UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2010 question paper

for the guidance of teachers

0653 COMBINED SCIENCE

0653/23 Paper 23 (Core Theory), maximum raw mark 80

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1 **(a)** excretion ;
sensitivity ; [2]

(b) **(i)** tissue ; [1]

(ii) assume answer refers to onion cells
they have cell walls ;
they have, vacuoles / cell sap ; [2]

(c) **(i)** nutrients must get through wall of alimentary canal ;
ref. to absorption ;
must be broken into small molecules to allow this to happen ; [max 2]

(ii) (teeth) break down large pieces of food to small ones / increase surface area ;
(enzymes) break down large molecules of food to small ones ; [2]

[Total: 9]

2 **(a)** **(i)** period ; [1]

(ii) Ge ; [1]

(b) aluminium ;
chlorine ;
helium ; [3]

(c) **(i)** flames / energy / heat / light given off ;
white product / new substance formed ;
chlorine colour disappears ; [max 2]

(ii) potassium + chlorine $\rightarrow$ potassium chloride ; [1]

(iii) sulfur and iron cannot be simplified / iron sulfide can be simplified ;
sulfur and iron properties retained in mixture / iron sulfide has different properties (from iron and sulfur) ;
proportions of iron and sulfur are fixed in iron sulfide / can be any proportions in mixture ;
sulfur not joined to iron / only atoms of same type are bonded with each other ;
colour ; [max 2]

[Total: 10]

3 **(a)** **(i)** IR / UV / X-rays / gamma / radio / microwave ;; [2]
(one mark for any correct from list)

(ii) damages eyes / cataracts / sunburn / cancer / brain damage ; [1]

(b) **(i)** no difference ; [1]

(ii) weight is 6 times greater on Earth (accept answers showing numbers) ; [1]

(c) particle ;
vibration ; [2]

(d) work = force × distance ;
= 6 × 2 = 12 J ; [2]

[Total: 9]

4 **(a)** **(i)** age of seeds ; [1]

(ii) water ;
air / oxygen ;
warm temperature ;
any additional factors negate correct ones [3]

(b) **(i)** (young plants / seedlings) will be able to photosynthesis / allows them to grow in a space / less competition with other trees ; [1]

(ii) **D** ; [1]

(c) **(i)** (different species of trees provide) many different habitats ;
many different food sources ; [2]

(ii) increased soil erosion ;
because roots no longer hold soil in place ;
because no leaf cover to stop rain hitting soil directly ;

increased carbon dioxide in atmosphere ;
because less photosynthesis ;
if trees are burnt carbon dioxide released into the air ;

decreased rainfall ;
because less transpiration ;
so less water vapour returned to the atmosphere ;

(these are the answers I would expect them to be able to give, but accept others such as loss of soil fertility, silting of rivers and flooding)
(candidate could get all 3 marks from one idea, or from 2 or 3 ideas) [max 3]

[Total: 11]

5 **(a)** **(i)** coal / methane ;
then one from:
very long time period to form ;
has required action of pressure / heat / bacterial action ;
formed underground / under rocks / within the Earth ; [max 2]

(ii) C_2H_2 ;
hydrocarbons contain hydrogen and carbon only / are made from hydrogen and carbon ; [2]

(b) fractional distillation ;
heated ;
boiling points ; [3]

(c) **(i)** limewater ;
turns cloudy / milky ; [2]

(ii) ethanol reacts with / joins with oxygen ; [1]

[Total: 10]

6 **(a)** **(i)** ruler / metre rule ; [1]

(ii) 8 cm^3 ; [1]

(iii) density = mass / volume ;
21.6 / 8 = 2.7 g / cm^3 ; [2]

(b) liquid most particles touching and irregular arrangement ;
gas – spaces between particles and irregular arrangement ; [2]

(c) **(i)** particles slightly further apart – definitely not bigger! ; [1]

(ii) problem; e.g. bridges expand in hot weather ;
amplification; e.g. causes damage – leave gaps ; [2]

[Total: 9]

7 **(a)** → magnesium chloride ; + hydrogen ; [2]

(b) **(i)** (in experiment 2) it took a shorter time to collect the same volume / amount of gas / OWTTE ; [1]

(ii) increase the temperature (of the acid) ;
increase the concentration of the acid ;
increase the surface area of the magnesium ; [max 2]

(iii) reaction too fast / sodium too reactive ;
reference to hazard / explosion / health and safety ; [2]

[Total: 7]

8 **(a)** **(i)** resistance = PD/current ;
= 3 / 0.3 = 10 ;
Ω / ohms ; [3]

(ii) ammeter and voltmeter correctly positioned ; [1]

(b) chemical ;
electrical ;
light ;
heat ; [4]

[Total: 8]

9 **(a)** **(i)** contracts ;
ref to pumping ;
squeezes blood out of heart ; [max 2]

(ii) coronary arteries ; [1]

(iii) **C** and **D** ; [1]

(b) **(i)** loss of water from leaves ;
as water vapour ; [2]

(ii) xylem ; [1]

[Total: 7]