**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**

International General Certificate of Secondary Education

# MARK SCHEME for the May/June 2012 question paper

# for the guidance of teachers

## 0654 CO-ORDINATED SCIENCES

**0654/52** Paper 5 (Practical), maximum raw mark 45

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.

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**1 (a)** tube **A** – no change ;
tube **B** – longer time than tube **C** ; (not greater than 600 seconds)
tube **C** – shorter time than tube **B** ; (not greater than 600 seconds)
times given in seconds ;                                                                    [4]

**(b)** fatty acids neutralise the alkali / fatty acids react with sodium carbonate ;
pH reduced to less than 8 / solution becomes acidic ;                          [2]

**(c)** bile emulsifies fat ;
increases surface area of fat ;
faster (digestion of fat) / more rapid neutralisation of sodium carbonate ;     [3]

**(d) (i)** judging the end point / lack of repeats / measuring errors / difficulty of keeping
temperature in range ;                                                          [1]

**(ii)** body temperature / optimal temperature / enzyme not denatured ;          [1]

**(e)** tube **D**: brown / orange / yellow / colour stays same as iodine ;
tube **D**: no starch ;
tube **E**: purple / lilac ;
tube **E**: protein present ;
(do not award this mark if the colour in tube **E** is incorrect)              [4]

[Total: 15]

**2** **(a)** **(i)** mass of piece of pipe, **M**, in grams to <u>1 decimal place</u> and within 20% of
supervisor ;                                                                                                     [1]

**(ii)** all 3 values of $l$, $d_e$ and $d_i$ **AND** $d_e$ greater than $d_i$ ;
clearly in cm ;                                                                                                   [2]

**(iii)** correct substitution ;
correct calculation to 2 or more significant figures ;
(a correct answer without working gains both marks)                         [2]

**(iv)** correct calculation to 2 or more significant figures;                              [1]

**(v)** use of m / v ;
correct calculation to 2 or more significant figures;                            [2]

**(vi)** if object does not have definite shape / irregular shaped object ;          [1]

**(b)** **(i)** volume of water and metal weight ;                                                        [1]

**(ii)** volume of water and metal weight and pipe ;
(this must be greater than volume in **(b)(i)**)                                        [1]

**(iii)** volume of the piece of pipe ;                                                                  [1]

**(iv)** density within 0.5 of answer in **(a)(v)** ;                                                  [1]

**(c)** **(i)** (method **1**) because rule more accurate than measuring cylinder ;      [1]

**(ii)** answer in **(b)(iv)** ×1000 ;                                                                       [1]

**[Total: 15]**

**3 (a) (i)** time 0 = start temperature recorded to nearest half a degree ; [1]

**(ii)** all readings entered to nearest half a degree ;
maximum temperature achieved no more than 1 minute beyond supervisor's time ;
temperature rise from table (within ±5 of supervisor's value) ; [3]

**(iii)** solid **A** darker grey / black / brown / pink / red ;
solution **B** paler blue / grey / colourless ; [2]

**(b) (i)** *axes*: temp vertical and time horizontal, both labelled with units ;
*scale*: linear and good use of grid ;
*points*: at least 5 correctly plotted to within ½ square within the first 3 minutes ;
*line*: smooth curve will include one maximum ; [4]

**(ii)** maximum temp rise from graph, $\Delta T$ = **max** – **start** in °C ; [1]

**(iii)** 25 × 4.2 × ans **(b)(ii)** ;
correctly worked out to 2 or more significant figures ; [2]

**(c) (i)** lid / insulate beaker ; [1]

**(ii)** in this reaction **chemical** energy has been transformed into **thermal** / **heat** energy ; (both needed for mark) [1]

[Total: 15]