

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International General Certificate of Secondary Education

## **MARK SCHEME for the October/November 2015 series**

### **0653 COMBINED SCIENCE**

**0653/21**

Paper 2 (Core Theory), maximum raw mark 80

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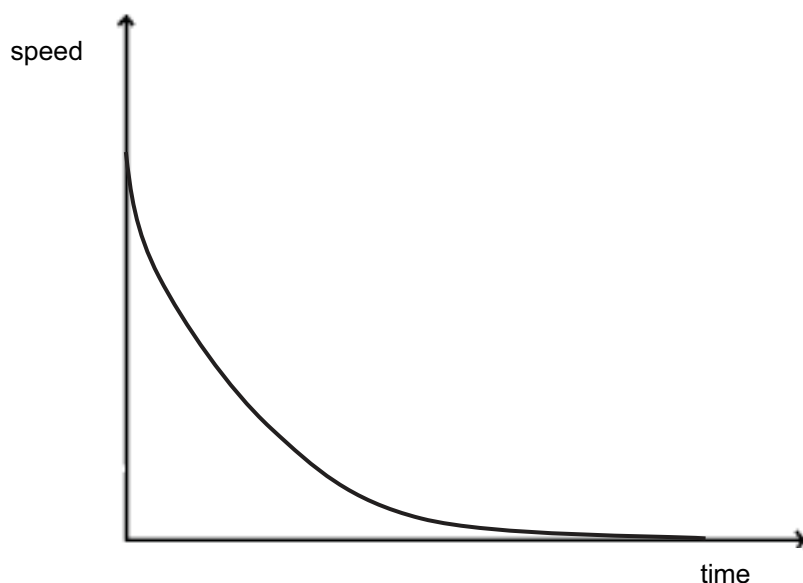
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- 1 (a) (i) **B and D** ; [1]
- (ii) **C** ; [1]
- (b) (on either cell **B** or **D** or a mixture of both) correct labelling of:  
 cell wall ;  
 vacuole ;  
 chloroplast ; [max 2]
- (c) (i) shape **X**, **AND**  
 lost less water (by transpiration) ;  
 this leaf / shoot has smaller (total) surface area ; [2]
- (ii) (*temperature*) (distance increases as) rate of transpiration increases / more  
 water lost in warmer conditions ;  
 (*humidity*) (distance increases as) rate of transpiration increases / more water  
 lost with reduced humidity ; [2]
- [Total: 8]**
- 2 (a) increases ; [1]
- (b) sodium atoms lose electrons ;  
 bromine atoms gain electrons ; [2]
- (c) (i) bromine ; [1]
- (ii) chlorine + sodium bromide → bromine + sodium chloride  
 LHS ; RHS ; [2]
- (iii) chlorine displaces bromine but iodine does not displace bromine ;  
 a more reactive halogen displaces a less reactive halogen / owtte ;  
**OR**  
 chlorine more reactive than bromine and so displaces it ;  
 iodine less reactive than bromine so does not displace it ; [max 2]
- [Total: 8]**
- 3 (a) potential (energy) **to** kinetic (energy) ; [1]
- (b) (i) weight / gravitational force ; [1]
- (ii) arrow on Fig. 3.1 pointing upwards ; [1]
- (iii) newton ; [1]

(c)



straight line/curve from higher on the y-axis with negative gradient ;  
line intersects x-axis ;

[2]

(d) any estimate less than 40 m, greater than 25 m ;  
weight of man stretching rope ;

[2]

(e) (KE causes) friction in the rope as it stretches and slackens/owtte ;

[1]

**[Total: 9]**

4 (a) (i) urethra correctly labelled ;  
prostate gland correctly labelled ;

[2]

(ii) yes, **AND**  
the sperm duct/tube ;  
on the unblocked/other side is clear ;  
idea of clear route for sperms (from testis) ;  
*allow:* idea of reduced fertility ;

[max 3]

(b) (i) days 0–5/6/7 and/or 30–35/36/37 ;  
lining of uterus is being shed/breaking down ;

[2]

(ii) day 14/15/16 ;

[1]

(iii) controlled by hormones/controlled by ovaries ;

[1]

(iv) for implantation/nourishment of embryo/ball of cells ;

[1]

**[Total: 10]**

5 (a) natural gas / biogas ; [1]

(b) (i)

<i>gases present <b>before</b> the explosion</i>	➔	<i>gases present <b>just after</b> the explosion</i>
(methane)		carbon dioxide
(oxygen)		water (vapour)
(nitrogen)		nitrogen

(all 3 correct for 2 marks, 2 correct for 1 mark)

::

[2]

(ii) exothermic ;

[1]

(c) (i)  $C_9H_{20}$  ;

[1]

(ii) covalent ;  
bonding between non-metals / electron sharing ;

[2]

(d) (i) condenses ;

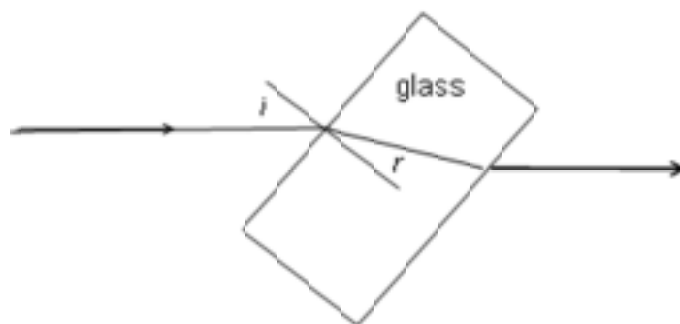
[1]

(ii) different boiling points ;

[1]

[Total: 9]

6 (a)



ray in glass bent towards normal ;  
emergent ray parallel to incident ;  
*i* and *r* clearly marked for correct angles ;

[3]

- (b) (i) ultra-violet/X-rays/gamma radiation ; [1]  
(ii) infra-red/IR ; [1]
- (c) (i) wavelength shown correctly and clearly ;  
amplitude shown correctly and clearly from x-axis to peak ; [2]  
(ii) loudness / volume ; [1]

**[Total: 8]**

7 (a)

<i>component of blood</i>	<i>function</i>
plasma	transport of oxygen
platelets	clotting of blood
red blood cells	defence against disease
white blood cells	transport of dissolved substances

(all correct for 2 marks, 2 or 1 correct for 1 mark)

;;

- (b) (i) diffusion happens from a higher to a lower concentration ; [1]  
(ii) used to react / break down glucose ;  
during respiration ; [2]  
(iii) any flight / fight / fear situation described ; [1]  
(iv) increase in pulse rate ;  
increase in blood glucose ;  
AVP ; [max 2]

**[Total: 8]**


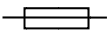

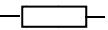
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- 8 (a) (i) flame/lighted splint ;  
explosion/‘pop’/burns with a squeaky pop ; [2]
- (ii) acid concentration decreases ;  
acid used up/not enough acid to react with all the iron ;  
rate of reaction decreases/reaction stops ; [max 2]
- (iii) silver nitrate ;  
white precipitate/owtte ; [2]
- (b) faster/more bubbling ;  
increase in temperature causes increase in rate of reaction/reaction finishes more quickly ; [2]
- (c) no reaction/bubbles ;  
copper is below hydrogen in the reactivity series/owtte ; [2]

**[Total: 10]**

- 9 (a) (i) potential difference/p.d. ; [1]
- (ii) current increases/goes up ; [1]
- (iii) meter reading increases/goes up ;  
current increases/goes up ;  
resistance decreases/goes down in a parallel circuit ; [max 2]
- (iv)  $(4 \times 2) = 8 (\Omega)$  ; [1]

(b)

<i>circuit component</i>	<i>symbol</i>
<i>direct current source</i>	
<i>fuse</i>	
<b>lamp / bulb</b>	
<i>fixed resistor</i>	

(all correct for 2 marks, 2 or 1 correct for 1 mark) [2]

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(c) (i) convection ; [1]

(ii) description / diagram of suitable apparatus ; [2]  
description of observation made that shows convection ;

**[Total: 10]**