

MARK SCHEME for the October/November 2008 question paper

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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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

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Page 2	Mark Scheme	Syllabus
	GCE O LEVEL – October/November 2008	5129

- 1 (a) sulphur dioxide / SO_2 ;
- (b) chlorine / Cl_2 ; dna – chloride
- (c) hydrogen / H_2 ; [1]
- (d) chlorine / Cl_2 ; [1]
- (e) ammonia / NH_3 ; dna – ammonium [1]
formula must be correct
- 2 (a) 3 symbols correct for 1 mark
4 symbols correct for 2 marks
line through any symbol loses 1 mark only
(ignore switches)

1 mark for series circuit independent of symbols
(a parallel circuit loses this mark)
(voltmeter in series loses 1 mark) [3]
- (b) (i) decreases ;
(ii) decreases / dimmer / becomes dim / goes out ; [2]
- 3 (a) (i) 2 or 4 or 5 or 6 ;
(ii) 2 or 4 or 5 ;
(iii) only 7 ;
(iv) only 1 ; [4]
incorrect numbers treated as a list
- (b) (i) peristalsis ;
(ii) fibre / roughage ; [2]
- (c) dissolve sugars / named sugar ;
(enzyme) starts digestion / starch to maltose / breakdown of food ;
soften / lubricates / moistens food / makes food slippery ; } any 2

ignore – smooth, easier to swallow, keep mouth wet [2]

Page 3	Mark Scheme	Syllabus
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- 4 (a) gas **A** = oxygen / O₂ ;
gas **B** = nitrogen / N₂ ;
- (b) amount of water depends on / varies with temperature ;
allow references to changes in climate and weather conditions but humidity alone is insufficient [1]
- (c) source is **dependent** on the pollutant
- carbon monoxide ;
incomplete combustion / car exhaust / cars ;
- sulphur dioxide ;
burning fossil fuels / volcanoes ;
- oxides of nitrogen ;
car exhausts ;
- forest burning / from factories are insufficient [2]
- 5 (a) electrical / electric ; [1]
- (b) (i) $E = P \times t$ OR 100×300 ;
30 000 (J) ; (incorrect unit given loses 2nd mark)
500 (J) for 1 mark [2]
- (ii) 1 500 (J) ; (ignore any stated units) [1]
allow ecf (b) (i) to (b) (ii) if answer is positive
- 6 (a) (i) hormone / protein ;
- (ii) (dissolved) in blood / by blood / in plasma / bloodstream ;
dna (red) blood cells
- (iii) liver ; [3]
- (b) (i) pupil / iris ;
- (ii) ciliary muscles / lens / cilliary body ; [2]

Page 4	Mark Scheme	Syllabus
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- 7 (a) intense heat / high temperature (400–900°C) / catalyst ;
dna temperature alone
- (b) alkenes contain a double bond or alkanes only have single bonds
ignore references to triple bonds [1]
- (c) orange / brown / red / yellow ;
colourless ; (dna clear) [2]
- (d) many monomers / small molecules / alkenes
added / joined together } any 2
to form long chains / large molecules [2]
- 8 (a) original length **and** length with load ; [1]
- (b) 1.2 ;
6.0 ; [2]
- 9 (a) (i) amylase ; [1]
- (ii) maltose ; dna – glucose / sugar / sucrose [1]
- (b) amylase / enzyme (from seed piece spreads) ;
diffuses through jelly ; } any 2
digests / breaks down starch ; [2]
- (c) boiling denatures / damages dna killed ;
enzyme (do not award with incorrect science) ; } any 2
starch not digested / starch is present ;

enzyme alone = 0 with incorrect science [2]
- 10 (a) A – sulphuric acid / H₂SO₄ ;
B – carbon dioxide / CO₂ ;
C – copper / Cu ; [3]
- (b) iron more reactive than copper ;
silver less reactive than copper (or converse) ; [2]
iron more reactive (than silver) or converse gains 1 mark

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- 11 (a) changing ;
induces ;
complete ;
zero ; [4]
- 12 (a) (i) 1 – plants ;
3 – animals / herbivores ; dna named animals
4 – atmosphere / carbon dioxide / air ; [3]
- (ii) respiration / decay / combustion / rotting / decomposing / decomposition
dna decomposer [1]
- (b) glucose / starch / sugars / carbohydrate ; dna food [1]
- 13 (a) $a = F/m$ OR $20/5$;
 $= 4$;
 m/s^2 ; [3]
- (b) 50 ; [1]
- (c) 8 J ;; [2]
8 + wrong unit / 800 J / wrong number + J /
800 Ncm all gain 1 mark
800 alone / 800 + wrong unit both gain no marks
- 14 (a) (i) light is faster (than sound) ; [1]
- (ii) $t = \text{distance/speed}$ OR $99 / 330$
1st mark awarded for correct statement of formula
 $= 0.3\text{ s}$ [2]
- (b) No. of oscillations OR (complete) waves per second ; [1]
- (c) (i) infra-red (ir) / microwave / radar / radio(wave) ; [1]
- (ii) gamma / γ ; [1]
- 15 (a) (i) B ;
E ; [2]
- (ii) zygote ; dna embryo [1]
- (b) D – fruit (wall) / pericarp ;
E – seed ; [2]

Page 6	Mark Scheme	Syllabus
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- 16 (a) different numbers of neutrons / ^{18}O has two more neutrons / ^{16}O has two fewer neutrons / different mass / nucleon number is insufficient
- (b) same number of electrons ;
in the outer shell ;
same electronic structure = 2 [2]
- (c) 2, 6 ; [1]
- (d) six electrons in the outer shell in group 6 / six valence electrons ; [1]
- 17 (a) water ;
minerals / mineral salts ;
named mineral ; (e.g. Mg N P K nitrate phosphate) salts, ions, nutrients are insufficient [2]
- (b) thin (cell) walls ;
not waterproof / permeable / water can pass through the cell wall /
lower water potential in the cell ;
large surface (area) ; } any 2 [2]
- 18 (a) (i) perpendicular to mirror at A ; [1]
- (ii) same distance behind mirror as pin in front ;
same height above A behind the mirror ; [2]
- (iii) 32 ; [1]
- (b) entering: bends towards normal ; (vertical loses mark)
rays entering and leaving are parallel ;
(marks are independent)
straight line through block = 0 [2]

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19 (a) mass of one atom of an element ;
relative to an atom of carbon 12 ;
accept ratio of average mass of atom to $1/12^{\text{th}}$ carbon atom = 2

(b) (i) 40 ; [1]

(ii) $46 \Rightarrow 36 \therefore 4.6 \Rightarrow 3.6\text{g}$; [2]
 $1/10^{\text{th}}$ of their M_r for $2\text{H}_2\text{O}$;
or $1/5^{\text{th}}$ of their M_r for H_2O = 1

(c) universal indicator / named indicator
blue / purple / correct colour change
pH indicator – $\text{pH} > 7 = 2$ marks

incorrect test = 0 marks

blue litmus = 0 marks [2]