



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education  
Advanced Subsidiary Level

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**PHYSICAL SCIENCE**

**8780/02**

Paper 2 Short Response

**For Examination from 2011**

SPECIMEN MARK SCHEME

**40 minutes**

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**MAXIMUM MARK: 30**

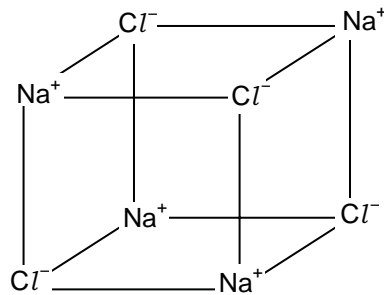
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This document consists of **3** printed pages and **1** blank page.

- 1 (a) micrometer (screw gauge)/travelling microscope [1]
- (b) either ohm-meter or voltmeter and ammeter  
or multimeter/avo on ohm setting [1]
- (c) either (calibrated) c.r.o. or a.c. voltmeter and  $\times \sqrt{2}$  [1]

2  $\text{kg m s}^{-2}$  [1]

3 (a)



ionic bonding [1]  
correct ions and shape [1]

(b) molten  $\text{NaCl}$  has mobile ions which conduct; in solid  $\text{NaCl}$  the ions are fixed in place [1]

4 (a)  $\text{C}_6\text{H}_{10}$  [1]

(b) % carbon =  $(82/72) \times 100 = 87.8\%$  [1]

5 (air) resistance increases with speed [1]  
resultant/accelerating force decreases [1]

6 (a)  $90^\circ$  [1]

(b)  $130 = F \times 0.45$  (allow e.c.f. for angle in (i)) [1]  
 $F = 290 \text{ N}$  [1]  
(allow 1 mark only if angle stated in (i) is not used in (ii))

7 (a) elimination [1]

(b) (i)  $\text{CH}_2=\text{CHCH}_2\text{CH}_3$  [1]

(ii)  $\text{CH}_2=\text{C}(\text{CH}_3)_2$  [1]

- 8 the (only) intermolecular force present is van der Waals' forces [1]  
 vdW increase with increase in number of electrons in S8 compared to C<sub>12</sub>. [1]
- 9 when a wave (front) is incident on an edge/obstacle/slit/gap [1]  
 wave 'bends' into the geometrical shadow/changes direction/spreads [1]
- 10 (a) most  $\alpha$ -particles deviated through small angles (accept 'undeviated') [1]  
 few  $\alpha$ -particles deviated through angles greater than 90°/large angles [1]
- (b) (i) allow  $10^{-9}$  m  $\rightarrow$   $10^{-11}$  m [1]  
 (ii) allow  $10^{-13}$  m  $\rightarrow$   $10^{-15}$  m [1]
- (if (i) and (ii) out of range but (ii) = (i)  $\times 10^{-4}$  or  $10^{-5}$  then allow 1 mark)  
 (if no units or wrong units but (ii) = (i)  $\times 10^{-4}$  or  $10^{-5}$  then allow 1 mark)
- 11 add aqueous silver nitrate followed by concentrated aqueous ammonia [1]  
*allow addition of aqueous chlorine*  
 off-white ppt formed which dissolves in conc ammonia [1]  
*allow red/orange colour with aqueous chlorine*  
*observations tied to correct reagents*
- 12 (a) rate = the gradient of the tangent at A [1]
- (b) graph starts at 0,0 and rises more steeply than original [1]  
 graph levels off at about  $\frac{1}{2}$  the volume of the original [1]

