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

0653 COMBINED SCIENCE

0653/63 Paper 6 (Alternative to Practical), maximum raw mark 60

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1 (a) (i) 37 °C ;
body temperature / optimal for enzymes / owtte ; [2]

(ii) 205, 217, 185 ;; [2]

(iii) 202 s ;
(allow 1 mark max in parts **(i)** and **(ii)** if times only given in minutes) [1]

(b) pink due to sodium carbonate ;
fat is digested / broken down ;
fatty acids neutralise the alkali ;
causing phenolphthalein to change colour / neutralise ; [max 2]

(c) to ensure contents / tubes reach the temperature / all tubes the same temp / body temp ; [1]

(d) EITHER
repeat with boiled / heated / denatured lipase (demonstrates it is an enzyme) ;
no change in pink colour / no reaction / very long time to change colour ;
OR
repeat with different types of fat or named fat (demonstrates it breaks down fats) ;
reaction works as before / owtte ; [max 2]

[Total: 10]

2 (a) 13.7 ; [1]

(b) (i) length (l) = 7.8 ;
external diameter, ($\mathbf{d_e}$) = 2.5 ;
internal diameter, ($\mathbf{d_i}$) = 1.8 ; [3]

(ii) $2.5^2 - 1.8^2$; (allow ecf)
= 3.01 ; [2]

(iii) – (**V**) = 3.14 × 3.01 × 7.8 ÷ 4 = ; (allow ecf)

(between) 18.1 and 18.5 ; [2]

(c) (formula used) density = mass / volume ;
0.74 ; (allow ecf from incorrect values, but **not** from incorrect formula) [2]

[Total: 10]

3 **(a)** 20.**0** ; 47.5 ; 43.5 ; (no tolerance) [3]

(b) **(i)** axes correct and both labelled with units ;
points correctly plotted ;
smooth curve through points ;
maximum ; [4]

(iii) from graph (should be about 34 but accept 32) ; [1]

(iii) substitution 25 × 4.2 × ans **(b)(iii)** ;
correctly worked out if use 34 = 3360 ; [2]

[Total: 10]

4 **(a)** **(i)** correct answers in column 3 ; [1]

time after drinking coffee / min	number of beats in 30 s	number of beats per min
0	36	**72**
5	39	**78**
10	42	**84**
15	45	**90**
20	45	**90**
25	37	**74**
30	36	**72**

(ii) suitable axes (scale and labels) ;
plotting correct ;
decent curve drawn ; [3]

(iii) correct estimate from graph (about 17.5) ; (do **not** allow range) [1]

(b) **(i)** exercise causes heart rate to increase (therefore not a fair test) ; [1]

(ii) volume of coffee ;
concentration of coffee ;
(amount of / quantity of coffee – max 1) [2]

(iii) take readings more frequently (e.g. every 2 minutes) ;
would see more clearly the peak in heart rate ;
more readings between 15 and 20 minutes ; [max 2]

[Total: 10]

5 **(a)** **(i)** 9 (cm) ; [1]

(ii) 9 × 30 = 270 ;
× 2 = 540 (m) ; [2]

(iii) allow any sensible idea, e.g. distracted / forgot / not concentrating / didn't hear correct sound owtte ;
(**NOT** just timing / experimental error) [1]

(iv) 1.76(5) ; (allow 1.76 or 1.77) [1]

(v) using <u>their</u> value from above ÷ <u>their</u> distance ;
answer ;
e.g. 540 ÷ 1.765 = 306 [2]

(vi) must comment on their value, e.g. accurate as values are close together / inaccurate as values far apart ; [1]

(b) any two of the following:
longitudinal wave ;
(requires) molecules / particles ;
closer together ; [max 2]

[Total: 10]

6 **(a)** <u>lighted</u> splint ;
pops / small explosion etc ; [2]

(b) **(i)** bubbles / gas / hydrogen floats Mg to surface / owtte ; [1]

(ii) (copper) doesn't react with <u>acid</u> ; [1]

(c) magnesium + copper produces hydrogen faster / steeper graph ;
copper acts as a catalyst / hydrogen given off faster (if say steeper graph) ; [2]

(d) some magnesium / solid remains ; [1]

(e) sketch below others ;
(and) reaches same level ; [2]

(f) connected to a syringe (labelled or graduations shown) ; [1]

[Total: 10]