

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) 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 cm³ 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 (cm³) ; [1]

(b) (i) 55 (cm³) ; [1]

(ii) $V_2 = 250 - 55 = 195$ (cm³) ; [1]

(c) the student cannot tell when the cup is 'full' of water/owtte ;
measuring cylinder / scale is not accurate / to 1 cm³ ;
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 (cm³) ;
7.7 (cm³) ;
7.0 (cm³) ; [3]

(iii) 7(.0) or 7.03 (cm³) ; [1]

(c) $7.03 \times \frac{0.015}{25}$ or $7 \times \frac{0.015}{25}$ or 0.004218 ;
0.004(2) (mol/dm³) ; [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]