

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

0654/63

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, (**d_e**) = 2.5 ;
internal diameter, (**d_i**) = 1.8 ; [3]
- (ii) $2.5^2 - 1.8^2$; (allow ecf)
= 3.01 ; [2]
- (iii) $-\text{(V)} = 3.14 \times 3.01 \times 7.8 \div 4 =$; (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 $25 \times 4.2 \times \text{ans (b)(iii)}$;
 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]

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- 5 (a) (i) 9 (cm) ; [1]
- (ii) $9 \times 30 = 270$;
 $\times 2 = 540$ (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 their value from above \div their distance ;
answer ;
e.g. $540 \div 1.765 = 306$ [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) lighted splint ;
pops / small explosion etc ; [2]
- (b) (i) bubbles / gas / hydrogen floats Mg to surface / owtte ; [1]
- (ii) (copper) doesn't react with acid ; [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]