Sulfuric Acid: Questions

1. The annual production of sulfuric acid, H_2SO_4, in the UK is 2,300,000 tonnes.

    (a) Calculate the mass of sulfur used each day to produce this acid. (Relative atomic masses: H =1, O = 16, S = 32)

    _____tonnes [4]

    (b) About 0.5% of the sulfur used escapes from the factory into the atmosphere as sulfur dioxide, SO_2. Calculate the mass of sulfur dioxide escaping each day.
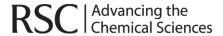
    _____tonnes [3]

2. In the catalytic converter for the manufacture of sulfuric acid there are four beds of catalyst at different temperatures. The gases pass over each catalyst bed in turn. The table gives the temperatures of the gases as they arrive and leave each bed.

Catalyst bed	Gas temperature before/°C	Gas temperature after/°C	Percentage of sulfur dioxide converted to sulfur trioxide
1	435	600	63
2	445	518	88
3	445	475	95
4	420	442	99.5

    (a) Why does the temperature rise when the gases pass through a bed of catalyst?

    _____[1]

(b) What happens to the gases between different beds of catalyst?

_____[1]

(c) The gas leaving each stage is cooler than leaving the stage before. What effect does this have on the percentage of sulfur dioxide converted into sulfur trioxide?

_____[1]

(d) The final yield of sulfuric acid could be increased by increasing the pressure. Why is this not done?

_____

_____[1]