

**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.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

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- 1 (a) compound / made up of / consists of carbon and hydrogen only (mixture = 0) [2]
- (b) oxygen / O<sub>2</sub> [1]
- (c) (i) carbon dioxide / CO<sub>2</sub>  
water / H<sub>2</sub>O / steam (either order) [2]
- (ii) carbon monoxide / CO [1]
- (d) oxides of nitrogen / lead (compounds)  
not sulfur dioxide / carbon monoxide / carbon dioxide [1]
- 2 (a) carbon dioxide / CO<sub>2</sub>  
oxygen / O<sub>2</sub> (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<sup>2</sup> [3]  
(unit independent of answer)

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- 4 (a) B [1]
- (b) (i) C [1]
- (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 / I<sub>2</sub>  
potassium bromide / KBr (either order) [2]
- (d) remove / destroy / kill bacteria / germs / microbes  
safe to drink is insufficient [1]

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- 8 (a) (artery has) less carbon dioxide  
more oxygen  
more glucose  
is at higher pressure } any 2 [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 [2]  
(if not stated assume answer is about artery)
- (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 [2]  
(bigger and length alone are insufficient)
- 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 cm<sup>3</sup> or correct reading from graph [1]  
(ii) (b) (i) × 32 = 24000 cm<sup>3</sup> (ecf) [1]
- (c) glowing splint  
relights [2]  
(result is dependent on the test)
- 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 [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  
(independent marks) [2]

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

(ii) refractive index [1]

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- (iii) gamma /  $\gamma$   
 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)  $6.0 \times 0.4$   
 $= 2.4$   
 Nm [2]  
 (unit is independent)

- (c) (b) / 0.6 OR force = moment / distance or variation  
 $= 4.0$  [2]  
 (ecf from (b))  
 ( $6.0 \times 0.4 = f \times 0.6$  gains first mark)  
 (4 alone = 2 marks)