Written to the specification from Speca's own topic maps, then independently rechecked for accuracy. These are original practice questions, not past-paper questions. Spotted a mistake? Tell us at hello@speca.co.uk.

SPECA

GCSE Combined Science (AQA Trilogy) · Chemistry

The Rate and Extent of Chemical Change · Mark Scheme

For use with the Tiered Worksheet. Marking points are indicative, not exhaustive: award equivalent correct answers.

Section A: Foundation (Q1 to 10)

1) 48 ÷ 60 = 0.8 cm³/s (1); correct units shown (1) [2]

2) Any four of: concentration of reactants (in solution); pressure of reacting gases; surface area of solid reactants; temperature (1 mark each, max 4) [4]

3) Increasing concentration means more particles in the same volume (1); so particles collide more frequently, increasing the rate (1) [2]

4) A smaller piece size gives a larger surface area to volume ratio (1); more particles are exposed and available to collide, increasing collision frequency and so the rate (1) [2]

5) Increasing temperature increases collision frequency, as particles move faster (1); it also increases the energy of each collision, so a greater proportion of collisions have at least the activation energy: both effects together give temperature a larger impact on rate than the other factors (1) [2]

6) A catalyst is a substance that changes the rate of a reaction without being used up in the reaction (1); it works by providing an alternative reaction pathway with a lower activation energy, so more collisions succeed (1) [2]

7) A catalyst does not appear as a reactant or product in the equation (1) [1]

8) A reaction in which the products can react to re-form the original reactants (1); A + B ⇌ C + D (1) [2]

9) Endothermic (1); a reversible reaction that is exothermic in one direction is endothermic in the other, transferring the same amount of energy either way (1) [2]

10) The point in a closed system where the forward and reverse reactions are occurring at exactly the same rate (1); so the amounts of reactants and products remain constant (1) [2]

Section B: Higher (Q11 to 17)

11) Draw a tangent to the curve at that point in time (1); calculate the gradient of the tangent, which gives the rate of reaction at that specific moment (1) [2]

12) Gradient = 12 ÷ 8 = 1.5 cm³/s (1); this value represents the rate of reaction at t = 20 s (1) [2]

13) 0.6 ÷ 30 = 0.02 mol/s (1); correct units shown (1) [2]

14) If a system at equilibrium is subjected to a change in conditions, the system responds to counteract that change (1); shifting the position of equilibrium accordingly (1) [2]

15) Increasing temperature shifts the equilibrium in the endothermic direction (1), which is the reverse (back) reaction here, since the forward reaction is exothermic (1); so the amount of ammonia at equilibrium decreases (1) [3]

16) Increasing the concentration of nitrogen shifts the equilibrium to counteract the change, i.e. towards using up the extra nitrogen (1); so the equilibrium shifts to produce more ammonia (1) [2]

17) Increasing pressure shifts the equilibrium towards the side with fewer moles of gas (1); the products side (2 moles) has fewer than the reactants side (4 moles) (1); so the equilibrium shifts to produce more ammonia (1) [3]

Free from speca.co.uk/gcse-science-questions-by-topic. Original questions written by Speca, not past papers.
Speca is not affiliated with, endorsed by, or sponsored by AQA.

Total: 21 marks (Section A) + 16 marks (Section B) = 37 marks

Speca is an independent product and is not affiliated with, endorsed by, or sponsored by AQA. This mark scheme is originally authored by Speca and is not an AQA document.