

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
International General Certificate of Secondary Education

**MARK SCHEME for the June 2005 question paper**

**0653 COMBINED SCIENCE**

**0653/02**

**Paper 2 (Core Theory), maximum raw mark 80**

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 Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

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

- CIE will not enter into discussion or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the June 2005 question papers for most IGCSE and GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

**Grade thresholds** for Syllabus 0653 (Combined Science) in the June 2005 examination

	maximum mark available	minimum mark required for grade:			
		A	C	E	F
Component 2	80	N/A	42	27	20

The threshold (minimum mark) for D is set halfway between those for Grades C and E.  
The threshold (minimum mark) for G is set as many marks below the F threshold as the E threshold is above it.

June 2005

IGCSE

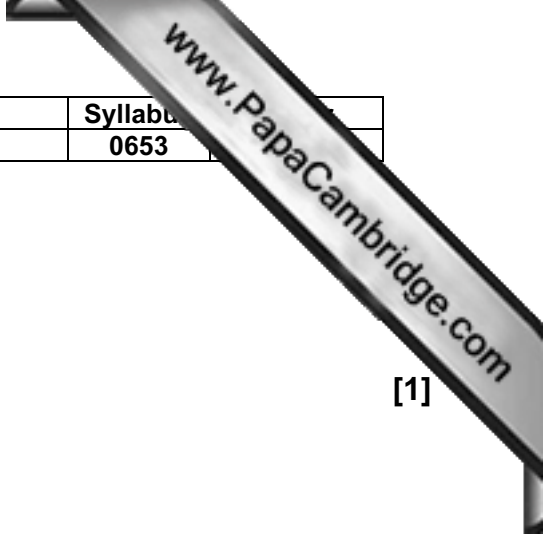
MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT: 0653/02

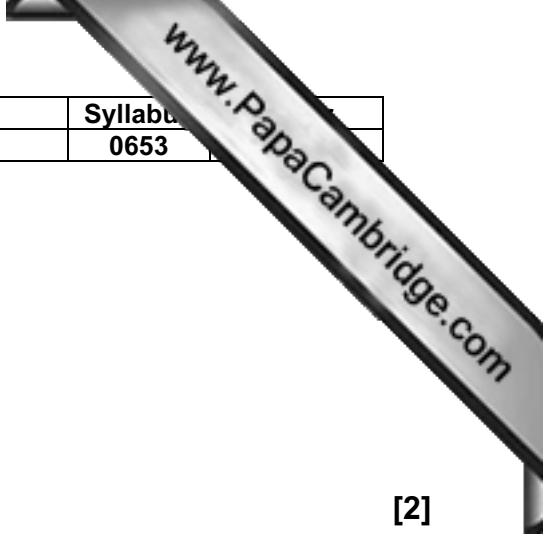
COMBINED SCIENCE  
Paper 2 (Core Theory)

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- 1 (a) D;  
A;  
C;
- (b) (i) xylem/vascular bundles; [1]
- (ii) osmosis (from within the cell);  
as vapour/evaporation;  
by diffusion;  
through stomata; max[2]
- 2 (a) placenta/umbilical cord/umbilical vein;  
blood;  
amniotic; [3]
- (b) (i) virus may get into baby's blood/cross the placenta;  
(reject any suggestion that baby shares mother's blood) [1]
- (ii) avoid/reduce sexual contact/use of condom; [1]
- (c) needed for bone formation;  
needed for formation of teeth;  
for the developing fetus/for the baby;  
to stop her teeth losing calcium; max [2]
- 3 (a) (i) argon;  
noble/inert gas/reference to atoms being stable/having full outer shells; [2]
- (ii) magnesium and oxygen/hydrogen; [1]
- (iii) magnesium and argon; [1]
- (iv) H/hydrogen;  
nucleon number and proton number both 1/other reasonable; [2]
- (b) same number of each type of atom/element on both sides; [1]
- (c) (i) acid concentration; [1]
- (ii) (3)  
has the highest rate of reaction;  
high surface area and high temperature both increase rate; [2]
- 4 (a) (i)  $\leq 20$  Hz; [1]
- (ii) molecules vibrate;  
vibration passes from one molecule to another;  
description of compression and rarefaction; max [2]
- (b) (i) speed = distance  $\div$  time/suitable symbolic version;  
21 = 712 (cm/s); [1]

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(ii) work = force x distance/suitable symbolic version;  
 $0.02 \times (21 \div 100)$ ;  
**0.0042 (J)**;

(c) white fur;  
 is a poor emitter of radiation;  
 OR  
 fur traps air;  
 air is poor conductor (of heat); [2]  
 (allow other suitable alternatives)

5 (a) (i) (cilia beat) and move mucus;  
 mucus contains bacteria/dirt;  
 upwards/away from lungs; max [2]

(ii) cilia stop working;  
 bacteria get into lungs/remain in lungs;  
 bacteria cause damage/disease; max [2]

(b) (i) 650; [1]

(ii) as sulphur dioxide increases, deaths increase; [1]

(iii) illness takes time to develop/other reference to time delay; [1]  
 (reject reference to some sulphur dioxide still in the air)

6 (a) (i) potassium + chlorine  $\rightarrow$  potassium chloride; [1]

(ii) flames/burning;  
 exothermic means heat is given out; [2]

(b) (i) neutralisation; [1]

(ii) hydrochloric (acid);  
 potassium hydroxide; [2]

(iii) use of named indicator;  
 reference to the corresponding neutral colour;  
 OR  
 use a pH meter;  
 check pH = 7; [2]

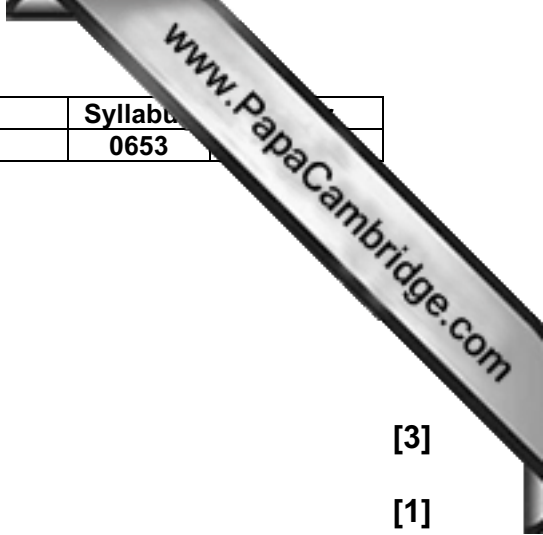
(iv) warm/heat the solution;  
 evaporate/boil off the water;  
 suitable additional practical detail; [2]

7 (a) (i) arrow labelled **B** pointing downwards; [1]

(ii) forces are equal/balanced; [1]

..... [1]

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(b) density = mass ÷ volume/suitable symbolic version;  
 $25 \div 30 = 0.83(3) \text{ (g/cm}^3\text{)}$ ;

(c) diagram Y;  
 particles touching/close packed/very close together;  
 in a regular arrangement; [3]

8 (a) (i) enzyme/carbohydhrase/amylase; [1]

(ii) small intestine; [1]

(iii) move food along/mix with enzymes; [1]

(b) (i) use of Benedict's solution and heat/warm;  
 colour change to orange/red; [2]

(ii) oxygen;  
 carbon dioxide;  
 water; (all three = 2 marks; two correct = 1 mark) [2]

9 (a) coal; [1]

(b) (i) (A)  
 oxygen is reacting/joining with the wood/oxygen is needed for burning; [1]

(ii) carbon dioxide/carbon monoxide/water vapour; [1]

(iii) (thermal) decomposition;  
 wood is made of large/complex molecules and simpler ones  
 are being formed/owtte; [2]

(c) (i) appearance of orange/brown/shiny substance/substance; [1]

(ii) carbon + copper oxide → copper + carbon dioxide/monoxide; [1]

10 (a) resistance = voltage ÷ current/suitable symbolic version;  
 $5 \div 0.5/10 \text{ (ohms)}$ ; [2]

(b) description of convection;  
 hot water rises;  
 hot water is less dense; max[2]

(c) transverse;  
 speed;  
 refraction;  
 radio; [4]