UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2010 question paper for the guidance of teachers

0652 PHYSICAL SCIENCE

0652/02 Paper 2 (Core Theory), maximum raw mark 80

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1 **(a)** 124 ;;
(allow 1 mark for some correct working with incorrect final answer) [2]

(b) $CuO_3 \rightarrow CuO + CO_2$; [1]

(c) **(i)** use of limewater ;
goes cloudy / white precipitate ; [2]

(ii) conducts electricity ; [1]

[Total: 6]

2 **(a)** charge moves from **A** to **B** / **A** discharges through **B** ;
current is the movement of charge ; [2]

(b) $V = IR$;
60 or .060 or 600 etc.;
correct unit mV or V ; [3]

[Total: 5]

3 **(a)** **(i)** wavelength correctly marked ; [1]

(ii) depth decreases ;
so speed reduces ;
(mention of refraction C1 if nothing else scored) [2]

(b) $f = 18/4$;
$= 4.5$ Hz ; [2]

(c) **(i)** ray from lamp to boy's eye reflecting off water **i ≈ r** ;
traced back to image ; [2]

(ii) rays do not pass through the image ; [1]
(accept cannot be cast on a screen)

[Total: 8]

4 **(a)** **(i)** hydrochloric ; [1]

(ii) hydrogen ; [1]

(iii) suitable drawing showing collection over water / in a gas syringe / by upward delivery ;
at least one correct label ; [2]

(b) RFM of zinc chloride = 136 (g) ;
mass of zinc = 130 g ; [2]

[Total: 6]

5 **(a)** **(i)** balance ;
measuring cylinder ; [2]

(ii) mass of empty cylinder (m_1) and mass of cylinder plus sea water ;
volume of water (m_2) ; [2]

(iii) mass of sea water = $m_2 - m_1$;
density = mass / volume ; [2]

(b) use of density = mass / volume ;;
V = 250 cm^3 [2]

[Total: 8]

6 **(a)** liquid is solidifying / freezing ;
(so) temperature remains constant ; [2]

(b) energy is absorbed from the surroundings ;
ice needs energy to melt ;
water absorbs energy to raise temperature only ;
(recognition that Cora's water has to melt C1) [3]

[Total: 5]

7 **(a)** sulfur dioxide ;
SO_2 ; [2]

(b) mention of acid rain ;
(mention of ozone depletion or global warning do not award this mark.)
destroys buildings, damages fish / deforestation etc. ; [2]

[Total: 4]

8

sodium	11 ;	+1 ;
aluminium ;	*13*	+3 ;
chlorine ;	17 ;	*–1*

[6]

[Total: 6]

9 **(a)** **(i)** magnetised steel / magnet (accept south pole) ; [1]

(ii) south (seeking) pole at the top and north (seeking) pole at the bottom ; [1]

(b) **(i)** a.c. supply (<u>not</u> battery) ; [1]

(ii) circuit diagram with current through the solenoid ;
controller placed in the solenoid (can be taken from the diagram) ;
reduce the current to zero / remove controller from the solenoid (with current still on) ; [3]

(iii) <u>both</u> sets of players attracted by the controller ; [1]

[Total: 7]

10 **(a)** hydrogen
advantage: no pollutants produced, etc. ;
disadvantage: expensive (to separate from water) / difficult to store, etc. ;

ethanol
advantage: few pollutants produced / renewable, etc. ;
disadvantage: CO_2 emitted / uses land available for other crops, etc. ; [4]

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

(ii) fermentation ; [1]

[Total: 6]

11 **(a)** alkanes have only single bonds (between carbon atoms) / saturated ;
alkenes have double bonds (between carbon atoms) / unsaturated ; [2]

(b) ethane ;
ethene ; [2]

(c) use of bromine (water) ;
remains unchanged with alkane ;
goes colourless with alkene ; [3]

(d) polymers / plastics ; [1]

[Total: 8]

12 (a) use of tongs / forceps / protective clothing / gloves / lead shielding / not point source;
(reject exposure time / goggles / storing in lead) ; [1]

(b) background radiation ; [1]

(c) (i) random / spontaneous nature of emissions ; [1]

(ii) beta × ;
no significant change with aluminium ;
gamma ✓ ;
count rate above background even with lead / significant amount of radiation penetrates the aluminium ; [4]

[Total: 7]

13 (a) (X) steeper curve starting at the origin ;
ending at same level ; [2]

(Y) shallower curve starting at the origin ;
ending at same level ; [2]

[Total: 4]