Cambridge International AS Level

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PHYSICAL SCIENCE **8780/02**

Paper 2 Short Response **October/November 2017**

MARK SCHEME

Maximum Mark: 30

Published

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Question	Answer	Marks
1	*any two from:* in a gas there are negligible forces between molecules, in a liquid significant forces in a gas molecules are spaced well apart, in a liquid close together in a gas molecules are free to move, in a liquid they are constrained by other molecules	**2**

Question	Answer	Marks
2(a)	(addition) polymerisation	**1**
2(b)	(the product is) non-biodegradable / produces harmful combustion products	**1**

Question	Answer	Marks
3	resultant force AND resultant torque = 0	**1**
	forces are not aligned / there is a torque on the object	**1**

Question	Answer	Marks
4	cannot predict when a particular nucleus will decay	**1**
	decay not affected by external conditions	**1**

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Question	Answer	Marks
5(a)	a substance that increases the rate of a reaction without being consumed itself or used up OR increases rate and provides an alternate reaction pathway with a lower activation energy	**1**
5(b)	platinum / rhodium / palladium	**1**
5(c)	$2NO + 2CO \rightarrow N_2 + 2CO_2$	**1**

Question	Answer	Marks
6(a)	minimum of 5 straight vertical lines between the plates, starting and finishing on a plate and none touch / cross AND distributed evenly across full width of plate	**1**
	arrows on all given lines pointing downwards	**1**
6(b)	$5000 \div (2.0 \times 10^{-2})$	**1**
	250 000 (NC^{-1})	**1**

Question	Answer	Marks
7	$M_r(Na_2SO_4) = 142.1$ AND $M_r(H_2O) = 18$	**1**
	percentage of $Na_2SO_4 = 100 – 55.9 = 44.1\%$ AND Na_2SO_4: $\frac{44.1}{142.1}$ H_2O: $\frac{55.9}{18}$ 0.310 3.11 1 10	**1**
	x = 10	**1**

Question	Answer	Marks
8	increase in the number of protons (across the period)	**1**
	same number of shells / same amount of shielding or screening	**1**
	stronger attraction between nucleus AND electrons	**1**

Question	Answer	Marks
9	gap width between 10^{-4} to 10^{-7} AND m	**1**
	gap must be a similar size to the wavelength	**1**

Question	Answer	Marks
10(a)	**isomer A** $C_4H_{10}O$ = $(CH_3)_3COH$	**1**
10(b)	**Compound X** $C_4H_8O_2$ = $CH_3CH_2CH_2CO_2H$	**1**
	Compound Y $C_4H_8O_2$ = $(CH_3)_2CHCO_2H$	**1**
10(c)	**Compound Z** $C_4H_{10}O$ = $CH_3CH_2COCH_3$	**1**

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Question	Answer	Marks
11(a)	22.0	**1**
11(b)	$210^2 \div 22.0 / 2000$ (kW)	**1**
	400 (W)	**1**

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