



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

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**COMBINED SCIENCE**

**0653/23**

Paper 2 Core Theory

**May/June 2016**

MARK SCHEME

Maximum Mark: 80

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**Published**

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**[Turn over**

1 (a)

function	name of organ(s)
ingestion	<b>mouth ;</b>
absorption of digested food	<b>small intestine ;</b>
secrete digestive enzymes	<b>salivary glands ; small intestine ; pancreas ;</b> max 2

[4]

(b) plasma ;

[1]

(c) diffusion ;  
from high concentration to low concentration ;

[2]

(d) (i) pH 2.7 allow 0.1 pH tolerance ;

[1]

(ii) activity would disappear ;  
graph shows no activity above pH 4.5 ;

[2]

2 (a) (i) electrolysis ;

[1]

(ii) name: bromine ;  
colour: brown/orange-brown ;

[2]

(b) copper chloride → copper + chlorine ;

[1]

(c) (i) increase ;

[1]

(ii) electron ; proton ; neutron ;

[3]

(iii) no. protons + no. neutrons / number of particles in the nucleus ;

[1]

3 (a) weight / gravitational (force) ; *accept gravity*

[1]

(b) (i) *Either it does not affect the speed (no mark)*  
*weight / force / gravity acts downwards ;*  
*or it decreases the speed of the cart (no mark)*  
*due to friction / frictional forces ;*

[1]

(ii) (average) speed = distance / time (or rearranged) ;  
time = (distance / speed) = 20 / 8 = 2.5 (s)

[2]

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- (iii) horizontal straight line for constant speed /  
slightly sloping line for decreasing speed ;  
smooth sloping line (straight or curved) down to speed = 0 ; [2]
- (c) (from) potential (energy)/gravitational potential (energy) ;  
(to) thermal /heat (energy) ; [2]
- 4 (a) cell membrane ;  
ions ;  
xylem ;  
transpiration ; [4]
- (b) idea of:  
root hair cells are very delicate / fine / are easily damaged (by soil) / owtte ; [1]
- (c) (i) carbon dioxide + water ;  
(→) sugar / glucose + oxygen ; [2]
- (ii) light ;  
supply of carbon dioxide ;  
chlorophyll / chloroplasts ;  
(suitable temperature) ; [max 2]
- 5 (a) (i) fractional distillation ; [1]
- (ii) (compound / molecule) containing hydrogen and carbon ;  
only ; [2]
- (b) (i) methane ; [1]
- (ii) oxygen ; [1]
- (c) (i) C<sub>2</sub>H<sub>5</sub> correct ;  
–O–H correct ; [2]
- (ii) carbon dioxide ;  
water / steam / water vapour ; [2]
- 6 (a) thermal expansion (of sea water) ; owtte [1]
- (b) (i) evaporation ; [1]
- (ii) no effect ;  
decrease / cool ; [2]

(c) (i) radiation ; [1]

(ii)

gamma rays	X-rays		(visible) light	<b>infrared</b>		radio waves
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1. infrared ; – **must** be circled
  2. (visible) light ; – **must not** be circled
- infrared in correct space ;  
light in correct space ;

[4]

7 (a) (i)

organism	producer	consumer	herbivore	carnivore
buzzard		✓		✓
grass	✓			
snail		✓	✓	
thrush		✓		✓

one mark for each correct line ;;;

[3]

- (ii) grass → snail → thrush → buzzard  
organisms in correct order ;  
arrows in correct direction ;

[2]

(b) (i) keeping cattle / growing rice / leaving rubbish in dumps / avp ;

[1]

- (ii) it is a greenhouse gas / traps heat / infra-red radiation ;  
it contributes to global warming ;

[2]

8 (a) (i) (most reactive) calcium  
zinc  
iron  
copper ;

[1]

- (ii) bubbles of gas / fizzing / effervescence / dissolving ;

[1]

(b) (test) aqueous sodium hydroxide / aqueous ammonia ;  
(iron(II) ions) (gelatinous) green precipitate / green solid ;  
(iron(III) ions) brown precipitate / brown solid ;

[3]

(c) (i) exothermic ;

[1]

- (ii)  $1+ / +1 / \text{Na}^+ / \text{Na}^{1+}$  ;

[1]

(iii) (sodium atom) loses one / an electron ;

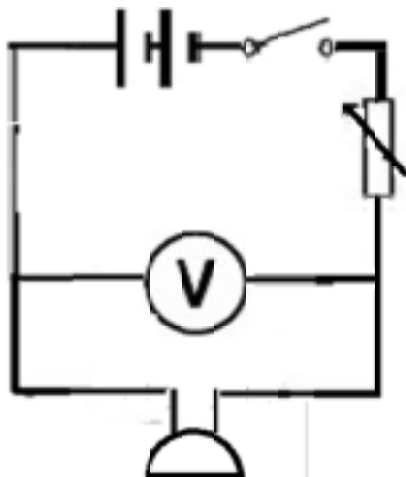
[1]

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9 (a) (i) resistor ; *accept* variable resistance / rheostat [1]

(ii) changes / varies current ;  
 changes / p.d. across the buzzer ; *owtte*  
 changes the resistance in the main circuit ; [max 2]

(iii)



ammeter symbol;  
 ammeter in series with buzzer (any correct point in circuit, *reject* if in the  
 voltmeter branch) ;  
 all else correct (ignore tiny gaps in wiring) ; [3]

(b) use of correct reading off graph at  $6\text{ V} > 0.015\text{ A}$  ;  
 resistance at  $6\text{ V} = 6 / 0.015 = 400\ (\Omega)$  ; [2]

(c) frequency unchanged / remains the same ;  
 amplitude increases ; [2]