OCR
RECOGNISING ACHIEVEMENT

GCSE

Physics A

General Certificate of Secondary Education

Unit **A332/01:** Unit 2 – Modules P4, P5, P6 (Foundation Tier)

Mark Scheme for January 2011

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

Guidance for Examiners

Additional Guidance within any mark scheme takes precedence over the following guidance.

1. Mark strictly to the mark scheme.

2. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.

3. Accept any clear, unambiguous response which is correct, eg mis-spellings if phonetically correct (but check additional guidance).

4. Abbreviations, annotations and conventions used in the detailed mark scheme:

/	=	alternative and acceptable answers for the same marking point
(1)	=	separates marking points
not/reject	=	answers which are not worthy of credit
ignore	=	statements which are irrelevant - applies to neutral answers
allow/accept	=	answers that can be accepted
(words)	=	words which are not essential to gain credit
<u>words</u>	=	underlined words must be present in answer to score a mark
ecf	=	error carried forward
AW/owtte	=	alternative wording
ORA	=	or reverse argument

eg mark scheme shows 'work done in <u>lifting</u>/(change in) <u>gravitational</u> potential energy' (1)
"work done" = 0 marks
"work done lifting" = 1 mark
"change in potential energy" = 0 marks
"gravitational potential energy" = 1 mark

5. If a candidate alters his/her response, examiners should accept the alteration.

6. Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.

   The example below illustrates how to apply this principle to an objective question.

   eg for a one mark question, where ticks in boxes 3 and 4 are required for the mark

Put ticks (✓) in the two correct boxes.	Put ticks (✓) in the two correct boxes.	Put ticks (✓) in the two correct boxes.
☐	☐	☒
☐	☐	☒
✓	☒	✓
☒	☒	✓
☐	☐	☐
This would be worth zero marks.	*This would be worth one mark.*	*This would be worth one mark.*

7. The list principle:

   If a list of responses greater than the number requested is given, work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, eg one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.

8. Marking method for tick boxes:

Always check the additional guidance.
If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes.
If there is at least one tick, ignore crosses. If there are no ticks, accept clear, unambiguous indications, eg shading or crosses.
Credit should be given for each box correctly ticked. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

eg if a question requires candidates to identify a city in England, then in the boxes

Edinburgh	
Manchester	
Paris	
Southampton	

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third <u>should be blank</u> (or have indication of choice crossed out).

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	×	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	×		✓		✓	✓		✓	
Score:	**2**	**2**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**NR**

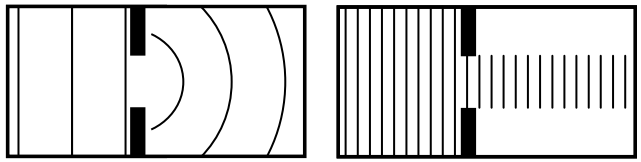
<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Additional Guidance</th></tr>
<tr><td>1</td><td>a</td><td>i</td><td>
<table>
<tr><td></td><td colspan="3">gravitational potential energy</td></tr>
<tr><td></td><td>stays the sam</td><td>increases</td><td>decrease</td></tr>
<tr><td>... waiting ...</td><td>✓</td><td></td><td></td></tr>
<tr><td>... moving ...</td><td></td><td>✓</td><td></td></tr>
<tr><td>... stopped ...</td><td>✓</td><td></td><td></td></tr>
<tr><td>... falling ...</td><td></td><td></td><td>✓</td></tr>
</table>
</td><td>[2]</td><td>Three correct for 2 marks.
Two or one correct for one mark.</td></tr>
<tr><td></td><td></td><td>ii</td><td>friction (1)</td><td>[1]</td><td></td></tr>
<tr><td></td><td>b</td><td></td><td>800 kJ (1)</td><td>[1]</td><td></td></tr>
<tr><td></td><td>c</td><td>i</td><td>The same as the change … (1) ☑
☐
☐</td><td>[1]</td><td></td></tr>
<tr><td></td><td></td><td>ii</td><td>☐
☐
Energy is lost due to friction. (1) ☑
☐</td><td>[1]</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>[6]</td><td></td></tr>
<tr><td>2</td><td>a</td><td></td><td>5m/s (1)</td><td>[1]</td><td></td></tr>
<tr><td></td><td>b</td><td></td><td>A (1)</td><td>[1]</td><td></td></tr>
<tr><td></td><td>c</td><td></td><td>D (1)</td><td>[1]</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>[3]</td><td></td></tr>
</table>

Question			Expected Answers	Marks	Additional Guidance
3	a		Measure the mass (of the dummy) (1) Measure the velocity of the dummy/car (before the crash) (1) Multiply the mass by the velocity (1)	[3]	**Allow** weight and speed. **Accept** measurements and calculations based on (change in) momentum = force x time
	b	i	increase (1) decrease (1)	[2]	
		ii	seat belts (1) ☐ ☐ ✓ ☐	[1]	
			Total	[6]	
4	a		iron (1)	[1]	
	b	i	230V (1)	[1]	
		ii	alternating current (1)	[1]	
	c		**E** **C** **D** **A** **B**	[3]	**E** somewhere before **C** **C** somewhere before **D** **D** somewhere before **A** **A** somewhere before **B** Four correct for 3 marks. Three correct for 2 marks. Two correct for 1 mark. No marks for one or none correct.
			Total	[6]	

<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Additional Guidance</th></tr>
<tr><td>5</td><td>a</td><td></td><td><u>light</u> (1)
resistance changes (1)
link LDR change to more current/buzzer comes on (1)
(Resistance) goes down with more light (or vice versa) (1)</td><td>[max 3]</td><td></td></tr>
<tr><td></td><td>b</td><td></td><td>20Ω (1)</td><td>[1]</td><td></td></tr>
<tr><td></td><td>c</td><td></td><td><table><tr><th></th><th>true</th><th>false</th></tr><tr><td>The buzzer and LDR are in parallel.</td><td></td><td>✓</td></tr><tr><td>The total resistance of the circuit …</td><td>✓</td><td></td></tr><tr><td>The battery pushes charge …</td><td>✓</td><td></td></tr></table></td><td>[2]</td><td>All three correct = 2 marks
Any two correct = 1 mark</td></tr>
<tr><td></td><td>d</td><td></td><td><table><tr><th>material</th><th>... lots of charges ...</th><th>... few charges ...</th></tr><tr><td>metal</td><td>✓</td><td></td></tr><tr><td>plastic</td><td></td><td>✓</td></tr></table></td><td>[1]</td><td>Both ticks required for the mark.</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>[7]</td><td></td></tr>
</table>

Question			Expected Answers	Marks	Additional Guidance
6	a		transverse (1)	[1]	
	b		frequency wavelength	[1]	**Both** words required for the mark.
	c		speed (1)	[1]	
	d	i	**A** **C**	[1]	**Both** answers are required for the mark. **Allow** diagrams correctly labelled 'reflection' and 'refraction'.
		ii	**Changes:** Speed/wavelength/direction (1) **Does not change**: Frequency (1)	[2]	**Ignore** amplitude. **Accept** colour. **Allow** 2 marks for detail of dispersion eg speed changes (1) are different for different frequencies/colours (1)
			Total	[6]	

Question			Expected Answers			Marks	Additional Guidance
7	a			**true**	**false**	**[2]**	All correct = 2 marks Three or two correct = 1 mark
			Analogue and digital signals …	✓			
			To carry a signal, waves …	✓			
			A signal becomes stronger …		✓		
			Only digital signals can be …		✓		
	b					**[1]**	If more than one box ticked, award no mark.
			Digital signals can transmit information …	✓	(1)		
	c		**C** (1)			**[1]**	
			Total			**[4]**	

Question			Expected Answers	Marks	Additional Guidance
8			 diffraction/diffract/diffracted (1) diffraction shown on at least one diagram/curved wavefronts on RHS of at least one diagram (1) wavelength not changing when waves travel through gaps (1) more diffraction on left diagram (right hand diagram must show little or no diffraction)/relating the size of the wavelength to the size of the gap (1) diffraction only happens when the wavelength matches (about the same as) the size of the gap (1)	4 max	Must use any of these words for this mark. Judge by eye.
			Total	**[4]**	

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

14 – 19 Qualifications (General)
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

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