

EXOTHERMIC REACTIONS, ENDOTHERMIC REACTIONS & BOND ENERGIES 1

MARK SCHEME

Q1.

Question	Answer	Extra information	Marks
(a)(i)	42 000	correct answer gains 2 marks with or without working allow 42 kJ if answer incorrect : correct substitution $500 \times 4.2 \times 20$ gains 1 mark	2
(ii)	any two from: <ul style="list-style-type: none"> • eye protection • lab coat • heat-proof mat • (heat-proof) gloves • (long) hair tied back • stand up • secure the beaker 		2
(iii)	Stir the water before measuring the temperature.		1
	Place a lid on the beaker.		1
(b)	the products → S the activation energy → Q the energy released by the reaction → P		1 1 1
Total marks			9

Q2.

Question	Answer	Extra information	Marks
(i)	(energy of) reactants greater than (energy of) products	allow converse allow (overall) energy decreases allow energy required to break bonds is less than the energy released making bonds	1
(ii)	line starting and finishing at same levels but with lower peak		1
Total marks			2

Q3.

Question	Answer	Extra information	Marks
(a)(i)	$\Delta T = (64 - 17) = 47 \text{ }^\circ\text{C}$		1
	$750 \times 4.2 \times 47$	allow ecf using their ΔT	1
	148 050	correct answer gains 3 marks with or without working ignore sign allow 148.05kJ allow 148kJ	1
(ii)	1085.7	correct answer gains 2 marks with or without working. allow answer in range 1080 – 1089 for 2 marks allow answer in range 1080000 – 1089000 for 1 mark if answer is incorrect allow $6/44 = 0.136 \text{ mol}$ for 1 mark allow $(44 \times \text{their } 7(a)(i))/(6 \times 1000)$ correctly calculated for 2 marks allow $(44 \times \text{their } 7(a)(i))/6$ correctly calculated for 1 mark If they have used the given value of 144 000: Allow any answer in range 1051 - 1059 for 2 marks with or without working.	2

		allow any answer in range 1051000 – 1059000 for 1 mark	
(iii)	repeat the experiment and then calculate the mean any one from: <ul style="list-style-type: none"> • use a lid • insulate the beaker • stir • prevent draughts 	do not allow flammable insulation	1 1
(iv)	inaccuracies likely to have similar effects	effects allow systematic errors	1
(b)(i)	8530	correct answer gains 3 marks with or without working. If answer is incorrect; (6 x 803) = 4818 gains 1 mark (8 x 464) = 3712 gains 1 mark correct addition of their calculated values gains 1 mark (ecf)	3
(ii)	(6481 – 8530) = (-)2049	ignore sign allow ecf from 7(b)(i)	1
Total marks			12

Q4.

Question	Answer	Extra information	Marks
(a)(i)	gives out as much energy / heat as A not smoky or no / less pollution	accept gives out most energy / heat ignore temperature	1 1
(ii)	2100 or 2.1kJ	ignore working	1
(b)(i)	Calories		1
(ii)	less obesity or less heart disease or so that diet can be balanced		1
Total marks			5