國立臺北教育大學106學年度碩士班考試入學招生考試

自然科學教育學系碩士班　化學　科試題

共十題，每題10分

1. Calculate the work for the expansion of an ideal gas from 2.6 to 6.0 L against a pressure of 2.0 atm at constant temperature. (10 分)

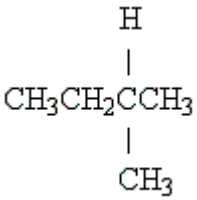
2. Which of the following molecules has a nonzero dipole moment? (10 分)
   (1) CO_2
   (2) CBr_4
   (3) SiH_4
   (4) SO_3
   (5) PCl_3

3. Write the molecular formula for a cyclic alkene having five carbon atoms. (10 分)

4. Complete the following esterification reaction: $CH_3OH + HCOOH \rightarrow$ (10 分)

5. Draw the structures of cis and trans isomers for 1,2-dichloroethene. (10 分)

6. Name the following molecule. (10 分)



7. Give the number of geometric isomers for the octahedral compound [$MA_2B_2C_2$], where A, B, and C represent ligands. (10 分)

8. When the equation $FeCr_2O_4 + K_2CO_3 + O_2 \rightarrow K_2CrO_4 + Fe_2O_3 + CO_2$ is balanced with the smallest set of integers, what is the sum of the coefficients? (10 分)

9. The color change of a chemical indicator requires an overtitration of 0.04 mL. Calculate the percent relative error if the total volume of titrate is 10.0 mL. (10 分)

10. Briefly write the principle of HPLC. (10 分)