UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2007 question paper

0652 PHYSICAL SCIENCE

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

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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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1 **(a)** 20 (m/s)

(b) **(i)** constant speed or implied, e.g. continues at 20 m/s, 1

(ii) deceleration **not** accept decreasing acceleration 1
constant +1 [3]
(constant acceleration 1)

(c) use of area under graph OR speed x time OR 20 x 1.5 1
= 30 1
m 1 [3]

[Total: 7]

2 **(a)** 2 3 4 2 (accept correct multiples) 1 [1]

(b) toxic/poisonous
interferes with respiration or implied, e.g. less oxygen passed around
prevents oxygen/carbon dioxide exchange
combines with haemoglobin/red blood cells
ANY TWO 1 + 1 [2]

(c) carbon dioxide 1 [1]

[Total: 4]

3

SO_2	burning fossil fuels, etc.	acid rain/consequence	3	[3]
NO_2	car engines	acid rain/consequence	3	[3]

[Total: 6]

4 **(a)** **(i)** wavelength correctly marked 1

(ii) f = 12/5 1
= 2.4 1
Hz or per second 1 [4]

(b) **(i)** gets shorter accept wavelengths get closer together 1

(ii) remains the same 1 [2]

[Total: 6]

5 **(a)** magnesium most reactive
copper least reactive
(allow one mark if copper and magnesium reversed with zinc in middle, ignore 'in Mg^{2+} etc'.) 1

(b) $Mg + CuSO_4 \rightarrow Mg\ SO_4 + Cu$ 1 [1]

(c) no reaction/nothing/no change 1 [1]

[Total: 4]

6 **(a)** **(i)** circuit 4 1 [1]

(ii) lowest resistance +1
resistors in parallel +1*
three in parallel, lower resistance than two in parallel +1* [any 2]

(b) reading the same 1
Current the same all the way round a (series) circuit +1 [2]

(c) reading less or ½ original 1
Current splits between +1 [2]

[Total: 7]

7 **(a)** 11 1
23 1
12 or difference between RAM & proton number 1
2.8.1 (accept $1s^2\ 2s^2\ 2p^6\ 3s^1$) (ecf from proton number) 1 [4]

(b) lithium 1
Li ecf for other Group 1 elements only 1 [2]

[Total: 6]

8 **(a)** **(i)** beta (this mark can only be scored if no other radiation is stated)
betas absorbed by aluminium 1
(Not accept if either included)

(ii) alpha 1
gamma 1
alphas stopped by paper 1
gammas go through aluminium but stopped by lead 1 [6]
(If α, β and γ give 0q, 0q then mark on merit)

(b) **(i)** Use of tongs, hold away from body, wear lead apron etc. 1

(ii) Store in lead box/fireproof container/locked store 1 [2]

[Total: 8]

9 **(a)** C_2H_4 (accept correct structural formula) 1 [1]

(b) ethene is unsaturated/has a double bond 1
ethane is saturated/has only single bonds 1 [2]

(c) bromine water 1
decolourised 1
no reaction/remains brown/yellow 1 [3]

(d) polymerisation 1 [1]

[Total: 7]

10 **(a)** K is the cathode 1
cathode hot 1
emits electrons 1
A is anode/positive 1
accelerates electrons 1 [any 4]

(b) **(i)** b: greater peak to peak on trace 1

(ii) b: more waves on screen 1
thus more waves per second 1 [3]

[Total: 7]

11 **(a)** calcium carbonate
$CaCO_3$ 1

(b) **(i)** heating 1

(ii) water 1

(iii) heat/energy given out 1 [3]

(c) neutralise acid/increase pH (NOT fertiliser/to make crops grow) 1 [1]

[Total: 6]

12 **(a)** refracted towards normal (NOT along or beyond) 1
refracted away from normal at exit 1
emergent ray parallel to incident ray 1 [3]
(refraction beyond or along normal at first face only third mark can score, refraction away from normal at first face allow ecf if consistent at second face, i.e. 2nd & 3rd marks can score)

(b) **(i)** normal drawn and angle of incidence correctly marked 1

(ii) normal drawn and angle of incidence correctly marked 1 [2]

[Total: 5]

13 **(a)** kill bacteria/germs/micro-organisms 1 [1]

(b) all three correct (2 correct – 1 mark) 2 [2]
covalent
covalent
ionic

(c) **(i)** Cl^- 1

(ii) 8 1

(iii) full/complete outer shell 1
Clear that both Cl and neon have full outer shell 1 [4]
(allow 1 mark for the same number of electrons)

[Total: 7]