**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**GCE Ordinary Level**

# MARK SCHEME for the May/June 2009 question paper

# for the guidance of teachers

## 5129 COMBINED SCIENCE

**5129/02** 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.

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**1** **(a)** **A** = potassium hydroxide
**B** = hydrogen
**C** = potassium sulfate
**D** = ammonia **do not accept** ammonium **[**
(accept correct formulae)

**(b)** hydroxide/$OH^-$ **[1]**

**(c)** purple / violet / blue **[1]**

**2** **(a)** 20 (N) **[1]**

**(b)** **(i)** no change / none /same / 2 kg

**(ii)** less / lower / decrease / lighter **[2]**

**3** **(a)** no effect / iron attracted to magnet **[1]**

**(b)** iron retains its magnetism / soft magnetic
steel keeps its magnetism / hard magnetic
iron easier to magnetise and demagnetise = 2 **[2]**

**4** **(a)** movement of water from high water concentration / potential to a low water potential / concentration through a partial / semi-permeable membrane **[2]**

**(b)** higher water concentration in soil than in roots
(allow converse) **[1]**

**(c)** they would wilt / lose water to the soil / die
the soil has a lower water concentration **[2]**

**5** **(a)** **(i)** aluminium /A*l* **[1]**

**(ii)** aluminium / A*l* / zinc / Zn **[1]**

**(iii)** iron / Fe **[1]**

**(b)** copper / Cu
zinc / Zn (either order) **[2]**

**6** **(a)** 400

**(b)** wave drawn with half the amplitude [1]

**(c)** **(i)** Hz / Hertz / $s^{-1}$ **[1]**

**(ii)** f = 340/1.7 or speed / wavelength
= 200 **[2]**

**7** **(a)** **(i)** nucleus **[1]**

**(ii)** cell wall
vacuole
chloroplast } any 2 **[2]**

**(b)** **(i)** defence against disease / phagocytosis / antibody production / tissue rejection / kill bacteria

**(ii)** convert fibrinogen to fibrin / cause clotting

**(iii)** transport blood cells / ions / food / hormones / carbon dioxide / urea / vitamins / plasma proteins **[3]**

**8** **(a)** magnesium more reactive than hydrogen **[1]**

**(b)** lighted splint / flame
pops / explodes
(result dependent on test) **[2]**

**(c)** fuel / making margarine / making ammonia **[1]**

**(d)** **(i)** 40 **[1]**

**(ii)** $24 \rightarrow 40$
$\therefore 1.8 \rightarrow (40 \times 1.8)/24$
= 3 g **[2]**

**9** **(a)** 0.8 (V) **[1]**

**(b)** 1.2/0.2 or V/I
= 6 (Ω) **[2]**

**(c)** Q = It or 0.2 × 120
= 24
C
(0.4C gains 2 marks / 0.4 only gains 1 mark)

**10** **(a)** **(i)** vitamins / named vitamin
minerals / named mineral **[2]**

**(ii)** prevents constipation / aids peristalsis **[1]**

**(b)** **(i)** Rajiv is older / larger / male / more active **[1]**

**(ii)** Sanjay will become obese
/ named effect on health of obesity **[1]**

**11** **(a)** dissolve in water
filter
evaporate the water / heat the solution **[3]**

**12** **(a)** to mark fixed points / mark 0 °C and 100 °C
ice melts at 0 °C
water boils at 100 °C
} any 2 **[2]**

**(b)** make more narrow **[1]**

**(c)** density / colour / emf / resistance / length / pressure **[1]**

**13** **(a)** number of affected people increasing
fastest increase in 1990s
rate of increase slows (after 1998)
more women affected than men
} any 3 **[3]**

**(b)** education / make people aware
supplying free needles to drug addicts / don't share needles
use of condoms
fewer sexual partners / abstinence
} any 2 **[2]**

**(c)** sharing needles / reduced self control **[1]**

**14 (a) (i)** mass / nucleon number
proton / atomic number

**(ii)** on right of periodic table
7 electrons in outer shell
in Group VII of the periodic table
gains an electron to for a negative ion
} any 2 **[2]**

**(iii)** drawn as 2 (in inner circle) 7 (in outer circle) **[1]**

**(b) (i)** sodium fluoride (ignore $NaF_2$) **[1]**

**(ii)** ionic / electrovalent **[1]**

**15 (a)** G-M tube / geiger tube (counter) / cloud chamber / spark counter / photographic film **[1]**

**(b) (i)** gamma / $\gamma$

**(ii)** alpha / $\alpha$

**(iii)** beta / $\beta$ **[3]**

**16 (a)** E = Pt or 2000 × 1200
= 2400000
J **[3]**
(40000 J or 40 kJ gains 2 marks / 40000 gains 1 mark)

**(b)** live exposed
electrocution / electric shock / cause a fire **[2]**

**17 (a)** clear land for agriculture
clear land for houses / factories / roads
cutting trees for timber
cutting trees for fuel / burning
} any 2 **[2]**

**(b) (i)** increased $CO_2$ / reduced $O_2$ / global warming **[1]**

**(ii)** loss of food / habitat **[1]**

**(iii)** erosion / landslides / washed away **[1]**

**18 (a) (i)** cracking

**(ii)** $C_6H_{14}$

**(iii)** correct displayed structure **[1]**

**(b)** water / steam / $H_2O$ **[1]**

**(c)** solvent / fuel / constituent of wine and beer
(do not accept making alcohol) **[1]**

**19 (a)** 62 (°) **[1]**

**(b)** R I = sin *r*/sin *i* or sin r = sin *i*/1.33 or sin 28/1.33
= 0.353
*i* = 20.7 (°)
(accept answers in the range 20.49 to 20.7) **[3]**

**20 (a)** making protein / enzymes / amino acids / DNA **[1]**

**(b) (i)** pale / yellow leaves / don't look green / change colour **[1]**

**(ii)** add fertiliser **[1]**

**(c) (i)** increased population / more people / global warming **[1]**

**(ii)** energy is lost at each stage of the food chain / not all energy is transferred to the animals
animals are further along the food chain / animals eat plants / shorter food chain **[2]**