

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
GCE Ordinary Level

**MARK SCHEME for the October/November 2009 question paper
for the guidance of teachers**

5129 COMBINED SCIENCE

5129/02

Paper 2 (Core Theory), maximum raw mark 100

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.

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Page 2	Mark Scheme: Teachers' version	Syllabus
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- 1 (a) compound / made up of / consists of carbon and hydrogen only
(mixture = 0)
- (b) oxygen / O_2 [1]
- (c) (i) carbon dioxide / CO_2
water / H_2O / steam (either order) [2]
- (ii) carbon monoxide / CO [1]
- (d) oxides of nitrogen / lead (compounds) [1]
not sulfur dioxide / carbon monoxide / carbon dioxide
- 2 (a) carbon dioxide / CO_2
oxygen / O_2 (correct order) [2]
- (b) (i) carbon dioxide (level) / temperature / the plant
not light [1]
- (ii) graph increasing with increasing intensity
maximum being reached / levelling off [2]
independent marks; decreasing graph loses first mark
- (c) food / oxygen / animals eat plants [1]
light and water are a list but energy is insufficient
- 3 (a) (i) line at 30m/s for first 20s
straight line from 30m/s at 20s up to 50 m/s at 40s [2]
ignore line above 40s
- (ii) velocity has direction / is a vector
speed has no direction / is a scalar [2]
only velocity has direction = 2
- (b) $F = ma$ or $a = F/m$ or 5100/1500
(correct formula always gets mark)
= 3.4
 m/s^2 [3]
(unit independent of answer)

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- 4 (a) B
- (b) (i) C
- (ii) reacts with water [1]
reason is independent of letter but incorrect list for C loses mark
- (c) (i) E [1]
- (ii) conducts electricity when melted }
high melting point / melts at 772 (°C) } any 2
soluble in water } [2]
reasons are independent of the letter
- 5 (a) fruit wall [1]
- (b) testa / seed coat
not testis / testes
cotyledon
plumule [3]
- (c) allows colonisation of new areas / grow in other places
prevents overcrowding / competition [1]
(not spread seeds alone)
- 6 (a) hydroelectric
potential
(not gravitational alone as not in words in question)
chemical
solar [4]
- 7 (a) halogens [1]
- (b) gas (to liquid) to solid [1]
- (c) iodine / I₂
potassium bromide / KBr (either order) [2]
- (d) remove / destroy / kill bacteria / germs / microbes [1]
safe to drink is insufficient

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- 8 (a) (artery has) less carbon dioxide
more oxygen
more glucose
is at higher pressure } any 2
(if not stated assume answer is about artery)
- (b) (artery has) thick(er) wall
no valves
narrower lumen
more muscle tissue
more elastic tissue } any 2
(if not stated assume answer is about artery) [2]
- (c) obesity
high fat diet
lack of exercise
drinking (large amounts of) alcohol
stress } any 2 [2]
- 9 (a) (i) 0.4 [1]
(ii) 0.8 [1]
- (b) speed
strength of magnet / strong magnet
length of wire (in field)
distance between magnets } any 2
(bigger and length alone are insufficient) [2]
- 10 (a) 4 points plotted correctly = 2 (+/- ½ square) [2]
2 or 3 points plotted correctly = 1 [1]
best fit straight line (between given points)
- (b) (i) 740–760 cm³ or correct reading from graph [1]
(ii) (b) (i) × 32 = 24000 cm³ (ecf) [1]
- (c) glowing splint
relights
(result is dependent on the test) [2]
- 11 (a) oxygen
alveoli
diffusion
carbon dioxide [4]

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- (b) (expired air) more carbon dioxide
less oxygen
more water vapour
higher temperature / warmer } any 3

12 (a) any insulator e.g. rubber, plastic, wood [1]

- (b) heated air expands
becomes less dense
heated air rises
cold air falls (to replace it) } any 3 [3]

- (c) black is better absorber / good absorber
(ignore emitter) [1]

13 (a) ink is soluble in water / pencil is insoluble in water / ink would run etc. [1]

- (b) red
yellow (either order)
(list up to –2 marks) [2]

- (c) brown [1]

14 (a) C
optimum pH and temperature
most suitable / works best at pH and temperature [2]
(reason is dependent on tube letter)
tube C can be identified by stating conditions
works best at 35 °C and pH 7 = 2 marks

- (b) (i) amylase
(ii) starch
(iii) sugar / maltose / glucose [3]

15 (a) rays converge to central point
central ray does not deviate [2]
(independent marks)

- (b) (i) *i* correct
r correct [2]

- (ii) refractive index [1]

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- (iii) gamma / γ
 X rays
 ultra violet / uv
 micro(waves)
 radio(waves) } any 2

[2]

- 16 (a) protons neutrons (either order)
 electrons lost
 element isotopes
 protons electrons (either order)
 (1 mark for **each pair** of answers)

[4]

- (b) 136

[1]

- 17 (a) X on cervix

[1]

- (i) ovary

- (ii) oviduct / fallopian tube

- (iii) uterus (wall) / womb

[3]

- (c) fusion of male / sperm and female gametes / egg / nuclei
 (an indication of joining is required – meet is insufficient)

[1]

- 18 (a) arrow vertically down (anywhere on diagram)

[1]

- (b) 6.0×0.4

$$= 2.4$$

Nm

(unit is independent)

[2]

- (c) (b) / 0.6 OR force = moment / distance or variation

$$= 4.0$$

(ecf from (b))

$$(6.0 \times 0.4 = f \times 0.6 \text{ gains first mark})$$

(4 alone = 2 marks)

[2]