Worksheet 6.5

The contact process

NAME: **CLASS:**

INTRODUCTION

Sulfuric acid is the most widely produced synthetic chemical in the world, and is used extensively in the manufacture of fertilisers. Other uses include the removal of rust and scale, production of paints and synthetic dyes, manufacture of explosives, soaps and detergents, and use in polymer industries. Sulfuric acid is a strong acid, a strong oxidant and an excellent dehydrating agent. For these reasons, demand for it has always been high.

No.	Question	Answer
1	Sulfuric acid has been known for hundreds of years, and was originally called 'oil of vitriol' by the alchemists of the Middle Ages. Why would the alchemists have given it this name?	
2	Rather than using elemental sulfur as a key raw material for producing sulfuric acid, most plants in Australia now use sulfur dioxide gas. State two sources of SO_2 for this industry, showing relevant equations for its production (where appropriate).	
3	Write a thermochemical equation for the converter reaction occurring in the contact process.	
4	The sulfur dioxide and air must be thoroughly cleaned and dried before they are passed over the catalyst beds. Why is this preliminary step necessary?	
5	Explain the optimal conditions of temperature and pressure to produce the maximum theoretical yield of product in the contact process.	

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No.	Question	Answer
6	In the contact process, a compromise must be made between rate and yield considerations. Describe the conditions actually used and why they are chosen.	
7	**a** Name the catalyst used in the contact process. **b** The catalyst is laid out in successive 'beds' across which the reactant gas mixture is rapidly passed. Explain why the catalyst is arranged in this manner in the context of both equilibrium and rate considerations.	
8	Explain why oleum ($H_2S_2O_7$) is generated as an intermediate step in the production of sulfuric acid, rather than the more direct hydrolysis of SO_3 with water.	
9	Using relevant equations to illustrate your answer, show why SO_2 and SO_3 are significant environmental pollutant gases.	
10	Draw a flowchart to summarise the contact process for sulfuric acid production.	