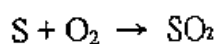


國立中央大學九十學年度碩士班研究生入學試題卷

所別: 環境工程研究所 丙組 科目: 分析化學 共 / 頁 第 / 頁

多題 20分

- Carbon dioxide dissolves in water to form carbonic acid. Calculate the pH of pure water that is in equilibrium with carbon dioxide in the atmosphere at 25°C is 0.03 atm, Henry's law constant for CO₂ is 29 atm mol⁻¹L⁻¹, and the dissociation constant in the carbonic acid-bicarbonate system is 4.45 × 10⁻⁷.
- A method sometimes suggested to ensure complete extraction of the organic pollutants from biological samples is to repeat the extraction a number of times with different solvents. What disadvantage would this technique have for the subsequent stages of the analysis?
- Indicate, by circling either T for True or F for False, whether you agree with each of the following statements:
 - The best way to analyse a mixture of H₂O and D₂O is by glc. T / F
 - If a mixture of ethane and ethene is not separating very well with argon as the carrier gas, it can be improved by switching to hydrogen. T / F
 - If you want to analyse a mixture of 1,2-, 1,3- and 1,4-dimethylbenzenes you are likely to have to use a capillary column. T / F
 - If you wanted to identify the contents of an unlabelled bottle containing a mixture of organic solvents that has been found on the street, you would use gc. T / F
- The sulfur in a 5.35 g sample of steel was burned to SO₂ in a stream of O₂. The SO₂ was in turn oxidized to sulfate in an H₂O₂ solution that contained 40.0 ml of 0.0360 N NaOH. The excess base was then titrated with 20.0 ml of 0.0320 N HCl. Calculate the percentage of sulfur in the sample. (S = 32, Na = 23) Reactions :



- Identify the oxidizing agent in each of the reactions, and write a balanced equation for its half-reaction.

