

MARK SCHEME for the October/November 2012 series

0653 COMBINED SCIENCE

0653/23

Paper 2 (Core Theory), maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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Page 2	Mark Scheme	Syllabus	Paper
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1 (a) (i) haploid ;
zygote ;
dissimilar ; [3]

(ii) fertilisation ; [1]

(b) (i) A – anther/stamen ;
B – stigma ; [2]

(ii) A ;
D ; [2]

(c) (i)

<i>tube</i>	<i>conditions</i>		
C	water	oxygen	no light
D	no water	oxygen	no light
E	water	no oxygen	no light

(all three tubes correct for 2 marks, two tubes correct for 1 mark) [2]

(ii) (lettuce) seeds need oxygen (for germination) ;
(lettuce) seeds need water/moisture (for germination) ;
(lettuce) seeds do not need light (for germination) ; [3]
(max 2 marks if germination **not** mentioned)

[Total: 13]

2 (a) (i) nitrogen 78 (%) ;
oxygen 21 (%) ; [2]

(ii) nitrogen/an element is in the Periodic Table/nitric oxide/a compound is not ;
nitrogen/an element only contains one type of atom/nitric oxide/a
compound contains more than one type of atom/element ;
nitrogen/an element cannot be broken down into simpler substances/nitric
oxide/a compound can ; [max 2]
the atoms in nitric oxide/a compound are bonded together ;

(iii) it represents one molecule of nitric oxide ;
reference to the bonding of atoms ;
reference to the 1 : 1 ratio of N : O ; [max 2]

(iv) oxidation ; [1]

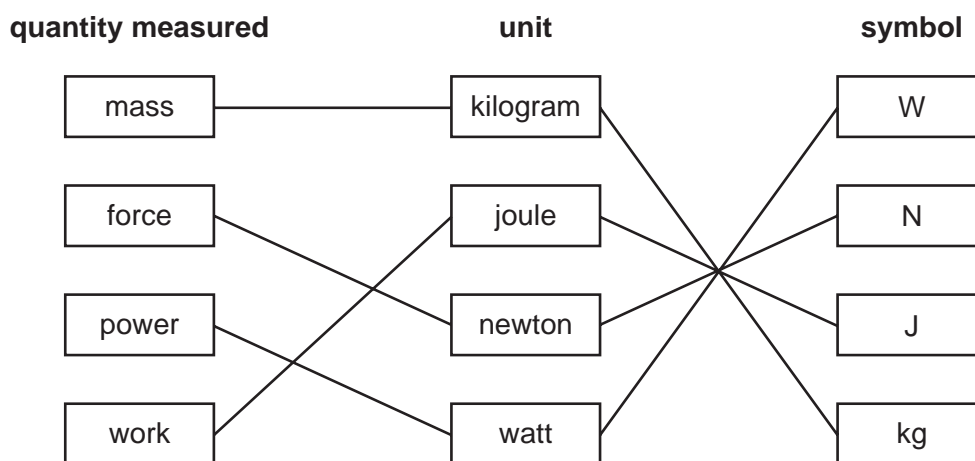
(b) (i) ionic/electrovalent ;
bonding is between metal and non-metal ; [2]

- (ii) products of combustion of magnesium reacted with water ;
to form an alkaline solution/ an alkali ;

[max 1]

[Total: 10]

3 (a)



[2]

- (b) **A** - constant speed/velocity ;
B - constant acceleration ;

[2]

- (c) (distance covered =) speed × time ;
 $20 \times 90 = 1800$ (m) ;

[2]

- (d) (i) (resistance =) voltage / current ;
 $= 12 / 2 = 6$ (Ω) ;

[2]

- (ii) (R =) $R_1 + R_2$;
 $6 + 6 = 12$ (Ω) ;

[2]

[Total: 10]

4 (a) carnivore **and** consumer ;

[1]

(b) (i) any number above 20 000 ;

[1]

(ii) longitudinal ;

[1]

(c) (i) idea of reflected randomly / scattered from rough surface / regularly from smooth ;

[1]

(ii) idea that it receives ultrasound back from a rough surface (but not from smooth) ;

[1]

Page 4	Mark Scheme	Syllabus	Paper
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- (d) soil erosion ;
 more carbon dioxide in air / increased greenhouse effect / global warming ;
 flooding ;
 extinctions / loss of habitat ;

[max 3]

[Total: 8]

- 5 (a) chlorination ;
 kills (harmful) microorganisms ;
AND/OR
 filtration ;
 removes solids ;
AND/OR
 evaporation ;
 removes all impurities / removes water from impurities ;

[max 4]

- (b) (i) red ;
 dye giving only one spot matches red in P / owtte ;

[2]

- (ii) S ;

[1]

[Total: 7]

- 6 (a) heat ;
 kinetic ;

[2]

- (b) (i) water turns to a gas / (water) vapour ;
 (as) particles / molecules get further apart ;
 (more) energetic particles escape ;
 heat is needed / used to cause evaporation ;

[max 2]

- (ii) heat is needed / used to cause evaporation ;
 (more) energetic particles escape ;
 remaining (particles) have less (thermal) energy ;

[max 1]

- (c) *in solid:*
 particles in regular arrangement ;
 particles all touching ;
in liquid:
 particles arranged irregularly ;
 particles touching ;

[max 2]

- (d) (efficiency =) useful energy out ÷ energy in ;
 idea of how little or how much energy is wasted by machine / device ;

[max 1]

[Total: 8]

Page 5	Mark Scheme	Syllabus	Paper
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7 (a) (i) A – incisor / canine ; [2]
 B – molar / premolar ;

(ii) crush / grind ;
 break into small pieces which are easier to digest ;
 increase surface area of food ;
 idea of better access for enzymes ; [max 2]

(b)

<i>part</i>	<i>ingestion</i>	<i>digestion</i>	<i>absorption</i>
mouth	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
stomach	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
small intestine	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

(1 mark per correct row) ;;; [3]

[Total: 7]

8 (a) (i) ductile ; [2]
 (electrical) conductor ;

(ii) mixture of metals ; [2]
 alloy is less malleable / harder / stronger / lower melting point ;

(iii) copper sulfide + oxygen \longrightarrow copper + sulfur dioxide ; [1]



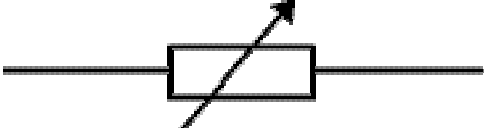
(b) (i) copper chloride solution / the conducting solution ; [1]

(ii) chlorine ;
 bubbles / gas given off ;

copper ; [4]
 reference to copper coloured / brown / pink layer / solid ;

[Total: 10]

9 (a)

<i>component</i>	<i>symbol</i>
ammeter	
fuse	
variable resistor	

[3]

(b) (i) 3 ;

[1]

(ii) correct symbol in parallel with bulb ;

[1]

(c) (i) angle of incidence and angle of reflection ;

[1]

(ii) 45° ;

[1]

[Total: 7]