

**Physics B**

General Certificate of Secondary Education

Unit **B652/01**: Unit 2 – Modules P4, P5, P6 (Foundation Tier)

**Mark Scheme for January 2011**

---

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of pupils of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support which keep pace with the changing needs of today's society.

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.

© OCR 2011

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](mailto:publications@ocr.org.uk)

1 Abbreviations, annotations and conventions used in the detailed Mark Scheme.

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

Question			Expected Answers	Marks	Additional Guidance
1	(a)	(i)	B (1)	1	if answer line is blank <b>allow</b> correct answer indicated in list <b>allow</b> background on line
		(ii)	A (1)	1	if answer line is blank <b>allow</b> correct answer indicated in list <b>allow</b> alpha particle or $\alpha$ on line
		(iii)	E (1)	1	if answer line is blank <b>allow</b> correct answer indicated in list <b>allow</b> uranium on line
		(iv)	C (1)	1	if answer line is blank <b>allow</b> correct answer indicated in list <b>allow</b> steel on line
		(v)	D (1)	1	if answer line is blank <b>allow</b> correct answer indicated in list <b>allow</b> radioisotope on line
	(b)	(i)	helium / He (1)	1	<b>not</b> he / HE <b>ignore</b> positive particle / slow moving
		(ii)	electron / e <sup>-</sup> (1)	1	<b>not</b> just e <b>ignore</b> negative particle
			<b>Total</b>	<b>7</b>	

Question			Expected Answers	Marks	Additional Guidance
2	(a)		12 (2) <b>but</b> if answer is incorrect 6 ÷ 0.5 (1)	2	
		(b)	breaks (1)	1	<b>allow</b> cuts / protects / stops (1) <b>ignore</b> melts / snaps / blows (up)
			<b>Total</b>	<b>3</b>	

Question	Expected Answers	Marks	Additional Guidance
3	<p><b>any two from:</b></p> <p>(Katie) is charged / floor is charged (1)</p> <p><b>BUT</b></p> <p>Katie and floor have opposite charges (2)</p> <p>by friction / rubbing (1)</p> <p>shoe(s) or floor is an insulator (1)</p> <p><b>any two from:</b></p> <p>metal / object is a conductor (1)</p> <p>metal / object connected to earth (1)</p> <p>charge runs to earth (1)</p>	3	<p><b>USE TICKS IN THIS QUESTION</b></p> <p><b>must have at least one point in each group</b></p> <p><b>allow</b> higher level answers</p> <p>either have gained or lost electrons (1)</p> <p>Katie is +ve floor is -ve / ORA. (1)</p> <p>electrons lost or gained (1)</p> <p><b>allow</b> grounded (1)</p> <p><b>allow</b> electrons run to earth (1) (higher level answer)</p> <p><b>ignore</b> charge goes from Katie to metal</p>
	<b>Total</b>	<b>3</b>	

Question		Expected Answers	Marks	Additional Guidance
4		repel / separate from / spread out / AW ..... fine / particulate / smaller <b>particles</b> / mist / wider (spray) / even / AW (1)  opposite / negative / AW..... attracted AW (1)	2	must have <b>both</b> correct answers in sentence to gain the mark  must have <b>both</b> correct answers in sentence to gain the mark  <b>ignore</b> stuck for the attracted mark
<b>Total</b>			<b>2</b>	

Question		Expected Answers	Marks	Additional Guidance
5		1 cells / DNA / tissue / organs (1)  2 sterilise (1)  3 cancer (1)	3	<b>allow</b> cancer or tumour (1)  <b>ignore</b> clean  <b>allow</b> tumour (1)
<b>Total</b>			<b>3</b>	

Question		Expected Answers	Marks	Additional Guidance
6	(a)	wavelength (1)	1	<b>allow</b> length of the wave (1)
	(b)	rarefaction (1)	1	<b>allow</b> rarefied / expansion / low pressure (area) (1) <b>not</b> decompression <b>allow</b> variations for the spelling of rarefaction but <b>not</b> reflection or refraction
<b>Total</b>			<b>2</b>	

Question		Expected Answers	Marks	Additional Guidance
7	(a)	aerial (1)	1	<b>allow</b> antenna
	(b)	idea of reflection (1) from (upper) atmosphere (1)  diffraction / spreads around flats (1)	3	<b>mark both sections together</b> <b>allow</b> higher level answers e.g. reflection (1) from ionosphere (1)  <b>not</b> goes around flats
		<b>Total</b>	<b>4</b>	

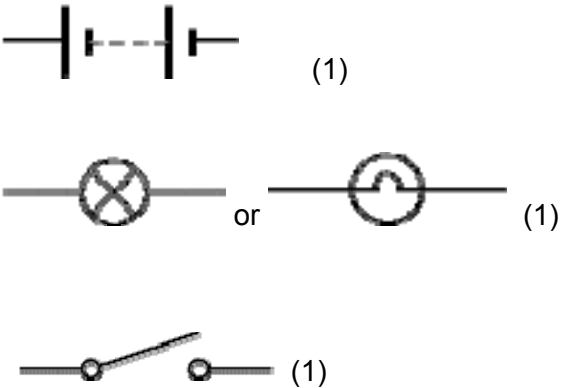
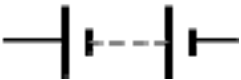
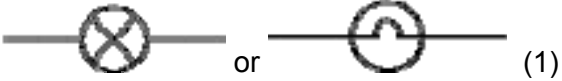

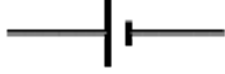

Question		Expected Answers	Marks	Additional Guidance
8	(a)	speed is a scalar (quantity) / ORA (1)	1	<b>allow</b> it is (just) 5 m/s (1) <b>allow</b> velocity is a vector (quantity) / has direction (1) <b>allow</b> speed has no direction / direction not included (1)
	(b)	(i) 11 (m/s) scores (2) <b>but</b> if answer incorrect 5 + (0.5 x 12) or 5 + 6 scores (1)	2	
		(ii) (momentum) increases / AW (1)	1	<b>allow</b> 5 units to 11 units / more than doubles (1)
<b>Total</b>			<b>4</b>	

Question		Expected Answers	Marks	Additional Guidance
9	(a)	refraction (1)	1	mark the answer on the line and ignore the list if no answer on the line <b>allow</b> ringed or marked correct answer on the list. more than one answer scores (0)
	(b)	convex parallel focal focal convex	4	5 correct scores (4) 4 correct scores (3) 3 correct scores (2) 2 or 1 correct scores (1)
	(c)	(i) dispersion (1)	1	<b>not</b> deviation
		(ii) blue deviates the most / refracts most / ORA / AW (1)	1	<b>allow</b> blue bends more (1) <b>allow</b> blue is slower / blue slows more (1) <b>ignore</b> blue has shorter wavelength mark answers on the diagram if answer line blank or neutral eg if blue and red are correctly labelled
<b>Total</b>			<b>7</b>	



Question		Expected Answers	Marks	Additional Guidance	
10	(a)	<p><b>any two from:</b>  weather forecasting (1)</p> <p>communications (1)</p> <p>military use (1)</p> <p>GPS (1)</p> <p>mapping (1)</p> <p>scientific research (1)</p>	2	<p><b>allow</b> (satellite) TV (1)</p> <p><b>allow</b> spying (1)</p> <p><b>allow</b> SATNAV / named SATNAV (1)</p> <p><b>allow</b> taking pictures of Earth (1)</p> <p><b>allow</b> Hubble / space telescope / space station / monitoring NEOs / space exploration (1)</p>	
	(b)	(i)	gravity (1)	1	<p><b>allow</b> weight / gravitational force (1)</p> <p><b>ignore</b> Earth</p> <p><b>but</b> Earth's <b>mass</b> [1]</p>
		(ii)	idea of above same point on Earth / in a fixed position / AW (1)	1	<p><b>not</b> just 'stays in same place'</p> <p><b>not</b> just same speed as Earth</p> <p><b>allow</b> above equator (1)</p>

Question		Expected Answers	Marks	Additional Guidance
	(iii)	24 (hours) / one day (1)	1	<p>Look at part (ii) and (iii) together</p> <p><b>allow</b> reference to 24 hours in part (ii) if no answer in part (iii)</p> <p>if 24 hours in part (ii) but incorrect time in part (iii), it scores (0) for part (iii), <b>but</b> award other correct responses in part (ii).</p> <p>e.g.                      (ii) takes 24 hours to orbit above equator (1) credit for above equator                      (iii) 365 days (0) as contradiction</p> <p>e.g.                      (ii) takes 24 hours to orbit (0) as credited in part (iii)                      (iii) 24 hours (1)</p> <p>e.g.                      (ii) takes 24 hours to orbit (0)                      (iii) ..... (1) as answer (24 hours) in part (ii)</p>
		<b>Total</b>	<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
11	(a)	 <p>  (1)   (1)   (1)                 </p>	3	must be in correct positions  allow  (1) allow terminals reversed (1)   allow  (1)
	(b)	variable resistor (1)	1	allow potentiometer / rheostat (1)
	(c)	increases (1)	1	if no answer on line, <b>allow</b> correct answer ticked, underlined or ringed on the list
		<b>Total</b>	<b>5</b>	

Question			Expected Answers	Marks	Additional Guidance
12	(a)	(i)	upwards (1)	1	if no answer on line, <b>allow</b> correct answer ticked, underlined or ringed in the list. more than one answer scores (0)
		(ii)	upwards (1)	1	if no answer on line, <b>allow</b> correct answer ticked, underlined or ringed in the list more than one answer scores (0)
	(b)		<b>name of any household equipment with a motor</b> eg vacuum cleaner / microwave / washing machine / mixer / DVD player / record player / refrigerator / hair dryer / fan heater etc (1)	1	<b>not</b> toaster / heater / kettle
			<b>Total</b>	<b>3</b>	

Question			Expected Answers	Marks	Additional Guidance
13	(a)		LDR (1)	1	if no answer on line, <b>allow</b> correct answer ticked, underlined or ringed in list
	(b)		decreases / AW (1)	1	<b>ignore</b> weaker
			<b>Total</b>	<b>2</b>	

Question		Expected Answers	Marks	Additional Guidance
14		increase the number of coils / AW (1)  speed up the rotation / AW (1)  increase the strength of the magnets / stronger magnets (1)	3	<b>not</b> bigger coils <b>allow</b> larger (surface) area of coils (1)  <b>allow</b> quicker / faster movement (1) but <b>ignore</b> more movement  <b>not</b> bigger magnets <b>allow</b> more magnets (1) <b>allow</b> more current to electromagnet (1)  do not credit motor ideas e.g. more current
		<b>Total</b>	<b>3</b>	

Question		Expected Answers	Marks	Additional Guidance															
15		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>(✓)</td> <td></td> </tr> <tr> <td>✓</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>✓</td> </tr> <tr> <td></td> <td>✓</td> <td></td> </tr> <tr> <td></td> <td>✓</td> <td></td> </tr> </table> <p style="text-align: right;">(2)</p>		(✓)		✓					✓		✓			✓		2	<b>ignore</b> extra ticks in top line  <b>any</b> 2 correct (1)  <b>all</b> 4 correct (2)  if 2 ticks in any line, mark line as <b>wrong</b>
	(✓)																		
✓																			
		✓																	
	✓																		
	✓																		
		<b>Total</b>	<b>2</b>																

Question			Expected Answers	Marks	Additional Guidance
16	(a)	(i)	both arrows pointing in anti-clockwise direction (1)	1	allow higher level answer in terms of electron flow as long as labelled (clockwise) (1)
		(ii)	to allow current to flow in one direction / to stop current flowing in the opposite direction / AW (1)	1	allow change AC into DC (1)
	(b)		to store charge (1)	1	allow higher level answers e.g. smoothing (1) allow even out current (1) ignore store electricity
<b>Total</b>				<b>3</b>	

Question			Expected Answers	Marks	Additional Guidance				
17	(a)		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>(0)</td> <td>1</td> </tr> <tr> <td>(1)</td> <td>0</td> </tr> </table> (1)	(0)	1	(1)	0	1	both correct for the mark
(0)	1								
(1)	0								
	(b)		so that the alarm continues to sound (even when the input signal is removed) / AW (1)	1	allow to keep it ringing (1)				
<b>Total</b>				<b>2</b>					

**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](mailto:general.qualifications@ocr.org.uk)

**[www.ocr.org.uk](http://www.ocr.org.uk)**

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

**Oxford Cambridge and RSA Examinations**  
**is a Company Limited by Guarantee**  
**Registered in England**  
**Registered Office; 1 Hills Road, Cambridge, CB1 2EU**  
**Registered Company Number: 3484466**  
**OCR is an exempt Charity**



**OCR (Oxford Cambridge and RSA Examinations)**  
**Head office**  
**Telephone: 01223 552552**  
**Facsimile: 01223 552553**

© OCR 2011