

MARK SCHEME for the October/November 2013 series

0653 COMBINED SCIENCE

0653/22

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.

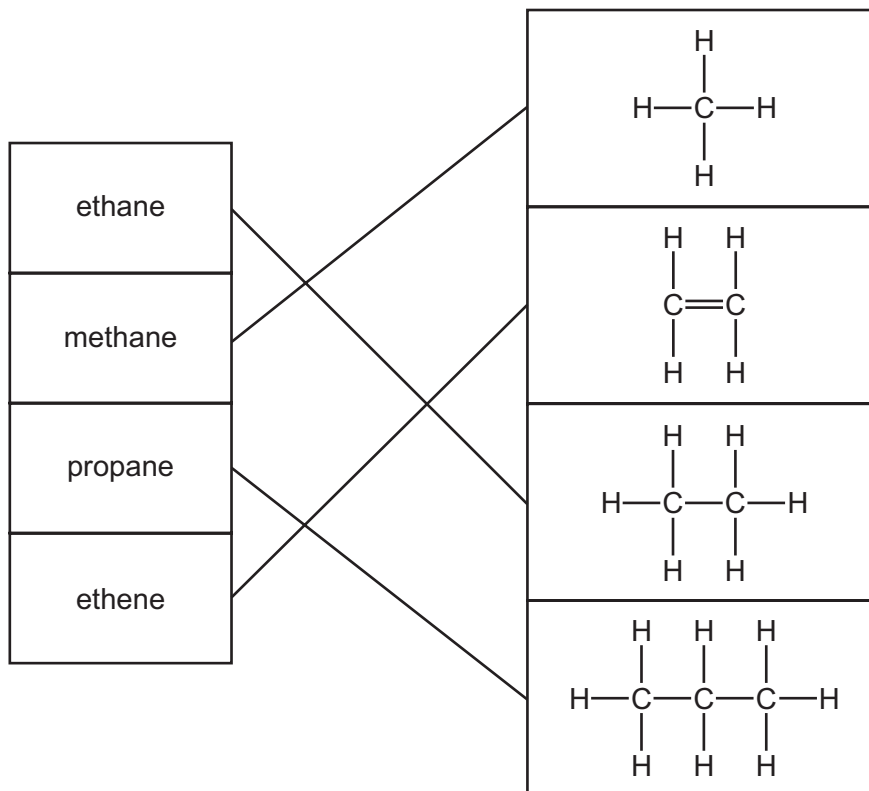
Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

Page 2	Mark Scheme	Syllabus
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- 1 (a) (i) **Q** conductor and **S** insulator ;
because iron is a metal ;
because sulfur is a non-metal ;
- (ii) chlorine ; [2]
copper ;
- (iii) electrolysis ; [1]

(b)



(all correct 2 marks, 1 correct 1mark);; [2]

- (c) (i) CF_2Cl_2 ; [1]
(all elements in any order)
- (ii) (not hydrocarbon) [1]
contains elements other than carbon and hydrogen/owtte ;

[Total: 10]

Page 3	Mark Scheme	Syllabus
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- 2 (a) (i) slow down ;
(ii) frequencies ;
(iii) frequencies ; [1]
(iv) amplitudes ; [1]
- (b) sound waves need a medium ;
as the air is sucked out there is less of a medium to convey the sound wave ;
no air means sound waves cannot pass through ; [3]

[Total 7]

- 3 (a) (i) label to xylem ;
label to phloem ; [2]
- (ii) transport (in either) ;
- xylem:*
transports water ;
transports, mineral (ions)/named ion ;
provides support ;
- phloem:*
transports nutrients made in the leaves ;
e.g. sucrose/sugar ; [max 4]

- (b) (i) more root hairs ;
shorter root hairs ; [2]
- (ii) increase in number in both types is the same/0.44 more root hairs
per unit area ;
decrease in length is much greater in B plants ; [2]
- (iii) reduced surface area ;
less able to take up water/mineral ions/named ion ;
reduced water causes reduced photosynthesis ;
less glucose made ;
glucose used for energy/respiration/growth ;
less mineral (ions), less growth ; [max 3]

[Total 13]

Page 4	Mark Scheme	Syllabus	
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- 4 (a) (i) increased ;
because mixture has become more alkaline/solid has reacted with water ;
- (ii) colour change (blue) to red ;
effervescence / (gas) bubbles produced ; [2]
- (b) (i) colour change of cobalt chloride paper shows water ;
and cloudy limewater shows carbon dioxide ; [2]
- (ii) paper covered with (layer of) sodium hydrogencarbonate / owtte ;
provides barrier between paper and air / oxygen ;
(if paper does burn) sodium hydrogencarbonate decomposes ;
to carbon dioxide / water which inhibits burning / owtte ; [max 2]
- [Total: 8]

- 5 (a) (i) series ; [1]
- (ii) ammeter in series ;
correct symbol ;
voltmeter in parallel ;
correct symbol ; [4]
- (iii) $R = R_1 + R_2$;
 $= 15 \Omega$; [2]
- (b) density = mass / volume ;
 $= 9000 / 3000 = 3 \text{ g/cm}^3$; [2]
- (c) water particles turn from liquid to gas ;
heat (energy) from body evaporates water particles ; [max 1]
- [Total: 10]

Page 5	Mark Scheme	Syllabus
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- 6 (a) A penis ;
B sperm duct ;
C urethra ;
- (b) sperm cannot pass through ;
idea that sperm cannot fertilise an egg ; [2]
- (c) (i) human immunodeficiency virus ; [1]
- (ii) not have sexual intercourse/wear a condom ;
not sharing needles/not donating blood ; [max 1]
- 7 (a) (i) liquid
solid ; (both required) [1]
- (ii) iodine atom contains more protons, neutrons (and electrons) than bromine ;
iodine atom has more electrons shells than bromine ; [2]
- (iii) mixture becomes brown ;
with one of the following
because iodine is produced ;
iodine is displaced by chlorine ;
chlorine is more reactive than iodine ; [max 2]
- (b) to kill harmful bacteria/microorganisms ;
to make water safe (for humans) ; [2]
- (c) flask contains a mixture/chlorine and helium atoms have not bonded ;
because helium is noble gas/inert ; [2]
(allow refs to filled electron shells in helium)

[Total: 9]

Page 6	Mark Scheme	Syllabus
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- 8 (a) (i) driving force forwards and friction forces backwards ;
- (ii) air resistance/tyres on road/brakes ;
- (iii) equal and opposite ; [1]
- (iv) constant speed ; [1]
- (v) gravity/weight ; [1]
- (b) (i) speed = distance/time ;
= 400/25 = 16 m/s ; [2]
- (ii) kinetic ; [1]
- (iii) gravitational potential ; [1]

[Total: 9]

- 9 (a) (i) producer ; [1]
- (ii) carbohydrate/glucose/sugar/starch/other ; [1]
- (iii) energy (flow/transfer) ; [1]
- (b) more microscopic green plants ;
fewer of other animals/named animal ; [2]
- (c) carbon dioxide ;
methane ; [2]

[Total:7]