www.dynamicpapers.com

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2014 series

0653 COMBINED SCIENCE

0653/21 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.

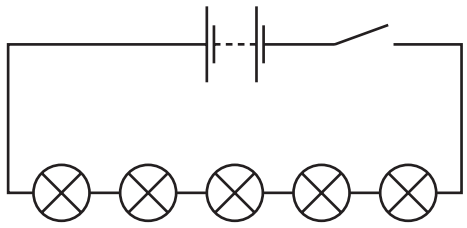
Cambridge is publishing the mark schemes for the October/November 2014 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

® IGCSE is the registered trademark of Cambridge International Examinations.

CAMBRIDGE
International Examinations

www.dynamicpapers.com

1 (a)



circuit symbols correct ;
circuit connected correctly with 5 lamps (allow ±1) ; [2]

(b) (i) gives p.d. required to light the lamp (for normal use)/what battery to use to make lamp work/to drive correct current ;
don't exceed stated p.d. or may blow lamp/too high current (owtte) ; [2]

(ii) R = 1.2/0.1 = 12 (Ω) ; [1]

(iii) Total resistance = 5 × 12 = 60 (Ω) ; *allow ecf* [1]

(iv) ohm ; [1]

[Total: 7]

2 (a) B C ;
(B C) D A ; [2]

(b)

material	description
element	can be found in the Periodic Table
element	cannot be broken down into simpler substances
mixture	contains different types of molecules
compound	only contains molecules which are identical but each molecule contains more than one type of atom

; ; ; ; [4]

(c) (i) fuels ; [1]

(ii) flammable ; [1]

(d) (i) carbon dioxide ;
water ; [2]

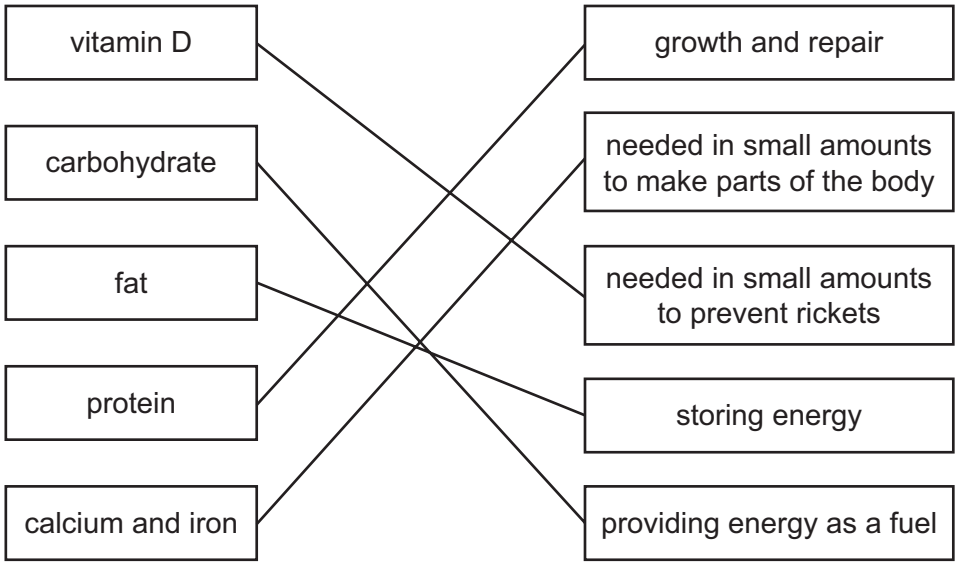
(ii) C_3H_8 ; [1]

[Total: 11]

© Cambridge International Examinations 2014

www.dynamicpapers.com

3 (a) (i)



(all 4 correct = 3 marks, 3 correct = 2 marks, 2 or 1 correct = 1 mark) [3]

(ii) prevents constipation ; [1]

(b) (i) meal **2** is balanced / meal **1** is not balanced / not enough vitamin C/D / not enough fibre / not enough iron / calcium ;
meal **1** contains too much fat / carbohydrate / energy ;
Jill does not need so much energy in food because of her lifestyle ; [max 2]

(ii) e.g. apple (no mark)
adds fibre / vitamins C/D ;
or
milk (no mark)
adds calcium / vitamins C/D ;
or
any food (no mark) and valid point that addresses the reasons mentioned in **(b)(i)** ; [1]

[Total: 7]

4 (a) (i) initial any between 8 and 14
final 7 ; [1]

(ii) initial violet / purple
final green ; [1]

(iii) neither acid nor alkali in excess ;
(chemical) reaction / neutralisation ;
Ref. to acid has pH<7 / low pH ; [max 2]

(b) (i) repeat without indicator ;
using same volumes of solutions ; [2]

(ii) evaporation / heating to remove water ; [1]

[Total: 7]

© Cambridge International Examinations 2014

www.dynamicpapers.com

5 (a) (i) **A** cell membrane ;
B vacuole ; [2]

(ii) **X** label line to green area and **Y** label line to white area ;
green color contained in chloroplasts ;
which are only present in cell X ;
or
white area does not contain chlorophyll / chloroplasts ;
which are absent from cell Y ; [3]

(iii) black/blue black or shaded area matching green area of leaf and labelled black ; [1]

(iv) chlorophyll / chloroplasts needed to make starch / for photosynthesis / to trap light ; [1]

(b) (i) enzyme is denatured ;
not the optimum pH for the enzyme ; [2]

(ii) pancreas / salivary glands / small intestine / stomach ; [1]

[Total: 10]

6 (a) (i) weight of the aircraft: **R** ;
thrust of the engines: **Q** and force of the brakes **S** (both needed, correct way round) ; [2]

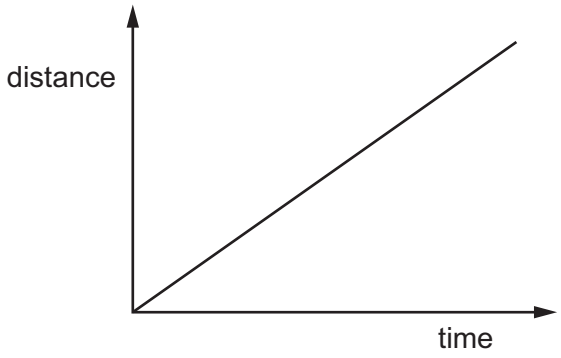
(ii) thrust and braking force equal and opposite ;
unbalanced forces needed to move / accelerate (the aircraft) ; [2]

(b) (i) chemical (energy) [1]

(ii) kinetic (energy) ;
gravitational / potential (energy) ; [2]

(iii) heat / sound ; [1]

(c)



[1]

[Total: 9]

© Cambridge International Examinations 2014

www.dynamicpapers.com

7 **(a)** **(i)** returns carbon / carbon dioxide back to air / produces carbon dioxide from sugar / glucose ; [1]

(ii) sugar / glucose + oxygen → carbon dioxide + water [2]
LHS ; RHS ;

(iii) grass → rabbit → fox / grass → rabbit → decomposer ;; [2]
(1 mark for correct organisms in right order, 1 mark for correct arrows)

(iv) feed on dead / decaying bodies / waste ;
release carbon / carbon dioxide back to the air ;
during respiration ; [max 2]

(b) **(i)** combustion / burning of fossil fuels (produces carbon dioxide) ;
reduces carbon dioxide removal by photosynthesis; [2]

(ii) (increases) global warming / description of consequences ; [1]

[Total: 10]

8 **(a)** infra-red ;
evaporates ;
molecules ; [3]

(b) mercury absorbs energy (from Sun) / mercury expands as temperature increases ;
mercury particles move faster / mercury particles get further apart ; [2]

(c)

higher frequency						lower frequency
gamma radiation	**X-rays**	**ultraviolet**	**visible**	**infra-red**	microwave	radio waves

any one in its correct box ;
second one in correct box ;
third and fourth in correct boxes ; [3]

(d) sound needs medium to travel through / can't travel through a vacuum / empty space ;
region between Sun and Earth is a vacuum ; [2]

[Total: 10]

© Cambridge International Examinations 2014

www.dynamicpapers.com

9 **(a)** **(i)** copper oxide + carbon → copper + carbon dioxide
LHS ; RHS ; [2]

(ii) copper oxide (loses oxygen so) is reduced ;
carbon (gains oxygen so) is oxidised ; [2]

(b) no reaction (between copper and dilute hydrochloric acid) ;
copper is below hydrogen in the reactivity series ; [2]

(c) (sulfur dioxide) dissolves in rain / atmospheric water / forms acid rain ;
collects in lakes / rivers etc. ;
damages plants / animals ;
effect of gas on respiratory system ;
other correct ; [max 3]

[Total: 9]

© Cambridge International Examinations 2014