UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2011 question paper for the guidance of teachers

0652 PHYSICAL SCIENCE

0652/21 Paper 2 (Core Theory), maximum raw mark 80

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UNIVERSITY of CAMBRIDGE
International Examinations

1 **(a)** balance ; [1]

(b) burette ; [1]

(c) thermometer ; [1]

(d) beaker **OR** burette ; [1]

[Total: 4]

2 **(a)** 50 (m / s) ; [1]

(b) deceleration ;
constant ; [2]

(c) use of area under graph, S = ½ × 30 × 10 ;
150 (m) ; [2]
(calculation 30 × 10 = 300 m – max 1)

(d) **(i)** zero ; [1]

(ii) mention of frictional force ; [1]

(e) car **A** ;
larger gradient ;
greater acceleration ; [max 2]

[Total: 9]

3 **(a)** suitable example of ionic compound e.g. sodium chloride ;
suitable example of covalent compound e.g. ammonia ; [2]

(b) suitable example for ionic compound ;
e.g. conduct electricity when molten or in aqueous solution / giant ionic structure / high melting and boiling points / etc.

suitable example for covalent compound ;
e.g. does not conduct electricity when molten / simple molecular structure / low melting and boiling points / etc. [2]

(c) diagram showing 2 electrons in outer shell ;
3 shells with 2 electrons in first shell and 8 in middle shell ; [2]

[Total: 6]

4 **(a)** bauxite ; [1]

(b) aluminium too reactive ;
more reactive than carbon / carbon not reactive enough / will not replace carbon ; [2]

[Total: 3]

5 **(a)** **(i)** so that the mean temperature of the ice is measured ; [1]

(ii) sample is below room temperature ;
so absorbs energy from the surroundings ; [2]

(b) – 2(°C) ; [1]

(c) temperature remains constant / ice melting ;
molecules gain potential energy / bonds are broken ; [2]

[Total: 6]

6 **(a)**

name	formula	mass of 1 mole / g	
water	H_2O	**18**	;
hydrogen chloride	**HC*l***	36.5	;
sodium fluoride	**NaF**	42	;
nitrogen	N_2	**28**	;

[4]

(b) Na^+ **AND** 11 ;

F^- **AND** 9 ; [2]

[Total: 6]

7 **(a)** **(i)** 45 ; [1]

(ii) 60 ; [1]

(b) **(i)** (a fast moving) electron ; [1]

(ii) loses 1 neutron ;
gains proton ; ('neutron changes to proton' gains 2 marks)
[2]

[Total: 5]

8 **(a)** suitable advantage, e.g. no pollution, etc. ;
suitable disadvantage, e.g. needs to be made, etc. ; [2]

(b) $2H_2 + O_2 \rightarrow 2H_2O$;; [2]
(correct formulae – 1 mark and correct balancing – 1 mark)

(c) lighted splint ;
pops ; [2]

(d) **(i)** ammonia ; [1]

(ii) Haber / Haber-Bosch ; [1]

[Total: 8]

9 **(a)** the (vibrating) rubber hits air molecules ;
causing them to vibrate/forming a sound wave ; [2]
(no mention of vibration 1 max.)

(b) **(i)** same frequency (approximately) ;
smaller amplitude ; [2]

(ii) number of waves (or vibrations) per second ;
Hz or hertz ; [2]

[Total: 6]

10 **(a)** halogens ; [1]

(b) fluorine/bromine/iodine/astatine ; [1]

(c) correct use of chlorine ; [1]
e.g. water sterilization / making plastics / etc.

(d) magnesium ; [1]

(e) bubble chlorine into the solution ;
turns brown / yellow ; [2]

(f) 35 ;
36 (allow e.c.f. on number in atom, i.e. atom + 1 for a max 1) ; [2]

[Table: 8]

11 **(a)** lamp/bulb ; [1]

(b) **(i)** 20 Ω ; [1]

(ii) <u>use of</u> I = V / R (= 9 / 20) ;
= 0.45 A ; [2]

(iii) <u>use of</u> V = IR (= 0.45 × 12) ;
= 5.4 V ; [2]

[Total: 6]

12 **(a)** alkanes ; [1]

(b) propane ;
C_3H_8 ; [2]

(c) contains oxygen ;
hydrocarbons contain hydrogen and carbon only ; [2]

[Total: 5]

13 **(a)** straight lines between poles ;
all lines start on one pole and finish on the other, none touch each other ;
arrows pointing north to south ; [3]

(b) complete circuit ;
mercury is a conductor ; [2]

(c) the rod will kick ;
towards/away from the observer ; [2]

(d) kick/move in the opposite direction ; [1]

[Total: 8]