



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE

0653/21

Paper 2 Core Theory

October/November 2016

MARK SCHEME

Maximum Mark: 80

Published

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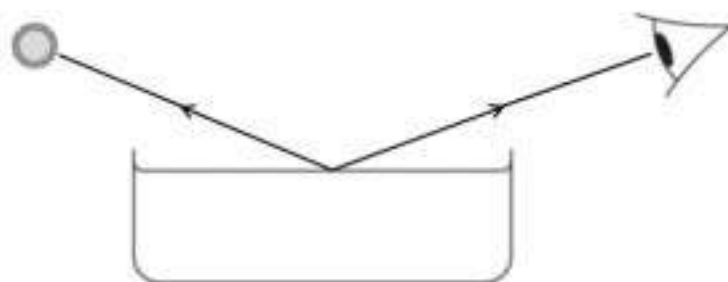
Page 2	Mark Scheme	Syllabus	Paper
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- 1 (a) (i) light/radiation (energy) ;
kinetic (energy) ; [2]
- (ii) (average) speed = distance/time OR $900/12$;
 75 (cm/s) ; [2]
- (iii) any two from:
volume/s = cross-sectional area $\times$ speed / volume = length $\times$ cross-sectional area ;
 75×10 ;
 $\times 60 \text{ (s)}$ seen ;
and
 $45\,000 \text{ cm}^3$; [3]
- (b) wind energy/hydro-power/AVA ;
use to turn a turbine (wind or water); [2]
- 2 (a) (i) electron ;
proton ; [2]
- (ii) 23 ; [1]
- (b) (i) electron loss ;
one (electron lost) ; [2]
- (ii) oxidation [1]
- (iii) exothermic [1]
- (iv) Na_2O ; [1]
- (c) (i) increases ; [1]
- (ii) decreases ; [1]

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- 3 (a) (i) oxygen ;
suitable temperature ; [2]
- (ii) geotropism ; [1]
- (b) seedlings get maximum amount of / more light ;
for photosynthesis ; [2]
- (c) (i) xylem ; [1]
- (ii) no leaves present ;
therefore no transpiration ; [2]
- (iii) any two from:
more humid ;
lower temperature ;
darker ; [2]
- 4 (a) (i) evaporation ; [1]
- (ii) infra-red ; [1]
- (iii) (thermal energy from Sun) causes water molecules to move faster / gain
more kinetic energy ;
(more) molecules moving fast enough / have enough energy to escape
(surface) ; [2]
- (iv) 10+ more molecules drawn touching below water level ;
in random arrangement ; [2]

(b)

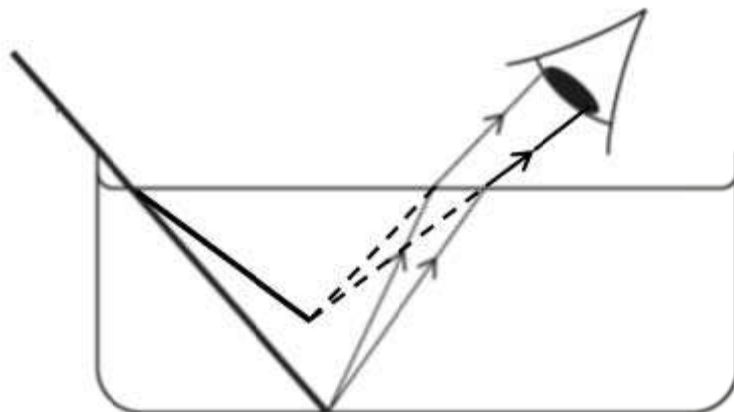


ray from Sun reflected at surface to eye ;
angles of incidence and reflection look equal (by eye) **and** (at least) one arrow ; [2]

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(c) (i) Second diverging ray refracted to eye ; [1]

(ii) rays to eye projected back and converge and image drawn ; [1]



(d) microwaves ; [1]

5 (a) (i) fractional distillation ; [1]

(ii) refinery gas / (bottled gas)

gasoline / (petrol)

(kerosine)

gas oil / (oil)

(fuel oil)

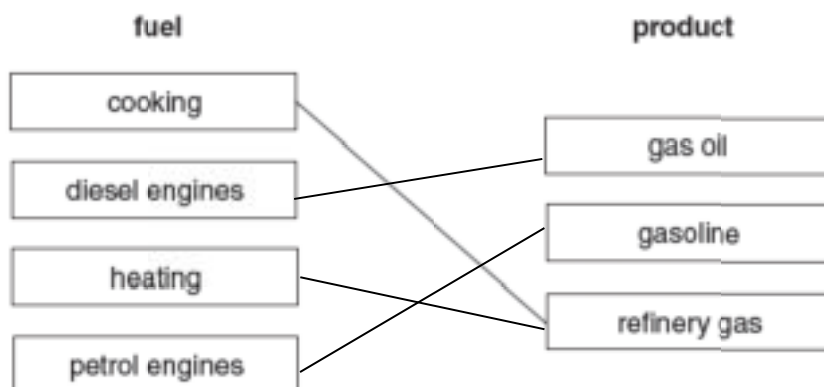
(bitumen)

;;

three correct is 2 marks, one or two correct is 1 mark

[2]

(iii)



1 mark for each correct ;;;

[3]

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- (b) (i) C=C double bond and all four C–H bonds correct ; [1]
- (ii) carbon dioxide / CO₂ ; [1]
- (iii) test: cobalt chloride (paper) ;
result: (blue to) pink ;
or
test: copper sulfate ;
result: (white / anhydrous to) blue ; [2]
- 6 (a) (i) vitamins / named vitamin ;
prevent diseases / named disease / role of named vitamin ; [2]
- (ii) respiration ; [1]
- (iii) carbohydrates, fat and protein ;;
all correct is 2 marks, two correct is 1 mark [2]
- (iv) fruit / vegetables / correctly named fruit or vegetable ; [1]
- (b) digestive ;
methane ;
greenhouse ;
global warming ; [4]
- 7 (a) electrons ;
stays the same ; [2]
- (b) (i) variable resistor ; [1]
- (ii) increase / decrease the resistance ;
decreases / increases the speed ; [2]
- (iii) correct circuit symbol connected across motor only ; [1]
- 8 (a) proton ;
metallic **and** non-metallic ;
high **and** high ; [3]
- (b) (i) iron
calcium
magnesium ;;
3 correct is 2 marks, 2 correct is 1 mark [2]
- (ii) magnesium oxide / magnesium carbonate /
magnesium hydrogen carbonate / magnesium hydroxide
/ magnesium sulfide **or** correct formula ; [1]

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(c) chlorine / Cl_2 ; [1]

9 (a) ovary correctly labelled ; [2]
oviduct correctly labelled ;

(b) (i) attaches to the wall ; [2]
of the uterus ;

(ii) rich blood supply / good source of nutrients / suitable temperature ; [1]

(c) Any two from [2]
sexual intercourse
sharing needles
blood transfusions
(from mother to baby) at birth
(from mother to baby) during breast feeding
avp ;;