

國立中央大學 106 學年度碩士班考試入學試題

所別： 大氣科學學系大氣物理 碩士班 不分組(一般生)
大氣科學學系大氣物理 碩士班 不分組(在職生)

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科目： 普通化學

本科考試禁用計算器 須有計算過程

*請在答案卷 內作答

1. Multiple choice. Please complete this problem by matching the following chemical species to each of questions. The proper answer to each of questions may be more than one choice.

參考用

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|------------------------------------|-----------------------------------|
| (A) NO | (J) CO ₂ |
| (B) NO ₂ | (K) CH ₄ |
| (C) N ₂ O | (L) O |
| (D) HNO ₃ | (M) O ₂ |
| (E) COS | (N) O ₃ |
| (F) H ₂ S | (O) CFCs |
| (G) SO ₂ | (P) F |
| (H) H ₂ SO ₄ | (Q) Cl |
| (I) CO | (R) Non-methane organic compounds |

- (a) Which four species are the primary greenhouse gases? (5 points)
- (b) Which species can be regarded as an indicator of urban air pollution? (5 points)
- (c) Which two gases are the major anthropogenic (human-made) sources of acid rain? (5 points)
- (d) In a rain-water sample collected from a highly polluted area, what acid or acids would you expect to detect generally? (5 points)
- (e) What industrial product (products) has (have) be entirely banned in 1996 according to Montreal Protocol for saving the atmospheric ozone? (5 points)
2. On the global issue of stratospheric ozone depletion, describe why and how the atmospheric ozone is destroyed? What are the effects of the ozone depletion on the Earth? (25 points)
3. List the types of chemical bond and tell the difference. Also give some examples for each type of chemical bond. (25 points)
4. A 40.0 ml sample of 0.1 M acetic acid (CH₃COOH) solution was titrated with 0.1 M NaOH. Calculate the pH of the solution under the following conditions. (25 points)
- (a) After the addition of 10.0 ml of NaOH
- (b) After the addition of 40.0 ml of NaOH

Given $K_a = 1.754 \times 10^{-5}$ for CH₃COOH.