

CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2012 series

5129 COMBINED SCIENCE

5129/22

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.

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| Page 2 | Mark Scheme | Syllabus | Paper |
|--------|-------------------------------------|----------|-------|
| | GCE O LEVEL – October/November 2012 | 5129 | 22 |

- 1 glands
blood
target
liver [4]
- 2 (a) $W = Fd$ or 2.5×2.4 [1]
= 6.0 [1]
J (unit independent) [1]
- (b) speed of rotation / falling weight }
no. turns in coil } any two
strength of magnetic field }
area of coil }
mass of weight } [2]
ignore: size of coil, bigger magnet, speed alone and weight alone
- 3 (a) arrow vertically down (anywhere on diagram) [1]
- (b) (i) P at beginning of path (above the building) [1]
(ii) K at end of path [1]
- (c) rate of change of velocity / speed } any 1
change in velocity / time } [1]
- 4 (a) 2, 8 (ignore correct charge) [1]
- (b) 80 12 [2]
8 1.2 (divide by 10) [1]
2 (divide by 4) [1]
ecf throughout
- (c) ionic / electrovalent [1]
- 5 (a) concrete expands [1]
- (b) path / concrete buckles } any 1
path / concrete cracks / breaks } [1]
ignore: destroy path / concrete

| Page 3 | Mark Scheme | Syllabus | Paper |
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| | GCE O LEVEL – October/November 2012 | 5129 | 22 |

- 6 (a) (i) A = (cell) membrane
B = cytoplasm
C = nucleus [3]
- (ii) controls / allows movement of substances into the cell } any 1
controls / allows movement of chemicals out of the cell } [1]
- (b) [Note: explanation must match the difference.
Mark difference and explanation together]
- difference no nucleus (in red blood cell)
explanation (cell can contain) more haemoglobin
 (cell can carry) more oxygen
- difference biconcave (disc) shape
explanation large surface area (per volume)
 increased uptake of oxygen (in lung capillaries)
 increased release of oxygen (in tissue capillaries)
 faster diffusion
 ignore: easier to carry oxygen } any 2
- difference flexible / small size of red blood cell
explanation cell can pass through capillaries rapidly [6]
- 7 (a) (i) gamma / γ [1]
- (ii) alpha / α [1]
- (b) neutron changes into proton / p increase by 1 and n decrease by 1
do not accept: electrons change [1]
- (c) use tongs or gloves }
keep distance from } any 2
point source away from body }
store in lead container / safely when not in use } [2]
ignore: lead suit, goggles, safety gear, protective gear
- 8 (a) magnetic materials are attracted to magnets / can be magnetised } any 1
non magnetic materials are not / cannot be magnetised } [1]

| Page 4 | Mark Scheme | Syllabus | Paper |
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| | GCE O LEVEL – October/November 2012 | 5129 | 22 |

(b) (i) steel is a hard magnetic material
 steel retains magnetism / permanent
 steel hard to magnetise
 iron is soft magnetic material
 iron easily loses magnetism / temporary
 iron easy to magnetise } any 1 [1]

(ii) no difference/ none / no effect [1]

(iii) more turns
 more current (voltage) / add more batteries [2]

(c) 0.8 [1]

9 (a) A = sulfuric (acid) / H₂SO₄
 B = water / H₂O
 C = copper / Cu [3]

(b) evaporate (some of the water) / heat / boil
 filter the crystals
 cool / crystallise } any 1 [2]
 ignore initial filtration
 evaporate to dryness max 1 mark

(c) high melting / boiling point
 conducts heat
 conducts electricity
 malleable
 ductile
 shiny
 high density
 sonorous } any 2 [2]

10 (a) a single seed may be defective / not all seeds germinate } any 1
 to give a fair test
 some seeds might not work [1]

(b) (i) add water to the cotton wool [1]

(ii) all the oxygen has been absorbed / oxygen absorber (present)
 without oxygen the cells cannot respire
respiration is necessary to release energy } any 1 [2]
energy is needed for growth / germination

(iii) temperature is too low / seeds are too cool / T is 4 °C
 reactions are too slow at low temperatures
 reference to enzymes working slowly / inactive at low T } any 1 [2]

| Page 5 | Mark Scheme | Syllabus | Paper |
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| | GCE O LEVEL – October/November 2012 | 5129 | 22 |

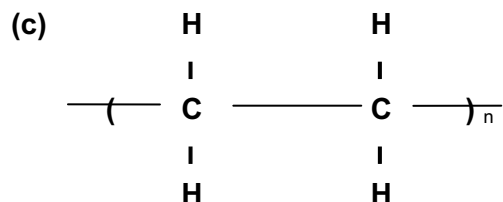
- 11 (a) (i) $I = V/R$ or $1.0/2$
 $= 0.5$ [2]
- (ii) 4.0 [1]
- (b) (i) reduced / decrease [1]
- (ii) reduced/ decrease [1]
- 12 (a) H_2 [1]
- (b) zinc has gained oxygen
steam has lost oxygen [2]
accept correct explanations in terms of electrons or oxidation states
- (c) (i) oxygen / O_2
water / H_2O [2]
accept steam / water vapour
- (ii) galvanising [1]
do not accept: sacrificial protection / electrolysis
- 13 (a) they are soluble in water
absorbed by root hair cell
diffusion
cell has large surface area (per volume)
allow reference to active transport if given
do not accept: osmosis } any 2 [2]
- (b) (i) 2200 (kg per hectare) [1]
- (ii) 80 kg per hectare gives yield of 8200 kg per hectare
40 kg per hectare gives yield of 5900 kg per hectare
 $8200 - 5900 = 2300$ kg per hectare
(allow ecf for 1 mark if calculation is correct from incorrect readings) [2]
- (iii) nitrogen (proteins) needed for growth
nitrogen needed to make amino acids / proteins [2]
- (iv) 9100 – 9200 (kg per hectare) [1]
- (c) conversion of light energy into chemical energy
production of carbohydrates / glucose
plants are source of food / energy for animals
(animals need) oxygen (to breathe / respire)
maintenance of O_2 / CO_2 balance in the atmosphere } any 2 [2]

| Page 6 | Mark Scheme | Syllabus | Paper |
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14 (a) C_nH_{2n} [1]

(b) (i) addition / reduction/ hydrogenation / redox [1]

(ii) (carbon to carbon) double bond / C=C [1]



open ended + repeat unit n times (below and after) (independent) [2]

15 (a) a blockage of the (coronary) arteries [1]

(b) high (animal) fat / cholesterol diet / obesity
 high blood pressure
 lack of exercise
 smoking
 stressful life / life-style
 family history
 diabetes

} any 2

[2]

16 (a) 1.8 [1]

(b) 9.16 [1]

17 clockwise
 anticlockwise
 anticlockwise
 horizontal / balanced

} all four correct = 2 marks
 2 or 3 correct = 1 mark

[2]

18 (a) three shared pairs
 one lone pair [2]

(b) covalent
 low
 non-metal non-metal (1 mark for both) [3]

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- 19 (a) 90 degrees to mirror where ray is incident [1]
- (b) \angle incidence = \angle reflection (approx) [1]
- (c) in approximately the correct position [1]
- 20 (a) carbon dioxide [1]
- (b) acetylene and oxygen (**both**) [1]
- (c) nitrogen [1]
- (d) sulphur dioxide [1]
accept: correct formulae