Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

COMBINED SCIENCES **5129/22**

Paper 2 Theory **May/June 2016**

MARK SCHEME

Maximum Mark: 100

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2016 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

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]**

6 **(a)** 23.7 ; allow 23.67 **[1]**

(b) radiation ;
conduction ; **[2]**

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

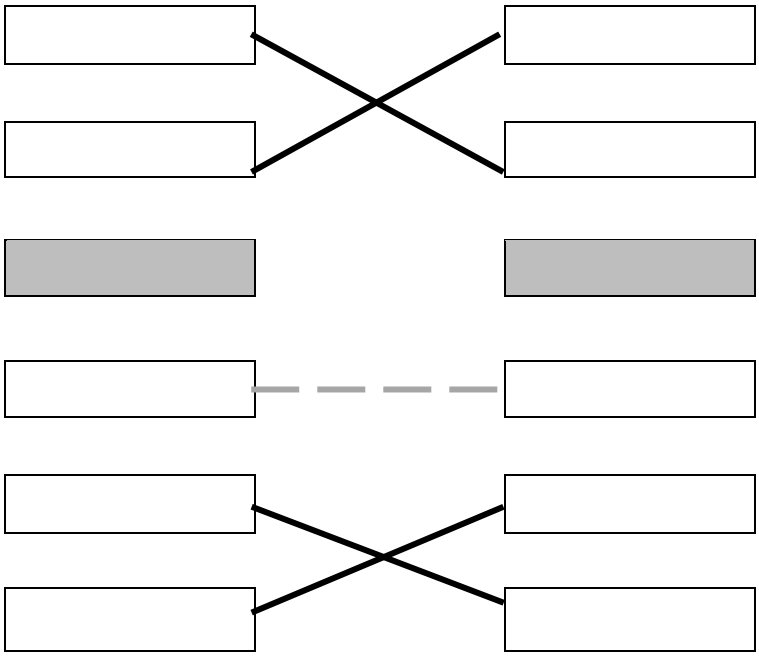
7 **(a)** 402 ; 32 ;
10.05 ; **[3]**

(b) glowing splint ;
relights ; **[2]**

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

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

8



;;;;; **[5]**

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]**

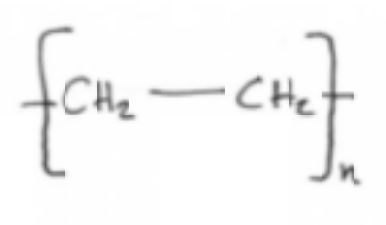
(ii) 20 (C) ; **[1]**

(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]

CH_2 chain open ended
bracket showing multiple units

14 (a) <u>stronger</u> magnet ;
<u>more</u> coils ;
<u>louder</u> sound ; **[3]**

answers must be **comparative**

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

allow λ = v / f **or** λ = 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]**

16 (a) 2 H_2 ; **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 H_2SO_4 **[1]**

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]**