**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**International General Certificate of Secondary Education**

# MARK SCHEME for the October/November 2012 series

## 0652 PHYSICAL SCIENCE

**0652/61** Paper 6 (Alternative to Practical), maximum raw mark 60

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.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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**1** **(a)** **(i)** 9866, 6742, 2194 (all three) ; [1]

**(ii)** 493, 337, 109 or 110 (all correct) ; [1]

**(b)** **(i)** alpha ;
beta ; [2]

**(ii)** (sheet of) lead ; [1]

**(c)** alpha and beta (both correct) ; [1]

**(d)** (alpha and beta particles) are charged ;
alpha / one is positive **OR** beta / one is negative ;
**OR** both correct ;
(they are oppositely charged gains both marks) [max 2]

**(e)** shown on graph ;
half-life is 1600 years ; [2]

**[Total: 10]**

**2** **(a)** **(i)** 64.5 ;
59.2 ; [2]

**(ii)** (64.5 – 40 =) 24.5 ***and*** (59.2 – 40 =) 19.2 (both correct) ; [1]

**(iii)** 1/70 = 0.014 ;
1/90 = 0.011 ;
(penalise incorrect d.p. once only) [2]

**(b)** **(i)** correct plots of 4 or 5 points ;
straight line drawn ; [2]

**(ii)** *x*- and *y*- distances shown on graph ;
*y*/*x* correctly calculated (1600 to 1800) ; [2]

**(c)** 300 – gradient / 10 correctly calculated from candidate's graph (around 120 to 140), do not allow impossible masses e.g. negative ; [1]

**[Total: 10]**

**3** **(a)** same mass of soil / same volume of water ; [1]

**(b)** (from) blue ;
(to) red ; [2]

**(c)** **(i)** 4.4 ;
4.9 ;
5.2 ; [3]

**(ii)** 5.6, 5.1, 4.8 (all three, ecf) ; [1]

**(iii)** (5.6 + 5.1 + 4.8 = 15.5, 15.5/3 =) 5.17 **OR** 5.2 ; [1]

**(d)** $2 \times 0.013 \times 10 / 5.2 = 0.05$ ($mol / dm^3$) (ecf) ;
(ignore more d.p.) [1]

**(e)** the (insoluble) <u>hydroxides</u> (of the metals) are formed / owtte ; [1]

**[Total: 10]**

**4** **(a)** 54 ;
86 ; [2]

**(b)** **(i)** 6.0 cm (1)
0.3 cm ; [2]

**(ii)** 6.0 × 0.3 × 2
= 3.6 $cm^2$ (ecf) ; [2]

**(c)** 25 / 3.6 (1) = 6.9 $cm^3$ (ecf) ; [2]

**(d)** heat is given off by the reaction / the temperature rises ;
(therefore) the reaction is faster (at higher temperature) ; [2]

**[Total: 10]**

**5** **(a)** **1a** green ;
**1b** purple / blue ; [2]

**(b)** (sodium) sulfate ; [1]

**(c)** (sodium) chloride ;
(sodium) nitrate ; [2]

**(d) (i) (ii)** (litmus is blue at first and then) turns red ;
(litmus is blue at first and then) turns red ;
bubbles are given off ; [3]

**(e)** **(i)** barium sulfate ; [1]

**(ii)** a solid is formed from a solution / insoluble solid forms ; [1]

**[Total: 10]**

**6** **(a)** **(i)** heat ;
light ; (either order) [2]

**(ii)** argon **OR** inert gas ; [1]

**(b)** A and V shown in correct places in the circuit ; [1]

**(c)** 0.6 A ;
12 V ; [2]

**(d)** **(i)** 150 / 240 = 0.6(25) A ; [1]

**(ii)** the resistance must be much higher at the higher e.m.f. (because of the higher temperature) ; [1]

**(e)** heat is made (instead of light) ;
**and one of:**
so that (electrical) energy is wasted / not needed / lost ;
more energy needs to be generated / fossil fuels need to be used (to make electricity) ; [max 2]

**[Total: 10]**