

A PEARSON COMPANY

Mark Scheme (Results) November 2010

GCSE

360Science

GCSE Additional Science Structured Paper P2 (5020H/1H)

GCSE Physics Structured Paper P2 (5048H/1H)

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

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

November 2010 Publications Code UG025777 All the material in this publication is copyright © Edexcel Ltd 2010

Using the Mark Scheme

- 1. This mark scheme gives you;
- * an idea of the type of response expected
- * how individual marks are to be awarded
- * the total mark for each question
- * examples of responses that should not receive credit.
- 2. ; separates points for the award of each mark.
- 3. / means that the responses are alternatives and either answer should receive full credit.
- 4. () means that a phrase/word is not essential for the award of the mark but helps the examiner to get the sense of the expected answer.
- 5. Phrases/words in **bold** indicate that the <u>meaning</u> of the phrase/word is **essential** to the answer.
- 6. OWTTE (or words to that effect) and eq (equivalent) indicate that valid alternative answers (which have not been specified) are acceptable.
- 7. 'Ignore' means that this answer is not worth a mark but does not negate an additional correct response.
- 8. 'Reject' means that the answer is wrong and negates any additional correct response for that specific mark.
- 9. ORA (or reverse argument) indicates that the complete reverse is also valid for the award of marks.
- 10. ecf (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

Marking

- 1. Suggestion/explanation questions should be marked correct even when the suggestion is contained within the explanation.
- 2. Do not award marks for repetition of the stem of the question.
- 3. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct scientific context.

Amplification

- 1. In calculations, full credit must be given for a <u>bald</u>, correct answer. If a numerical answer is incorrect, look at the working and award marks according to the mark scheme.
- 2. Consequential marking should be used in calculations. This is where a candidate's working is correct but is based upon a previous error. When consequential marks have been awarded write "ecf" next to the ticks.
- 3. If candidates use the mole in calculations they must be awarded full marks for a correct answer even though the term may not be on the syllabus at their level.
- 4. If candidates use chemical formulae instead of chemical names, credit can only be given if the formulae are correct.

Question Number	Answer	Acceptable Answers	Reject	Mark
1a	For 2 marks 13 (range 12-14.5);; For one mark			
	working shown on graph /numerical working in space ;			(2)

Question	Answer	Acceptable Answers	Ignore	Reject	Mark
Number					
1(b)(i)	may decay too quickly to be useful / eq ;	 won't be in the body long enough (to do the test/trace the blood flow) it will decay too quick may emit too much radiation / gamma / too quickly 	bald 'there won't be enough time' 'couldn't travel round the body fast enough' bald comments re damage	it would not emit enough gamma rays	(1)
Question	Answer	Acceptable Answers /	Ignore	Reject	Mark
1(b)(ii)	 any one from 1. too high a dose of radiation (before excretion); 2. consequence of too high a dose; 3. to reduce dose to other people ; 	 emits gamma for too long stays radioactive for too long damages too many cells (it will last too long) causes the body to be ill harm the body/person 	bald 'dangerous' 'damage'	power/strength of gamma	(1)

Question Number	Answer	Acceptable Answers	Ignore	Reject	Mark
1(c)	123-53;	70 seventy	neutrons		(1)

Question Number	Answer	Acceptable Answers	Ignore	Reject	Mark
1(d)	Any sensible answer in terms of ionisation / range / penetration / absorption	 alpha only travel a few centimetres in air alpha will not exit the body alpha are (highly /more) ionising (than gamma) alpha causes (more) biological damage/ damage to DNA/ damage to cells alpha are more highly absorbed /ORA alpha cannot travel through skin alpha stopped by paper 	bald 'damage' reference to beta	Alpha /beta/ gamma travelling <u>into</u> the body	(1)

Question Number	Answer		Acceptable Answers	Reject	Mark
2(a)(i)	0.40 OF	8 1.7-1.3	0.4		(1)
Question Number	Answer		Acceptable Answers	Reject	Mark
2(a)(ii)	0.37 OR	6.75-6.38	<u>37</u> 100		(1)
Question Number	Answer		Acceptable Answers	Further guidance	Mark
2(a)(iii)	ecf from (a)(i) and	l or (a)(ii)	bald correct ans gains both marksbald incorrect ans with power of ten		
	<u>0.37</u> ; 0.40	sub	mistake gains 1 mark (as evidence for correct method)		(2)
	0.925 ;	evaluation	0.9/0.93/0.92/ecf		

Question Number	Answer	Acceptable Answers	Ignore	Reject	Mark
2(b)	any sensible e.g. net downward force is reduced	 drag/air resistance has increased drag/air resistance when moving upward forces get bigger more friction from A to B no drag at A as its not moving there is an upward force after A 	references toenergyterminal velocityupthrust	 gravity is pulling it less decrease in weight bumps into stairs/objects 	(1)

Question Number	Answer	Acceptable Answers	Ignore	Mark
2(c)(i)	yesno mark			
	the velocity is constant	it has stopped accelerating	velocity	(1)

C N	Question lumber	Answer	Acceptable Answers	Reject	Mark
2	?(c)(ii)	weight / down force / (force due to) gravity	upthrust	Other upward forces	
					(1)

Question Number	Answer	Acceptable Answers	Reject	Mark
2(c)(iii)	Upward force/drag/air friction increases; (increases) with speed ;	credit answer to cii and ciii where seen allow for 1 mark 'gravity staying the same' if 'upthrust' is given in cii ORA		(2)

Question	Answer	Acceptable Answers	Reject	Mark
Number				
2(d)	 ball will reach a higher terminal velocity; 	takes longer to reach terminal velocity		
	PLUS any one from1. downward force is greater, but the upward force is same (as apple)	'heavier' is insufficient		
	2. higher speed needed to produce equivalent drag			(2)
	3. takes longer for weight to equal drag			

Question	Answer	Acceptable Answers	Ignore	Reject	Mark
Number					
3(a)	Any two from				
	 metastable / unstable system; 	Nucleon no/neutron no /mass (no) increases	References to E and heat emission		
	2. <u>splits/divides</u> ;		Bursts/explodes/breaks		
	3. (2) daughter <u>s</u> /nucle <u>i</u> ;	named daughter nuclei/atoms/elements	substances	cells/molecules (for MP3)	(2)
	4. (2 or more) neutrons(emitted)				

Question Number	Answer	Acceptable Answers	Reject	Mark
3(b)	 (2 light) <u>nuclei</u> (collide/fuse/combine); 	Sensible named <u>nuclei</u> e.g. hydrogen <u>nuclei</u>		
	2. form (heavier) nucleus (and energy);	Sensible named nucleus e.g. helium /atom/element		(2)

Question Number	Answer	Acceptable Answers	Reject	Mark
3(c)	Any three from 1. easier to produce fission (than fusion);	fusion difficult to produce fusion requires more energy to start it		
	2. one detail of conditions for fusion;	high p/ high T/high density needed		
	 one detail re controlling or sustaining or containing fusion; 	magnetic fields (bottles)/ lasers/ sustained for very short time only/ not achieved yet /melt container		(3)
	4. reason why fission has been used	at present fission has greater efficiency or greater yield/RA fission can be controlled/RA		

се	(0)
ce	

Question	Answer	Acceptable Answers	Reject	Mark
Number				
4(a)(ii)	Arrows radial inwards at both points, by eye			
				(1)

Question	Answer	Acceptable Answers	Ignore	Reject	Mark
Number					
4(a)(iii)	(Tensional) force along chain/rope	centripetal force	pull away from hammer	centrifugal force	
		pull of/by man	resultant force	centripetal force outwards	
					(1)

Question Number	Answer	Acceptable Answers	Reject	Mark
4(b)	Continues tangentially (on diagram or in text)	can be shown on diagram, by eye (between o in your and f in if)		(1)

Question Number	Answer	Acceptable Answers	ignore	Mark
4(c)	Force is radial along chain/rope	chains do not push chain remains under tension chain is tight /taut chain is pulling away from hammer	chain is straight centripetal force	(1)

Further copies of this publication are available from Edexcel Publications, Adamsway, Mansfield, Notts NG18 4FN

Telephone 01623 467467 Fax 01623 450481 Email <u>publications@linneydirect.com</u> Order Code UG025777 November 2010

For more information on Edexcel qualifications, please visit <u>www.edexcel.com/quals</u>

Edexcel Limited. Registered in England and Wales no.4496750 Registered Office: 190 High Holborn, London WC1V 7BH