

# Mark Scheme (Results)

## November 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).

November 2010

All the material in this publication is copyright

© Edexcel Ltd 2010

IGCSE SCIENCE 4437/3F - 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		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)

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	<i>independent marks</i>	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		1 1
	E distance from entrance reducing/going backwards		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 = $f \times \lambda$	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 <u>weighing scales</u>  rule	allow newton meter dna 'scales'	1 1
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
7(b)(ii)	8.0(g/cm <sup>2</sup> )		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
7(c)(i)	<u>measuring cylinder</u>		
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
7(c)(ii)	floats (in water)		
			(1)



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

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

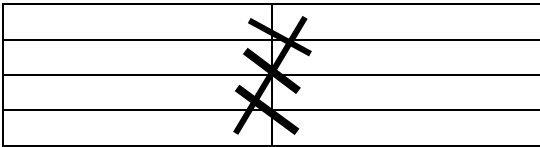
Question Number	Acceptable Answers	Extra Information	Mark
8(b)(ii)	lower/less/smaller / weaker / not as strong	dna 'slower' or 'slows down'	
			(1)

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

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

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

Question Number	Acceptable Answers	Extra Information	Mark
8(d)(ii)	any one of <ul style="list-style-type: none"> <li>lights can be switched on/off independently</li> <li>if a light fails the others will remain on</li> <li>lights may not fade as extra light switched on</li> </ul>	dna same brightness	
			(1)

Question Number	Acceptable Answers	Extra Information	Mark
9(a)(i)	any one of <ul style="list-style-type: none"> <li>(left to right) decreasing wavelength</li> <li>right to left, increasing wavelength</li> </ul>	<ul style="list-style-type: none"> <li>(left to right) increasing frequency</li> <li>right to left, decreasing frequency</li> </ul>	(1)
Question Number	Acceptable Answers	Extra Information	Mark
9(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
9(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
9(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
10(a)(i)	electron		(1)
Question Number	Acceptable Answers	Extra Information	Mark
10(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
10(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
10(b)	time from two appropriate activities shown clearly on the graph		1
	200 (million years)	or $\pm 10$ (million years)	1
			(2)

Question Number	Acceptable Answers	Extra Information	Mark
11(a)(i)	chemical		(1)
Question Number	Acceptable Answers	Extra Information	Mark
11(a)(ii)	kinetic		(1)
Question Number	Acceptable Answers	Extra Information	Mark
11(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
11(b)(ii)	efficiency = $\frac{\text{useful (energy) (output)}}{\text{total (energy) (output)}} \times 100\%$	Allow 'directly proportional' Allow 'power'	(3)

Question Number	Acceptable Answers	Extra Information	Mark
12(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
12(a)(ii)	730 mm/s	allow ecf from part ai  allow (1) for clear indication that (average) speed = distance $\div$ time (taken)	
			(2)

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



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