

# UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

## MARK SCHEME for the May/June 2006 question paper

### 0653 COMBINED SCIENCE

0653/02

Paper 2, maximum raw mark 80

These mark schemes are published as an aid to teachers and students, to indicate the requirements of the examination. They show the basis on which Examiners were initially instructed to award marks.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

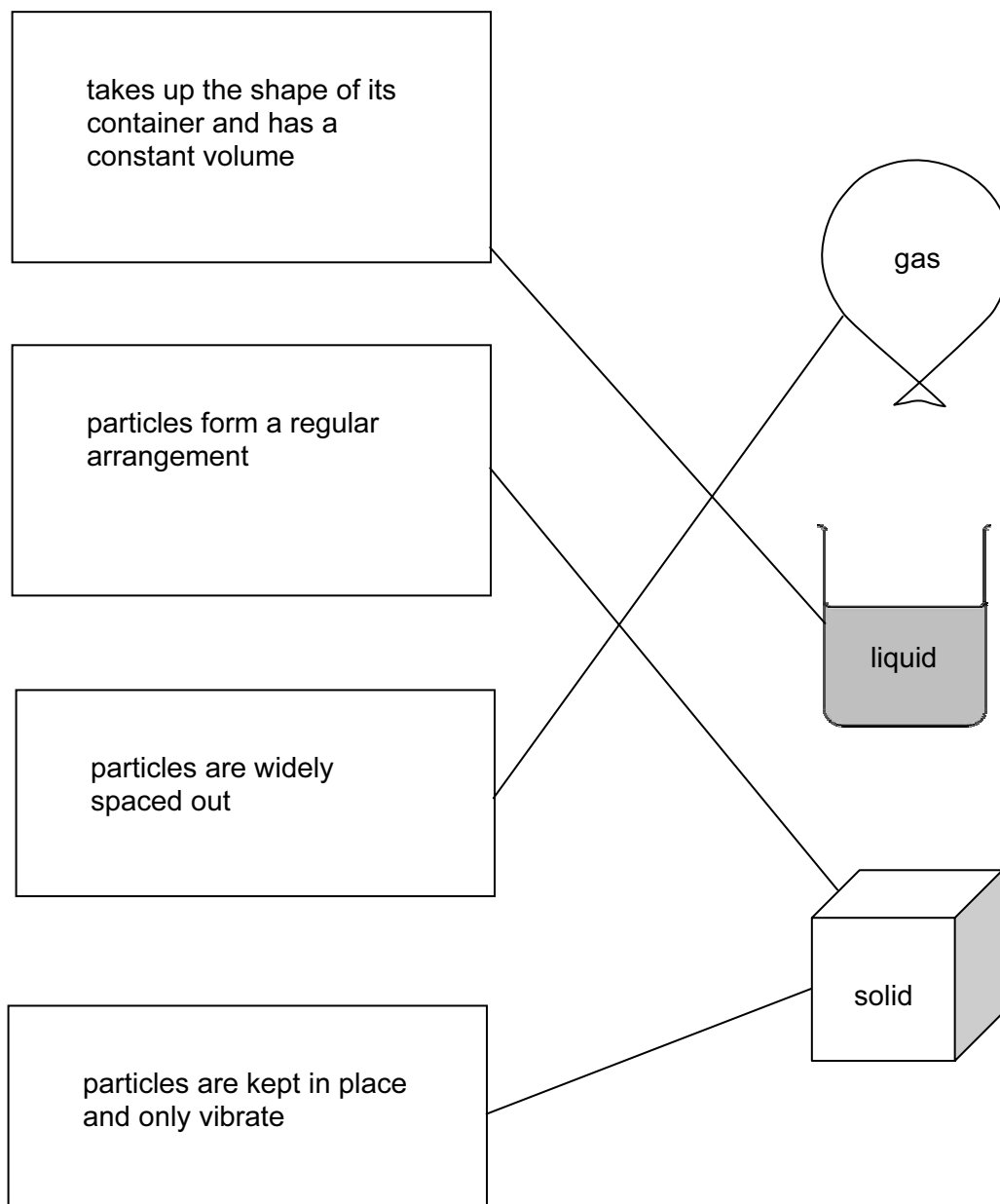
The minimum marks in these components needed for various grades were previously published with these mark schemes, but are now instead included in the Report on the Examination for this session.

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1 (a)



all three correct [2]  
 1 or 2 correct; [1]

(b) (i) water in glass tube rises; [1]

(ii) particles move faster when heated;  
 particles move further apart;  
 liquid expands; [3]

(iii) good absorber of radiation; [1]

[Total: 7]

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- 2 (a)** X amnion ;  
 Y uterus ;  
 Z cervix ; [3]
- (b)** from mother ;  
 from (mother's) blood ;  
 through placenta ;  
 by diffusion ; [3 max]
- (c)** smoking during pregnancy may result in low birthweight ;  
 because baby gets less oxygen ;  
 chemicals from smoke pass through placenta ;  
 correct ref to nicotine / carbon monoxide ; [2 max]
- [Total: 8]

Page 4	Mark Scheme	Syllabus	Paper
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- 3 (a) (i)** 3 (Cl) gas  
4 (Br) liquid  
5 (I) solid ;; (1 for numbers and 1 for states) [2]
- (ii)** gas; [1]
- (b) (i)** covalent; [1]
- (ii)** two bromine atoms/ions for every one magnesium atom/ion (owtte); [1]
- (c) (i)** chlorine / oxygen / ozone; [1]
- (ii)** people drinking the water may become ill / be poisoned / harmed;  
because the water may contain harmful microorganisms;  
chlorine sterilises the water / kills harmful microorganisms; [2 max]
- [Total: 8]

Page 5	Mark Scheme	Syllabus	Paper
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- 4 (a) (i) Geiger muller tube/Geiger counter etc; [1]
- (ii) concrete or lead shielding/radiation badges/minimal exposure times [max 2]
- (b) (i) atoms/molecules are ionised;  
what it does to materials [2]
- (ii) causes cancer;  
damage to cells; [2]
- (c) heat;  
steam;  
turbine; [3]
- (d) (i) high voltage means low current;  
this reduces energy losses; [2]
- (ii) resistance = voltage/current;  
 $= \frac{220}{10} = 22 \text{ ohms}$  [2]

[Total: 14]

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- 5 (a) nucleus A  
cell wall C  
chloroplast none (allow A)  
cell surface membrane B
- all correct three marks  
three correct two marks  
two correct one mark [3]
- (b) (i) root hair ; [1]  
(ii) large surface area ; [1]  
(iii) carbon dioxide + water → sugar / glucose / starch + oxygen ;; [2]  
(iv) lost, as water vapour / through stomata / by transpiration ; [1]
- [Total: 8]

<b>Page 7</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
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- 6 (a)** carbon;  
hydrogen; [2]
- (b) (i)** heat / light; [1]
- (ii)** carbon dioxide / water; [1]
- (c) A** is polymer;  
polymers are very large molecules / have very large numbers of atoms bonded /  
owtte; [2]
- (d) (i)** 1; [1]
- (ii)** reference to (avoidance of ) formation of sulphur dioxide;  
reference to reduced effects e.g. less acid rain;  
reference to reduced impact on health issues; [3]

[Total: 10]

<b>Page 8</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
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- 7 (a) leaves / plants, stop rain hitting the ground (hard) ;  
 roots hold soil in place ;  
 terracing stops water running down slopes ; [2 max]
- (b) (low)  
 idea that species diversity is the number of species present ;  
 if all sugar cane then only one kind of plant ;  
 only one kind of habitat ;  
 so few different species of animals ; [2 max]
- (c) (i) by diffusion ;  
 through wall of alimentary canal ;  
 in small intestine ;  
 ref. to villi ; [2 max]
- (ii) pancreas ;  
 secretes insulin ;  
 causes, cells / liver, to take glucose from the blood ; [3 max]
- (iii) needs sugar for respiration ;  
 to provide energy ; [2]
- [Total: 11]



<b>Page 9</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
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- 8 (a) (i) element made of only one type of atom and compound contains different atoms bonded together;  
 element cannot be simplified and a compound can be broken into its elements / is made from different elements; [1 max]
- (ii) iron oxide reduced;  
 any correct reference to reductive processes e.g. oxygen removed / positive ions gaining electrons; [2]
- (b) (i) carbon / manganese / other correct; [1]
- (ii) (zinc applied as) a barrier (between steel and environment) / owtte;  
 prevents reaction between steel / iron and oxygen (in environment);  
 prevents reaction between steel / iron and water (in environment); [3]  
 (allow correct reference and detail of sacrificial protection)
- (c) iron sulphate;  
 zinc sulphate; [2]
- [Total: 9]

<b>Page 10</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
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- 9 (a) (i)** acceleration; [1]
- (ii)** constant speed; [1]
- (iii)** stopping / deceleration; [1]
- (b)** distance = speed x time;  
= 10 x 15 = 150 (m) [2]

[Total: 5]