-3}$	1
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
6(a)	ANY TWO from : cosmic rays or Sun radon (gas) nuclear power medical food or drink ground (or rock or soil) or buildings weapon testing		1 1
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
6(b)(i)	<u>Becquerel</u>	must start with Be must end with l, le, ll or lle or plural must have <u>three</u> syllables in total allow Beckerel / bequerel dna becquel	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
6(b)(ii)	time (taken)/how long it takes for activity to halve owtte	<i>independent marks</i> e.g. half the atoms are left	1 1
			(2)
6(b)(iii)	Idea of two half-lives 6 hours	scores both marks	1 1
			(2)
6(b)(iv)	small (compared to source activity) or none as all figures are quoted for the source	(much) less than 10 Bq negligible	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
6(c)	ANY TWO from: tracer smoke detectors or fire alarm thickness control or gauging sterilising dating checking welds cancer treatment fluid flow		1 1
			(2)



Question Number	Acceptable Answers	Extra Information	Mark
7(a)	(semiconductor) diode	accept light emitting diode/LED (half-wave) rectifier	
			(1)
7(b)	can change the resistance of a <u>variable</u> (resistor)  <u>variable</u> (resistor) can change current/voltage	or the converse  or the converse  must refer to I, V or R  ignore reference to symbol	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
7(c)(i)	(6 volt) battery (of cells)	dna power supply	
			(1)
7(c)(ii)	6 (V)		
			(1)
7(c)(iii)	2.2 (V)	ecf candidate's cii - 3.8	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
7(d)	40 (mA).....40 (mA).	both required	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
8(a)(i)	<u>1.6</u> (s)		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
8(a)(ii)	<u>4.4</u> (s)		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
8(b)(i)	increase(d)/longer /more	dna slower/slowed it down	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
8(b)(ii)	no effect/no change/stays the same/ no difference/none/nothing		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
8(c)	wet/slippery/icy/greasy/ loose surface/muddy /snow/rain /smooth /gravel /oil	dna poor condition of the tyres or brakes	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
8(d)(i)	Single straight arrow pointing downwards and on a vertical line through C	judge by eye ignore labels	
			(1)
8(d)(ii)	friction (between lorry and air)/air resistance/drag	dna wind resistance	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
9(a)(i)	Twice amplitude/double amplitude/2× amplitude/ amplitude x 2	dna just 'amplitude'	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
9(a)(ii)	wavelength	aps dna just 'λ'	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
9(b)	$(f =) 30 \div 60$ or $(T =) 60 \div 30$ or $T = 2$ (s)		1
	= 0.5 (Hz)	allow ½ (Hz)	1
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
9(c)(i)	transverse (waves)	aps	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
9(c)(ii)	Any one from <ul style="list-style-type: none"> <li>• oscillates</li> <li>• vibrates</li> <li>• up and down</li> <li>• vertical</li> <li>• perpendicular to wave direction or water surface</li> </ul>	allow (simple) harmonic motion/s.h.m.  ignore any horizontal motion	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
10(a)(i)	chemical chemical energy chemical potential chemical potential energy	aps	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
10(a)(ii)	kinetic KE	dna 'movement' (energy) ignore 'heat' 'sound'	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
10(a)(iii)	electrical electric	Allow 'electricity'	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
10(b)	gravitational potential gravitational potential GPE		1
	Kinetic KE	accept 'movement'	1
	Heat thermal sound acoustic	accept if a correct pair are given e.g. heat and sound dna noise	1
			(3)

Question Number	Acceptable Answers	Extra Information	Mark
11(a)	14	number at the top left-hand side of the symbol	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
11(b)	...protons ....nucleus	both required in the correct order accept phonetic spelling  dna 'neutron'	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
11(c)	isotopes	ignore 'radioactive'	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
11(d)(i)	alpha/ $\alpha$ beta/ $\beta$	either order	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
11(d)(ii)	random spontaneous	accept erratic/irregular /not regular/not steady /not constant /not predictable	
			(1)

PAPER TOTAL: 75 MARKS

Further copies of this publication are available from  
International Regional Offices at [www.edexcel.com/international](http://www.edexcel.com/international)

For more information on Edexcel qualifications, please visit [www.edexcel.com](http://www.edexcel.com)  
Alternatively, you can contact Customer Services at [www.edexcel.com/asktheexpert](http://www.edexcel.com/asktheexpert) or on + 44 1204 770 696

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