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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CAMBRIDGE
International Examinations

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
strength of magnetic field
area of coil
mass of weight
} any two **[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
change in velocity / time
} any 1 **[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
path / concrete cracks / breaks
} any 1 **[1]**
ignore: destroy path / concrete

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) } any 2
increased release of oxygen (in tissue capillaries)
faster diffusion
ignore: easier to carry oxygen

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 **[1]**
do not accept: electrons change

(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]**

(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) / H_2SO_4
B = water / H_2O
C = copper / Cu **[3]**

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

(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
to give a fair test
some seeds might not work
} any 1 **[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 <u>respire</u>
<u>respiration</u> is necessary to release energy
<u>energy</u> is needed for growth / germination
} any 1 **[2]**

(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]**

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)
} any 2
allow reference to active transport if given **[2]**
do not accept: osmosis

(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]**

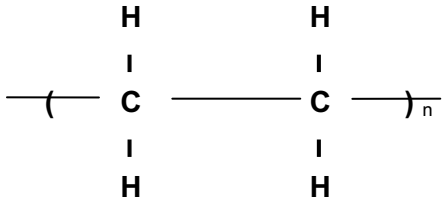
(c) conversion of light energy into <u>chemical</u> energy
production of carbohydrates / glucose
plants are source of food / energy for animals
(animals need) oxygen (to breathe / respire)
} any 2
maintenance of O_2 / CO_2 balance in the atmosphere **[2]**

14 (a) C_nH_{2n} **[1]**

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

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

(c)



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]**

19 **(a)** 90 degrees to mirror where ray is incident **[1]**

(b) < incidence = < 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