

Physics A

General Certificate of Secondary Education

Unit **A333/02**: Unit 3 – Ideas in Context plus P7 (Higher Tier)

Mark Scheme for June 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

Question		Answer	Mark	Guidance
3	a	nucleus is very small / atom is mostly empty space (1) because only a small proportion bounced back/ <u>most</u> went straight through (or deflected through small angles) (1) nucleus is positive (1) because (positive) alpha particles were repelled / deflected / back scattered (1) nucleus is massive / contains most of the atom's mass / very dense (1) because alpha particles bounce backwards towards the source	4	The reason must support a correct structural feature Maximum 2 marks for features ignore implication of contact collisions Ignore reflection of alpha
	b	protons have positive charge (1) like charges repel/electrostatic repulsion (1) strong force must overcome/be stronger than / balanced with the repulsive force (1)	3	allow protons repel each other gains 2 marks allow electromagnetic for electrostatic
Total			[7]	

Question		Answer	Mark	Guidance
4	a	A – photosphere (1) B - convective zone (1) C - radiative zone (1)	3	accept convection do not accept radiation zone
	b i	hydrogen (1) helium (1) (nuclear) fusion (1)	3	
	ii	radiation/light/photons/radiated (1)	1	ignore heat
Total			[7]	

Question		Answer	Mark	Guidance
5	a	<p>any 3 from:</p> <p>presence of line spectra / absorption spectrum / lines in a star's spectrum ;</p> <p>(line spectra) produced by movement of electrons in atoms / excitation of electrons / absorbed by electrons ;</p> <p>unique to each chemical elements ;</p> <p>(hence) can identify elements from lines ;</p>	3	Maximum of two marks if emission spectra from the star

Question	Answer	Mark	Guidance
b	<p>Either</p> <p>'peak frequency' / colour / wavelength linked to temperature (1)</p> <p>increased temperature leads to increased peak frequency/ decreased wavelength / bluer (1) ora</p> <p>Radiation/ frequency/ wavelength/ peak frequency linked to colour(1)</p> <p>OR</p> <p>Luminosity linked to temperature (1)</p> <p>Higher temperature higher luminosity ora (1)</p> <p>Size also needed to be known (1)</p>	3	<p>marks can be obtained from only one method, choose to benefit of candidate</p> <p>allow marks from appropriate diagram(s)</p> <p>A candidate getting the second marking point will usually gain the first marking point also.</p> <p>accept 'intrinsic brightness'/total radiation output for luminosity</p> <p>accept OR</p> <p>'Spectral type' linked to temperature (1)</p> <p>strength of different spectral lines links to temperature (1)</p> <p>different elements ionised at different temperatures (1)</p>
		[6]	

Question		Answer	Mark	Guidance
6	a	-270 (1)	1	
	b	<p>i any three from: gravity pulls particles/clouds inward / gravity compresses cloud / gravitational collapse ; volume decreases / density increases ; pressure increases ; particles gain kinetic energy ; particles collide more (often) ;</p>	3	<p>ignore fusion ignore particles more energetic collisions</p>
		<p>ii idea of balance (of inward and outward forces) (1) subsequent marks require first mark pressure / radiation pressure (1) gravity (1)</p>	3	ignore reference to other variables not changing
		Total	[7]	
		Total	[55]	

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

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