



Cambridge International Examinations
Cambridge Ordinary Level

COMBINED SCIENCES

5129/22

Paper 2 Theory

May/June 2016

MARK SCHEME

Maximum Mark: 100

Published

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- 1 (a) **A** = cell wall ;
B = vacuole ;
C = chloroplast ; [3]
- (b) difference : no chloroplasts / chlorophyll present ;
reason : cell receives no light ;
- difference : shape ;
reason : more water absorption ; [4]
- 2 (a) **A** ; [1]
- (b) **D** ; [1]
- 3 (a) chemical ;
gravitational potential / GPE ;
kinetic ; [3]
- (b) (i) 800 (W) ; [1]
- (ii) 18 (m) ; [1]
- 4 (a) **T** ; [1]
- (b) only one spot / colour (in chromatogram) ; [1]
- (c) (i) it does not dissolve / is insoluble ; [1]
- (ii) **R** ; [1]
- 5 (a) (i) 4000 (kg per hectare) ; [1]
- (ii) more fertiliser added, the greater the yield ;
effect becomes less pronounced as more is added ; [2]
- (b) any **one** from
- temperature
 - (amount of) light
 - carbon dioxide (concentration) ; [1]

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6 (a) 23.7 ; allow 23.67 [1]

(b) radiation ;
conduction ; [2]

(c) any **one** from
 • black absorbs heat
 • shiny reflects heat ; [1]

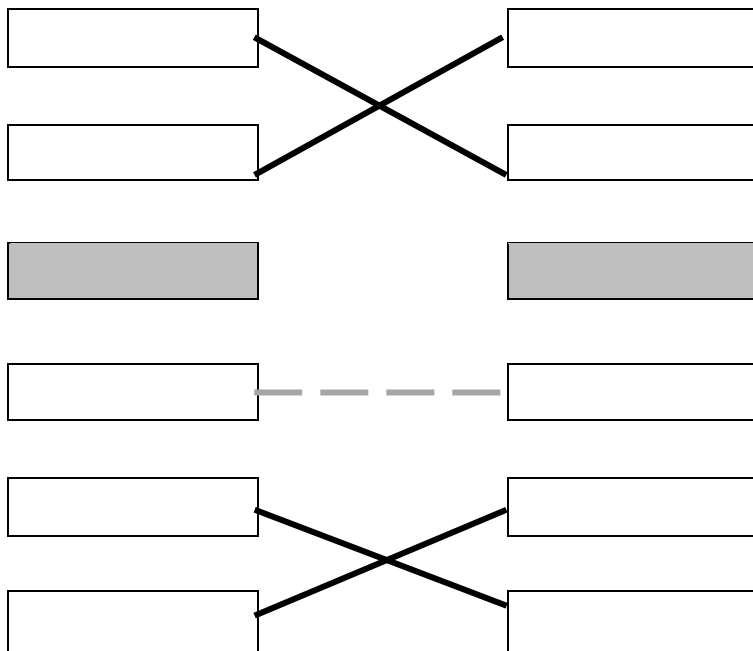
7 (a) 402 ; 32 ;
10.05 ; [3]

(b) glowing splint ;
relights ; [2]

(c) any **one** from
 • making steel
 • welding ; [1]

(d) (s) (l) (g) [1]

8



[5]

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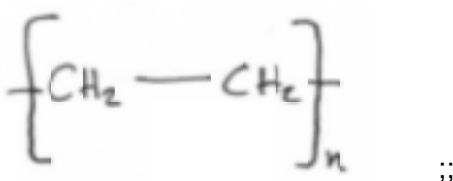
- 9 (a) line parallel to incident ray from the block ; [1]
- (b) $1.5 = \sin i / \sin r$;
 $r = 32.6$; [2]
allow $\sin r = \sin 54 / 1.5$
allow 33
- 10 (a) (i) 9 ; [1]
(ii) 19 ; [1]
- (b) 2, 7 (drawn on shells) ; [1]
- (c) (i) halogens ; [1]
(ii) decreases ; [1]
- 11 (a) (i) any **three** from
• water
• light
• temperature
• oxygen ;;; [3]
- (ii) **E** ;
G ; [2]
- (b) any **three** from
• starch stored in seed / cotyledon
• starch broken down
• (amylase) starch to glucose / maltose
• glucose / maltose soluble
• (glucose used in) respiration
• energy used for growth (during germination) ;;; [3]
- 12 (a) 30 ; [1]
- (b) (i) 1.5 ;
Volts / V ; [2]
- (ii) 20(C) ; [1]

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- (c) any **two** from
- current is the same
 - more work done (by the charge against higher resistance)
 - resistance proportional to potential difference
 - **R** has the highest resistance ;;
- [2]

- 13 (a) **A** = oxidation ;
B = polymerisation ;
C = steam / water ;
- [3]

- (b) speed up the reaction
- [1]

- (c)
- 
- [2]
- CH₂ chain open ended
 bracket showing multiple units

- 14 (a) stronger magnet ;
more coils ;
louder sound ;
- [3]
- answers must be **comparative**

- (b) (i) $v = f\lambda$;
 5.5 (m) ;
- [2]

allow $\lambda = v/f$ **or** $\lambda = 330/60$

- (ii) at least two waves drawn with
 same frequency / equal time period ;
 same amplitude ;
- [2]
- ignore extra waves
 less than two waves max 1

- 15 bacteria ;
 acid ;
 enamel ;
- [3]

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- 16 (a) 2 H₂; both required [1]
- (b) (rocket) fuel ;
making margarine ; [2]
- (c) evaporate to smaller volume ;
cool / (allow to) crystallise ; [2]

crystallisation alone is insufficient
- (d) any **two** from
 - conducts electricity
 - conducts heat
 - malleable
 - ductile
 - high melting point / high boiling point
 - high density ;;
[2]
- 17 E ;
C ;
D ; [3]
- 18 (a) any **one** from
 - like poles repel (allow repulsion)
 - align north-south when freely suspended
 - made from iron / steel (allow nickel / cobalt) ;;
[1]
- (b) any **one** from
 - induced magnetism
 - steel bar has become magnetised / a magnet ;
[1]
- (c) any **one** from
 - will not attract
 - loses magnetism more quickly ;
[1]
- 19 (a) the air ;
(cracking) hydrocarbons ; allow water / petroleum (crude oil) / named hydrocarbon [2]
- (b) iron ; allow Fe [1]
- (c) (i) hydroxide ; allow OH⁻ [1]
(ii) sulfuric acid ; allow H₂SO₄ [1]

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- 20** any **three** from
- nerve/brain damage
 - mental disorders (e.g. depression/ manias/ phobias)
 - pancreatitis/ damage to pancreas
 - liver damage/ cirrhosis
 - (Increased risk of) cancer
 - (increase risk of) heart disease
 - hypertension/ high blood pressure
 - strokes ;;;
- [3]**
- 21 (a)** 71 ;
- [1]**
- (b) (i)** beta ; allow electron
- [1]**
- (ii)** a neutron becomes a proton ;
allow number of protons increases by 1 and number of neutrons decreases by 1
- [1]**