AQA GCSE Chemistry

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
01.1	92 kJ	allow '-92 kJ'	1	AO2 4.6.2.2
01.2	if a system is an equilibrium and a change is made to any of the conditions, the system responds to counteract the change		1	AO1 4.6.2.4
01.3	it shifts to the right		1	AO2 4.6.2.7
02.1	one O atom should have 6 dots and 2 crosses and other should have 6 crosses and 2 dots. the O atoms should be sharing 2 dots and 2 crosses		2	AO2 4.2.1.4
02.2	a reaction that transfers energy to the surroundings		1	AO1 4.5.1.1
02.3	more SO_3 is added – shifts to the left pressure is increased – shifts to the right temperature is increased – shifts to the left more O_2 is added – shifts to the right		1 1 1 1	AO2 4.6.2.5 4.6.2.6 4.6.2.7
03.1	methanol gas is the product in unsealed container, product would escape (into surroundings) therefore, forward reaction would continue (to produce methanol) or continue to completion		1 1 1	AO1 4.6.2.3
03.2	**Level 3:** Three conditions identified with matching description of how the change will affect the position of the equilibrium. Full explanation of why change occurs provided.		5-6	AO1 4.6.2.4

	Level 2: At least two conditions identified with a matching description of how the change will affect the position of the equilibrium. Attempt at explanations given, with some accurate points given.		3-4	4.6.2.5 4.6.2.6 4.6.2.7
	Level 1: At least one condition identified, thought description of how the change will affect position not given, incorrect, or incomplete. No attempt at explanation provided.		1-2	
	No relevant content		0	
	Indicative content <u>increasing total pressure:</u> • shifts the equilibrium to the right/results in a greater relative amount of product • because there is a smaller number of molecules on this side of the equation <u>decreasing temperature:</u> • shifts the equilibrium to the right/results in a greater relative amount of product • because the reaction is exothermic in the reaction shown <u>increasing the amount/concentration of the reactant:</u> • shifts equilibrium to the right/results in a greater relative amount of product until equilibrium is established again • because there is a smaller number of molecules shown in the equation on the left and the concentrations of all substances will change until equilibrium is reached again			

03.3	mass of one mole of CO = 12 + 16 = 28g 10 g of CO is $\frac{10}{28}$ = 0.3571 mol from the equation, 0.3571 moles of CO makes 0.3571 moles of methanol mass of one mole of methanol = 12 + 16 + (4 × 1) = 32 g mass of 0.3571 mol of methanol = 0.3571 × 32 = 11.4272 = 11.4 g to three significant figures		1 1 1 1 1 1	AO2 4.3.2.1 4.3.2.2
04.1	reversible	accept 'equilibrium'	1	AO1 4.6.2.1
04.2	H_2 and I_2 react together to make HI at the same rate that HI reacts to form H_2 and I_2		1	AO2 4.6.2.3
04.3	when H_2 and I_2 react to form HI energy is transferred from the surroundings/the system takes in energy from the surroundings		1 1	AO1 4.5.1.1 4.6.2.1
05.1	reactants and products can escape from the apparatus		1	AO2 4.6.2.3
05.2	Bunsen burner		1	AO1
05.3	steam/water/water vapour		1	AO2 4.6.2.2
05.4	attach bung to test tube attach delivery tube to test tube feed delivery tube into beaker in ice water		1 1 1	AO3
06.1	place it in a bigger water bath/ensure that the level of the solution is below the level of the water or stir it		1	AO3

06.2	heating the mixture shifts the equilibrium towards the blue cobalt ion solution or right hand side or product side so the reaction is endothermic in the forward direction (from left to right)		1 1	AO3 4.6.2.6
06.3	pink to blue		1	AO3 4.6.2.5
06.4	concentration of chloride ions is increased so a change occurs to counteract the change and the equilibrium shifts to the right/relative amount of product increases		1 1 1	AO2 4.6.2.5
07.1	increases the pressure so more of the colourless N_2O_4 is formed because the system is responding to counteract the change by shifting the position of the equilibrium to the side with the smaller number of molecules		1 1 1 1	AO3 4.6.2.4 4.6.2.7
07.2	the temperature of the mixture is decreased so the relative amount of product at equilibrium decreases or position of equilibrium moves to the left so the colour change gets lighter/colourless/clear		1 1 1	AO2 4.6.2.6
07.3	no effect because there are the same number of molecules shown in the equation in both the products and reactants		1 1	AO2 4.6.2.7
08.1	three (minutes) the amounts of both X and Y are constant from this time onwards		1 1	AO3

08.2	they are the same		1	AO1 4.6.2.3
08.3	forward		1	AO3 4.6.2.2
09.1	$ICl(l) + Cl_2(g) \rightleftharpoons ICl_3(s)$ **or** $ICl_3(s) \rightleftharpoons Cl_2(g) + ICl(l)$	one mark for identifying ICl and Cl_2 as the reactants one mark for state symbols one mark for reversible arrow	3	AO3 4.6.2.1
09.2	exothermic		1	AO2 4.6.2.2
09.3	ice bath reduces the temperature of the system in exothermic reaction, energy is transferred to the surroundings so increasing the temperature/minimising the change		1 1 1	AO3 4.6.2.6
10.1	ammonium chloride		1	AO3 4.6.2.1
10.2	reaction is reversible therefore, as ammonia and hydrogen chloride gases cool they react to form ammonium chloride		1 1 1	AO2 4.6.2.1
10.3	crystals turn blue		1	AO3 4.6.2.1
10.4	test tube would warm up		1	AO3 4.6.2.2

11.1	three		1	AO2 4.3.2.1
11.2	14 + (3 × 1) = 17	award two marks for correct answer with no working	1 1	AO2 4.3.1.2
11.3	$\frac{68}{17}$ = 4	award two marks for correct answer with no working	1 1	AO2 4.3.2.1
11.4	$4 \times 6.02 \times 10^{23}$ $= 2.408 \times 10^{24}$ $= 2.41 \times 10^{24}$		1 1 1	AO2 4.3.2.1
12.1	**two** from: • moves around on surface of water • fizzing • lilac/mauve/purple flame • if universal indicator has been added to the water, these is a colour change from green to purple/blue	one for each correct observation	2	AO1 4.1.2.5
12.2	lithium hydroxide hydrogen		1 1	AO1 4.1.2.5 4.4.1.2
12.3	no change		1	AO1 4.4.1.2

13.1	use a pipette to transfer the sodium hydroxide because its resolution is higher/it measures more accurately add a few drops of indicator only so it is easier to detect the colour change/to avoid wasting indicator		1 1 1 1	AO3 4.4.2.3
13.2	repeat without indicator so that the crystals are not contaminated with indicator		1 1	AO3 4.4.2.3
13.3	0.025 mol of sodium hydroxide makes 0.025 mol of sodium chloride molar mass of sodium chloride is 23 + 35.5 = 58.5 mass of 0.025 mol = 0.025 × 58.5 = 1.4625 = 1.5 (g) to two significant figures		1 1 1 1	AO2 4.3.2.1 4.3.2.2
14.1	$2SO_2$ g two		1 1 1	AO2
14.2	forward reaction		1	AO2 4.6.2.2
14.3	more energy transferred to break reactant bonds than is transferred to surroundings on formation of product bonds		1	AO3 4.5.1.3
14.4	decrease yield		1	AO2 4.6.2.6
14.5	high/increase yield		1	AO1 4.6.1.2

14.6	provides an alternative reaction pathway with a lower activation energy so more frequent collisions with enough energy to react		1 1 1	AO1 4.6.1.4
14.7	increase pressure fewer molecules in the products so equilibrium position will shift right to minimise change	accept answer that matches with student's balanced equation	1 1 1	AO1 4.6.2.7
14.8	expensive/dangerous		1	AO3