

MARK SCHEME for the October/November 2013 series

5129 COMBINED SCIENCE

5129/21

Paper 2 (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 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	Paper
	GCE O LEVEL – October/November 2013	5129	21

- 1 amino acids
liver
urine
excretion [4]
- 2 (a) alkali metals [1]
- (b) decreases/goes down [1]
- (c) lighted splint
explodes with a pop (result dependent on test) [2]
- (d) (i) $2\text{Rb} + \text{Cl}_2 \rightarrow 2\text{RbCl}$ [1]
- (ii) ionic [1]
- 3 (a) $Q = It$ or 0.8×600 [1]
= 480 [1]
C (unit mark independent) [1]
8 scores 1
- (b) kinetic [1]
- (c) speed = distance/time or $4.8/1.5$
= 3.2 [2]
- 4 (a) $\sin i/\sin r$ or $\sin 22/\sin 15$ [1]
= 1.4 OR 1.45 OR 1.447 [1]
- (b) 68 [1]
- (c) $3 \times 10^8/300\,000\,000$ [1]

Page 3	Mark Scheme	Syllabus	Paper
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- 5 (a) food chain A
 cow = herbivore, primary consumer
 human = carnivore, secondary consumer
- food chain B
 human = herbivore, primary consumer [6]
- (b) (i) 1%
 (ii) 10%; [2]
- (c) more energy/protein reaches the human in B than A
 in A energy is lost in supporting the cow
 example of energy loss (respiration/movement/excretion) } any 1 [2]
- 6 (a) two bonding pairs
 two lone pairs [2]
- (b) 34 78 [2]
 3.4 7.8 (divide by 10) [1]
 1.95 (divide by 4) [1]
- 7 (a) ammonium chloride
 potassium hydroxide (accept correct formula) [2]
- (b) potassium hydroxide (accept correct formula) [1]
- (c) sulphur dioxide (accept correct formula) [1]
- (d) calcium carbonate (accept correct formula) [1]
- 8 (a) opposite charges attract [1]
- (b) all same charge **or** they repel [1]
- 9 (a) (i) increases/doubles [1]
 (ii) increases/doubles [1]
- (b) no alternating/changing current
 no changing magnetic field
 no induced e.m.f. } any 2 [2]

Page 4	Mark Scheme	Syllabus	Paper
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- 10 (a) B = combustion/burning
 C = photosynthesis
 D = nutrition/feeding/eating/digestion/ingestion
 E = respiration [4]
- (b) (i) glucose
 oxygen (either order)
 carbon dioxide [3]
- (ii) night and day [1]
- 11 (a) 31, 38, 31 [3]
- (b) same number of electrons in outer shell or same electronic structure [1]
- (c) gallium/Ga [1]
- 12 (a) diagram includes rule and spring balance/newton meter/weights [2]
- (b) straight line up to 2.5 N
 then a curve [2]
- (c) 12 [1]
- 13 (a) 3 [1]
- (b) $R = V/I$ or 1.5/3 or 1.5/(a)
 = 0.5 [1]
 [1]
- 14 (a) (i) ball expands [1]
- (ii) ring contracts [1]
- (b) wood is poor conductor/good insulator [1]

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- 15 (a) (i) yeast/enzymes (do not accept other catalysts)
anaerobic/no oxygen (ignore air)
25–40°C [3]
- (ii) 2, 2 [1]
- (b) addition/hydration [1]
- (c) (i) contains double bond [1]
- (ii) (brown to) colourless/decolourises [1]
- 16 (a) $60 \times 0.8/1.2$
 $= 40$ [1]
[1]
- (b) $P = E/t$ or $150/1.25$
 $= 120$ [1]
[1]
- 17 (a) use oxygen
produce carbon dioxide
release energy [3]
- (b) carbon monoxide poisonous
sulphur dioxide acid rain } any linked
oxides of nitrogen acid rain [2]
- 18 (a) C:
A:
B: [3]
- (b) **stomach**
(chemical) digestion (of proteins)
storage of food (preventing constant ingestion)
mechanical digestion/increase of surface area/volume } any 1
mixing of food with (gastric) secretions
sterilisation of food/killing bacteria on food
absorption of small molecules e.g. glucose/alcohol [1]
- ignore reference to providing acid pH for optimum enzyme action
- pancreas**
secretion of enzymes/protease/lipase/amylase
secretion is alkaline/neutralise acidity of gastric contents } any 1
accept produces insulin/glucagon [1]

Page 6	Mark Scheme	Syllabus	Paper
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ileum

secretion of enzymes/protease/lipase/maltase
 (accept any correct enzyme)
 absorbs digested materials/provides large surface area for
 peristalsis } any 1 [1]

colon

absorption of water
 peristalsis
 production of mucus (for lubrication) } any 1 [1]

(c) (i) line labelled X ending on the liver [1]

(ii) bile emulsifies fats
 increases surface area (available for enzyme action)
 fats digested more rapidly (by lipase)
 bile is alkaline/neutralises gastric contents } any 3 [3]

19 (a) 137 [1]

(b) 56 [1]