淡江大學100學年度轉學生招生考試試題

系別：化學學系二年級　　科目：普通化學

考試日期：7月18日(星期一) 第3節　　本試題共 10 大題，　1 頁

1. (15 pts) How many orbitals can have the designation 5p, $3d_{z2}$, 4d, n = 5, n = 4?

2. (15 pts) Draw a Lewis structure that obeys the octet rule for each of the following.
   a. HCN　b NH_4^+　c. CO_2

3. (10 pts) Why must all six atoms in C_2H_4 be in the same plane?

4. (10 pts) Which charge(s) for the N_2 molecule would give a bond order of 2.5?

5. (10 pts) What are three-centered bonds?

6. (15 pts) Draw the following.
   a. *cis*-hexene　b. *cis*-2,3-dichloro-2-pentene

7. (5 pts) Which one of the following types of radiation has the shortest wavelength, the greatest energy, and the highest frequency?
   (a) ultraviolet radiation　(b) infrared radiation　(c) visible red light　(d) visible blue light　(e) microwaves

8. (5 pts) Of the following, which molecule or ion has the largest bond angle?
   (a) O_3　(b) OF_2　(c) NH_2^-　(d) H_2O　(e) C_2H_2

9. (5 pts) How many electrons are involved in pi bonding in benzene, C_6H_6?
   (a) 12　(b) 6　(c) 3　(d) 30　(e) 18

10. (10 pts) Define 'empirical formula' and 'molecular formula' of a compound.