

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International General Certificate of Secondary Education

## **MARK SCHEME for the October/November 2015 series**

### **0654 CO-ORDINATED SCIENCES**

**0654/61**

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

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- 1 (a) water (is produced / present) ; [1]
- (b) carbon dioxide (produced / present) ; [1]
- (c) control / to show that water and carbon dioxide are not present ; [1]
- (d) respiration ; [1]
- (e) heat / it gets hot ;  
light ; [2]
- (f) goggles / tie hair back / Bunsen position or safety flame ; [max 1]
- (g) (i) mass / amount of water ;  
distance to test-tube ;  
volume of water ;  
start temperature of water ;  
mass / amount of food ; [max 2]
- (ii) heat loss to air / not all energy goes to water ;  
incomplete burning ; [max 1]
- [Total: 10]**
- 2 (a) starch ; [1]
- (b) (i) burette / pipette / syringe ; [1]
- (ii) (dropping) pipette / syringe / burette / dropper ; [1]  
(*must be different to the answer to (b)(i)*)
- (c) 57 ;  
8 ;  
4 ; [3]
- (d)  $\text{Fe}^{2+}$  (*no mark if no explanation*) because it caused a faster reaction / shorter time / faster ; [1]

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(e) (i) copper ; [1]

(ii) copper hydroxide ; [1]

(f) add 1 cm<sup>3</sup> water ; [1]

[Total: 10]

3 (a) (i)  $h = 8.2$  (cm) ; [1]

(ii)  $B = 4.6$  (cm) ; [1]

(iii)  $T = 6.7$  (cm) ; [1]

(iv)  $d = 4.6 + 6.7 = 11.3$ ,  $\frac{11.3}{2} = 5.7$  (cm) ; (allow: 5.65 or ecf) [1]

(v)  $V_1 = \pi d^2 \frac{h}{4} = 3.14 \times 5.7^2 \times \frac{8.2}{4} = 209$  or 209.2 (cm<sup>3</sup>) ; [1]

(b) (i) 55 (cm<sup>3</sup>) ; [1]

(ii)  $V_2 = 250 - 55 = 195$  (cm<sup>3</sup>) ; [1]

(c) the student cannot tell when the cup is 'full' of water/owtte ;  
measuring cylinder / scale is not accurate / to 1 cm<sup>3</sup> ;  
air bubbles in the water ;  
warmer / colder affecting density ; [max 2]

(d) subtract the masses **AND** gives volume ; [1]  
(allow: subtract masses and divide by the density)

[Total: 10]

4 (a) water ;  
oxygen ;  
suitable temperature / warmth ; [max 2]

(b) (*all must extend the line*)  
dish **A**: seedling is straight / towards light ;  
dish **B**: seedling is curved to the left ;  
dish **C**: seedling is straight ; [3]

(c) phototropism ; [1]

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(d) Benedict's (and heat) ;  
red/orange/yellow/green (from blue) ; [2]

(e) demonstrates repeatability/reliability ;  
not all germinate/AW ; [2]

[Total: 10]

5 (a) tube dips into water, in suitable vessel ; [1]

(b) (i) (first signs of the) whiteness or milkiness ; [1]

(ii) 6.4 (cm<sup>3</sup>) ;  
7.7 (cm<sup>3</sup>) ;  
7.0 (cm<sup>3</sup>) ; [3]

(iii) 7(.0) or 7.03 (cm<sup>3</sup>) ; [1]

(c)  $7.03 \times \frac{0.015}{25}$  or  $7 \times \frac{0.015}{25}$  or 0.004218 ;  
0.004(2) (mol/dm<sup>3</sup>) ; [2]

(d) litmus ;  
red **to** blue ;  
**OR**  
universal indicator ;  
orange/yellow **to** green/blue/purple ;  
(allow other suitable indicator and result ;;) [max 2]

[Total: 10]

6 (a) one student times the 1-metre run and the other times the 2-metre run ;  
**OR**  
one student releases and the other times at 1 m and 2 m ; [max 1]

(b) 2.6(s) **AND** 3.5(s) recorded in correct place ; [1]

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- (c) (i)  $\frac{1}{3.5} = 0.29 \text{ (m/s)}$  ;  
 $\frac{2}{4.9} = 0.41 \text{ (m/s)}$  or  $\frac{1}{1.4} = 0.71 \text{ (m/s)}$  (so must have accelerated) ;  
**OR**  
same distance (1 m) ;  
in less time quoting 1.4 s ;  
**OR**  
correct calculation of acceleration ;; [max 2]
- (ii) height = 2 cm, average speed = 0.41 (m/s) ;  
height = 4 cm, average speed = 0.57 (m/s) ;  
height = 5 cm, average speed = 0.65 (m/s) ; [max 2]
- (d) since acceleration due to gravity is independent of mass ;  
the results will be the same ;  
**OR**  
more friction ;  
slower ; [max2]
- (e) (speeds too great) difficult to measure time / reaction time now significant ; [1]
- (f) (gravitational) potential energy **to** kinetic energy ; [1]

**[Total: 10]**